SEQUENCE LISTING

<110> INTREXON CORPORATION
PRECIGEN, INC.
BROUGH, DOUGLAS
BOLINGER, CHERYL
YARLAGADDA, RAMYA
KURELLA, VINODHBABU
PRABAKARAN, PONRAJ
METENOU, SIMON
DING, KUAN-FU

<120> HUMAN PAPILLOMAVIRUS VACCINES AND USES OF THE SAME

<130> 2584.156PC01

<150> US 62/639,354
<151> 2018-03-06

<160> 147

<170> PatentIn version 3.5

<210> 1
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus pIX fragment nucleotides

<400> 1
agctctttgg tggcgagcgg cgcggcctct 30

<210> 2
<211> 439
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus DNA polymerase fragment nucleotides

<400> 2
aacatcaata cctcaaagtc atggtcaggg acactttcgc cctcacccac acctccctcc 60

gcaaggcggc gcaggcctac gcgctgcccg tggagaaggg ctgttgcccc taccaggccg 120

tcaaccagtt ctacatgcta ggctcttacc gttcggacac ggacgggttt cccctccaag 180

agtactggaa agaccgcgaa gagttcgtcc tcaaccgcga gctgtggaaa aagaaggggg 240

aggataagta tgacatcatc cgcgagaccc tcgactactg cgcgctcgac gtccaggtca 300

ccgccgagct ggtgcacaag ctgcgcgagt cctacgcctc cttcgtcagg gactcggtgg 360

gcttgcaaga agcaagcttc aacgtcttcc agcggcccac catctcctcc aactcccatg 420

ccatcttcag gcagatcgc 439

<210> 3
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus penton base protein fragment nucleotides

<400> 3
actgaggctg cggctaaggc tgaggtcgaa gcca 34

<210> 4
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus hexon protein fragment nucleotides

<400> 4
ataggtgtgg atgccacaca ggcgggagat aaccctatat atgct 45

<210> 5
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus fiber protein fragment nucleotides

<400> 5
gtagcaggcc ccctagctgt ggccaatggc 30

<210> 6
<211> 399
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus pIX nucleotides

<400> 6
atgagcgaca ccggcaacag ctttgatgga agcatcttta gcccctatct gacagtgcgc 60

atgcctcact gggctggagt gcgtcagaat gtgatgggtt ccaacgtgga