SEQUENCE LISTING

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<120> Compositions and Methods Using Capsids Resistant to Hydrolases

<130> PCT APSE

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<151> 2013-07-24

<160> 20

<170> PatentIn version 3.5

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<213> Bacteriophage MS2

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guucgcguuu acgcggacgg ugagacugaa gauaacucau ucucuuuaaa auaucguucg 240

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aucaaguuag auggccgucu gucguaucca gcugcaaacu uccagacaac gugcaacaua 900

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cgggggugggu gugcucgaaa gagcacgggu gcgaaagcgg uccggcucca ccgaaaggug 3480

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gttcacaggc ttacaaagta acctgtagcg ttcgtcagag ctctgcgcag aatcgcaaat 180

acaccatcaa agtcgaggtg cctaaagtgg caacccagac tgttggtggt gtagagcttc 240

ctgtagccgc atggcgttcg tacttaaata tggaactaac cattccaatt ttcgctacga 300

attccgactg cgagcttatt gttaaggcaa tgcaaggtct cctaaaagat ggaaacccga 360

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Trp Ile Ser Ser Asn Ser Arg Ser Gln Ala Tyr Lys Val Thr Cys Ser
35 40 45

Val Arg Gln Ser Ser Ala Gln Asn Arg Lys Tyr Thr Ile Lys Val Glu
50 55 60

Val Pro Lys Val Ala Thr Gln Thr Val Gly Gly Val Glu Leu Pro Val
65 70 75 80

Ala Ala Trp Arg Ser Tyr Leu Asn Met Glu Leu Thr Ile Pro Ile Phe
85 90 95

Ala Thr Asn Ser Asp Cys Glu Leu Ile Val Lys Ala Met Gln Gly Leu
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Leu Lys Asp Gly Asn Pro Ile Pro Ser Ala Ile Ala Ala Asn Ser Gly
115 120 125

Ile Tyr
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gctaacgggg tcgctgaatg gatcagctct aactcgcgtt cacaggctta caaagtaacc 180

tgtagcgttc gtcagagctc tgcgcagaat cgcaaataca ccatcaaagt cgaggtgcct 240

aaagtggcaa cccagactgt tggtggtgta gagcttcctg tagccgcatg gcgttcgtac 300

ttaaatatgg aactaaccat tccaattttc gctacgaatt ccgactgcga gcttattgtt 360

aaggcaatgc aaggtctcct aaaagatgga aacccgattc cctcagcaat cgcagcaaac 420

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<223> MS2 specific packing sequence

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cacaagcggc cggcatggtc ccagcctcct cgctggcgcc ggctgggcaa cattcgtggc 120

gaatgggacc atatatatat acatgaggat tacccatgtc catgg 165

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<223> MS2 specific packing sequence

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<222> (216)..(221)
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agcggccggc atggtcccag cctcctcgct ggcgccggct gggcaacatt cgtggcgaat 180

gggaccatat atatatacat gaggattacc catgtccatg g 221

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<223> shRNA

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<223> HDV ribozyme

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<222> (147)..(165)
<223> MS2 specific packing sequence

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agcctcctcg ctggcgccgg ctgggcaaca ttcgtggcga atgggaccat tagccaagct 180

gaccctgaag ttcatctgat gagactccga attcggagtc gaaacacggt aaccgtgtca 240

tgaacttcag ggtcagcttg gcggccggca tggtcccagc ctcctcgctg gcgccggctg 300

ggcaacattc gtggcgaatg ggacccattc aaacatgagg attacccatg tcgaagccat 360

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<223> siRNA

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<222> (114)..(162)
<223> Hammerhead ribozyme

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<221> misc_feature
<222> (163)..(168)
<223> NcoI restriction site

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aagagtgaac ttcagggtca gcttgtcacc ggatgtgctc tccggtctga tgagtccgtg 180

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tggatttctc accttctgtc caaccaatct tggaaccact gtccgggcat cagtccatat 180

taaggtgccc aagctggctg ccaacaaggc aaaacttgag gaagttgctg cacgatacaa 240

ccttcaggtc cgtggtactc gaggagaaca cacagaagct gagggaggag tctatgacat 300

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gacagtggtt ccaagattgg ttggacagaa ggtgagaaat ccaagcctgt cgtcgtgaga 240

aaatggaacc ctcttctcaa tctcgttcac agctgtgacc aatcgcctgt agatctgtcc 300

aagatcacca cccatctaca tgaggatcac ccatgtgcgg ccgcgctgcc accgctgagc 360

aataactagc ataacccctt ggggcctcta aacgggtctt gaggggtttt ttgctgaaac 420

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<220>
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cctgggcatc agtccatatt aaaatacctg acccatattt taatatggac tgatgccccc 180

atattaaatc caagcctgtc gtcgccatat tgaaccctct tctcaatctc ccatattatc 240

gcctgtagat ctgtccggcc ggcatggtcc cagcctcctc gctggcgccg gctgggcaac 300

attcgtggcg aatgggacc 319

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<223> MS2 specific packing sequence

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<222> (74)..(94)
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<222> (95)..(157)
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tattaatcaa gagttaatat ggactgatgc ccttggccgg catggtccca gcctcctcgc 120

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<222> (55)..(75)
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<222> (171)..(233)
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gctgcacgat acatcaagag tgtatcgtgc agcaacttct tcataataat ggccggcatg 180

gtcccagcct cctcgctggc gccggctggg caacattcgt ggcgaatggg acc 233

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<212> DNA
<213> Artificial Sequence

<220>
<223> half looped shRNA

<220>
<221> misc_feature
<222> (1)..(6)
<223> BamHI restriction site

<220>
<221> promoter
<222> (7)..(26)
<223> T7

<220>
<221> stem_loop
<222> (27)..(45)
<223> MS2 specific packing sequence

<220>
<221> misc_RNA
<222> (46)..(66)
<223> sense strand siRNA

<220>
<221> misc_RNA
<222> (67)..(69)
<223> first half loop

<220>
<221> stem_loop
<222> (70)..(87)
<223> second MS2 specific packing sequence

<220>
<221> misc_RNA
<222> (88)..(92)
<223> second half loop

<220>
<221> misc_RNA
<222> (93)..(113)
<223> antisense strand siRNA

<220>
<221> misc_RNA
<222> (114)..(176)
<223> HDV ribozyme

<400> 16
ggatcctaat acgactcact atagggacat gaggatcacc catgtaaggg catcagtcca 60

tattaatcaa catgaggatc acccatgtag agttaatatg gactgatgcc cttggccggc 120

atggtcccag cctcctcgct ggcgccggct gggcaacatt cgtggcgaat gggacc 176

<210> 17
<211> 982
<212> DNA
<213> Artificial Sequence

<220>
<223> bacterial expression construct (E. coli)

<220>
<221> misc_feature
<222> (1)..(6)
<223> BamHI restriction site

<220>
<221> promoter
<222> (7)..(25)
<223> T7

<220>
<221> stem_loop
<222> (33)..(52)
<223> first MS2 specific packing sequence

<220>
<221> misc_feature
<222> (53)..(74)
<223> first MS2 sequence spacer

<220>
<221> gene
<222> (75)..(794)
<223> EGFP gene

<220>
<221> misc_feature
<222> (795)..(809)
<223> second MS2 sequence spacer

<220>
<221> stem_loop
<222> (810)..(828)
<223> second MS2 specific packing sequence

<220>
<221> misc_feature
<222> (829)..(843)
<223> third MS2 sequence spacer

<220>
<221> misc_RNA
<222> (844)..(906)
<223> HDV ribozyme

<220>
<221> misc_feature
<222> (907)..(914)
<223> NotI restriction site

<220>
<221> terminator
<222> (915)..(982)
<223> Transcription terminator

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acggagtttg aagcatggtg agcaagggcg aggagctgtt caccggggtg gtgcccatcc 120

tggtcgagct ggacggcgac gtaaacggcc acaagttcag cgtgtccggc gagggcgagg 180

gcgatgccac ctacggcaag ctgaccctga agttcatctg caccaccggc aagctgcccg 240

tgccctggcc caccctcgtg accaccctga cctacggcgt gcagtgcttc agccgctacc 300

ccgaccacat gaagcagcac gacttcttca agtccgccat gcccgaaggc tacgtccagg 360

agcgcaccat cttcttcaag gacgacggca actacaagac ccgcgccgag gtgaagttcg 420

agggcgacac cctggtgaac cgcatcgagc tgaagggcat cgacttcaag gaggacggca 480

acatcctggg gcacaagctg gagtacaact acaacagcca caacgtctat atcatggccg 540

acaagcagaa gaacggcatc aaggtgaact tcaagatccg ccacaacatc gaggacggca 600

gcgtgcagct cgccgaccac taccagcaga acaccccccat cggcgacggc cccgtgctgc 660

tgcccgacaa ccactacctg agcacccagt ccgccctgag caaagacccc aacgagaagc 720

gcgatcacat ggtcctgctg gagttcgtga ccgccgccgg gatcactctc ggcatggacg 780

agctgtacaa gtagacgccg gccattcaga catgaggatc acccatgtcg aagacaacaa 840

agaggccggc atggtcccag cctcctcgct ggcgccggct gggcaacatt cgtggcgaat 900

gggaccgcgg ccgcgctgcc accgctgagc aataactagc ataacccctt ggggcctcta 960

aacgggtctt gaggggtttt tt 982

<210> 18
<211> 1398
<212> DNA
<213> Artificial Sequence

<220>
<223> dicotyledenous plant expression construct

<220>
<221> misc_feature
<222> (1)..(6)
<223> BamHI restriction site

<220>
<221> promoter
<222> (7)..(18)
<223> T7

<220>
<221> misc_feature
<222> (19)..(33)
<223> first MS2 sequence spacer

<220>
<221> stem_loop
<222> (34)..(53)
<223> first MS2 specific packing sequence

<220>
<221> misc_feature
<222> (54)..(63)
<223> second MS2 sequence spacer

<220>
<221> misc_feature
<222> (64)..(139)
<223> first Carnation Italian ringspot virus sequence

<220>
<221> gene
<222> (140)..(859)
<223> EGFP gene

<220>
<221> misc_feature
<222> (860)..(1210)
<223> second Carnation Italian ringspot virus sequence

<220>
<221> misc_feature
<222> (1211)..(1225)
<223> third MS2 sequence spacer

<220>
<221> stem_loop
<222> (1226)..(1244)
<223> second MS2 specific packing sequence

<220>
<221> misc_feature
<222> (1245)..(1259)
<223> fourth MS2 sequence spacer

<220>
<221> misc_RNA
<222> (1260)..(1322)
<223> HDV ribozyme

<220>
<221> misc_feature
<222> (1323)..(1330)
<223> NotI restriction site

<220>
<221> terminator
<222> (1331)..(1398)
<223> Transcription terminator

<400> 18
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acagaaatat ctcaggattt gaccgtccgg tgagttgcgc ttatcacttg cgtaaggtat 120

ttctctcttc attgttcata tggtgagcaa gggcgaggag ctgttcaccg gggtggtgcc 180

catcctggtc gagctggacg gcgacgtaaa cggccacaag ttcagcgtgt ccggcgaggg 240

cgagggcgat gccacctacg gcaagctgac cctgaagttc atctgcacca ccggcaagct 300

gcccgtgccc tggcccaccc tcgtgaccac cctgacctac ggcgtgcagt gcttcagccg 360

ctaccccgac cacatgaagc agcacgactt cttcaagtcc gccatgcccg aaggctacgt 420

ccaggagcgc accatcttct tcaaggacga cggcaactac aagacccgcg ccgaggtgaa 480

gttcgagggc gacaccctgg tgaaccgcat cgagctgaag ggcatcgact tcaaggagga 540

cggcaacatc ctggggcaca agctggagta caactacaac agccacaacg tctatatcat 600

ggccgacaag cagaagaacg gcatcaaggt gaacttcaag atccgccaca acatcgagga 660

cggcagcgtg cagctcgccg accactacca gcagaacacc cccatcggcg acggccccgt 720

gctgctgccc gacaaccact acctgagcac ccagtccgcc ctgagcaaag accccaacga 780

gaagcgcgat cacatggtcc tgctggagtt cgtgaccgcc gccgggatca ctctcggcat 840

ggacgagctg tacaagtagg ttcgctgaaa cgagtgtaaa tctggcatag catacaggtt 900

actcttgttg ggttctagat gttatgatga cgagtcggtt cgggctccgc actaggtttg 960

gtcacctagg ggatggagat atggaaaggg tctcgtgtgc tgttagacgg tcgtaagacg 1020

cgcttgcaac atgggcctat gaccggataa gtcatagcaa tactagccaa catgaatagg 1080

attcctgttt acgaaagtta gatgtcactt gtggaaacgg acccagacac ggttgatctc 1140

accttcgggg gggctataga gatcgctgga agcactaccg gacaaccgga acattgcaga 1200

aatgcagccc acgccggcca ttcagacatg aggatcaccc atgtcgaaga caacaaagag 1260

gccggcatgg tcccagcctc ctcgctggcg ccggctgggc aacattcgtg gcgaatggga 1320

ccgcggccgc gctgccaccg ctgagcaata actagcataa ccccttgggg cctctaaacg 1380

ggtcttgagg ggtttttt 1398

<210> 19
<211> 1246
<212> DNA
<213> Artificial Sequence

<220>
<223> monocotyledenous plant expression construct

<220>
<221> misc_feature
<222> (1)..(6)
<223> BamHI restriction site

<220>
<221> promoter
<222> (7)..(24)
<223> T7

<220>
<221> misc_feature
<222> (25)..(33)
<223> first MS2 sequence spacer

<220>
<221> stem_loop
<222> (34)..(52)
<223> first MS2 specific packing sequence

<220>
<221> misc_feature
<222> (53)..(62)
<223> second MS2 sequence spacer

<220>
<221> misc_feature
<222> (63)..(139)
<223> first Carnation Italian ringspot virus sequence

<220>
<221> gene
<222> (140)..(859)
<223> EGFP coding sequence

<220>
<221> misc_feature
<222> (860)..(1058)
<223> second Carnation Italian ringspot virus sequence

<220>
<221> misc_feature

<222> (959)..(971)
<223> Maize necrotic streak virus sequence

<220>
<221> misc_feature
<222> (1059)..(1073)
<223> third MS2 sequence spacer

<220>
<221> stem_loop
<222> (1074)..(1092)
<223> second MS2 specific packing sequence

<220>
<221> misc_feature
<222> (1093)..(1107)
<223> fourth MS2 sequence spacer

<220>
<221> misc_RNA
<222> (1108)..(1170)
<223> HDV ribozyme

<220>
<221> misc_feature
<222> (1171)..(1178)
<223> NotI restriction site

<220>
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<222> (1179)..(1246)
<223> Transcription termnator

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acagaaatat ctcaggattt gaccgtccgg tgagttgcgc ttatcacttg cgtaaggtat 120

ttctctcttc attgttcata tggtgagcaa gggcgaggag ctgttcaccg gggtggtgcc 180

catcctggtc gagctggacg gcgacgtaaa cggccacaag ttcagcgtgt ccggcgaggg 240

cgagggcgat gccacctacg gcaagctgac cctgaagttc atctgcacca ccggcaagct 300

gcccgtgccc tggcccaccc tcgtgaccac cctgacctac ggcgtgcagt gcttcagccg 360

ctaccccgac cacatgaagc agcacgactt cttcaagtcc gccatgcccg aaggctacgt 420

ccaggagcgc accatcttct tcaaggacga cggcaactac aagacccgcg ccgaggtgaa 480

gttcgagggc gacaccctgg tgaaccgcat cgagctgaag ggcatcgact tcaaggagga 540

cggcaacatc ctggggcaca agctggagta caactacaac agccacaacg tctatatcat 600

ggccgacaag cagaagaacg gcatcaaggt gaacttcaag atccgccaca acatcgagga 660

cggcagcgtg cagctcgccg accactacca gcagaacacc cccatcggcg acggccccgt 720

gctgctgccc gacaaccact acctgagcac ccagtccgcc ctgagcaaag accccaacga 780

gaagcgcgat cacatggtcc tgctggagtt cgtgaccgcc gccgggatca ctctcggcat 840

ggacgagctg tacaagtagt gtctgatgat gtgaggaacg tggactgtga tgtggtggtg 900

cggtaccatg gctggtcacc atggtaatgc gtagggcaac acagttcatt aagactcact 960

gatgatggca ccagacacgg ttgatctcac cttcgggggg gctatagaga tcgctggaag 1020

cactaccgga caaccggaac attgcagaaa tgcagcccac gccggccatt cagacatgag 1080

gatcacccat gtcgaagaca acaaagaggc cggcatggtc ccagcctcct cgctggcgcc 1140

ggctgggcaa cattcgtggc gaatgggacc gcggccgcgc tgccaccgct gagcaataac 1200

tagcataacc ccttggggcc tctaaacggg tcttgagggg tttttt 1246

<210> 20
<211> 1774
<212> DNA
<213> Artificial Sequence

<220>
<223> mammalian expression construct

<220>
<221> misc_feature
<222> (1)..(6)
<223> BamHI restriction site

<220>
<221> promoter
<222> (7)..(24)
<223> T7

<220>
<221> misc_feature
<222> (25)..(33)
<223> first MS2 sequence spacer

<220>
<221> stem_loop
<222> (34)..(52)
<223> first MS2 specific packing sequence

<220>
<221> misc_feature
<222> (53)..(62)
<223> second MS2 sequence spacer

<220>
<221> misc_feature
<222> (63)..(561)
<223> Encephalomyocarditis virus IRES sequence

<220>
<221> gene
<222> (562)..(1343)
<223> EGFP gene

<220>
<221> polyA_signal
<222> (1344)..(1586)
<223> SV40 late poly(A) signal sequence

<220>
<221> misc_feature
<222> (1587)..(1601)
<223> third MS2 sequence spacer

<220>
<221> stem_loop
<222> (1602)..(1620)
<223> second MS2 specific packing sequence

<220>
<221> misc_feature
<222> (1621)..(1635)
<223> fourth MS2 sequence spacer

<220>
<221> misc_RNA
<222> (1636)..(1698)
<223> HDV ribozyme

<220>
<221> misc_feature
<222> (1699)..(1706)
<223> NotI restriction site

<220>
<221> terminator
<222> (1707)..(1774)
<223> Transcription terminator

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atatgttatt ttccaccata ttgccgtctt ttggcaatgt gagggcccgg aaacctggcc 180

ctgtcttctt gacgagcatt cctaggggtc tttcccctct cgccaaagga atgcaaggtc 240

tgttgaatgt cgtgaaggaa gcagttcctc tggaagcttc ttgaagacaa acaacgtctg 300

tagcgaccct ttgcaggcag cggaaccccc cacctggcga caggtgcctc tgcggccaaa 360

agccacgtgt ataagataca cctgcaaagg cggcacaacc ccagtgccac gttgtgagtt 420

ggatagttgt ggaaagagtc aaatggctct cctcaagcgt attcaacaag gggctgaagg 480

atgcccagaa ggtaccccat tgtatgggat ctgatctggg gcctcggtgc acatgcttta 540

catgtgttta gtcgaggtta aaaaacgtct aggcccccg aaccacgggg acgtggtttt 600

cctttgaaaa acacgatgat aatatggtga gcaagggcga ggagctgttc accggggtgg 660

tgcccatcct ggtcgagctg gacggcgacg taaacggcca caagttcagc gtgtccggcg 720

agggcgaggg cgatgccacc tacggcaagc tgaccctgaa gttcatctgc accaccggca 780

agctgcccgt gccctggccc accctcgtga ccaccctgac ctacggcgtg cagtgcttca 840

gccgctaccc cgaccacatg aagcagcacg acttcttcaa gtccgccatg cccgaaggct 900

acgtccagga gcgcaccatc ttcttcaagg acgacggcaa ctacaagacc cgcgccgagg 960

tgaagttcga gggcgacacc ctggtgaacc gcatcgagct gaagggcatc gacttcaagg 1020

aggacggcaa catcctgggg cacaagctgg agtacaacta caacagccac aacgtctata 1080

tcatggccga caagcagaag aacggcatca aggtgaactt caagatccgc cacaacatcg 1140

aggacggcag cgtgcagctc gccgaccact accagcagaa cacccccatc ggcgacggcc 1200

ccgtgctgct gcccgacaac cactacctga gcacccagtc cgccctgagc aaagacccca 1260

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gcatggacga gctgtacaag tagttctaga gcggccgctt cgagcagaca tgataagata 1380

cattgatgag tttggacaaa ccacaactag aatgcagtga aaaaaatgct ttatttgtga 1440

aatttgtgat gctattgctt tatttgtaac cattataagc tgcaataaac aagttaacaa 1500

caacaattgc attcatttta tgtttcaggt tcaggggggag gtgtgggagg ttttttaaag 1560

caagtaaaac ctctacaaat gtggtaacgc cggccattca gacatgagga tcacccatgt 1620

cgaagacaac aaagaggccg gcatggtccc agcctcctcg ctggcgccgg ctgggcaaca 1680

ttcgtggcga atgggaccgc ggccgcgctg ccaccgctga gcaataacta gcataacccc 1740

ttggggcctc taaacgggtc ttgaggggtt tttt 1774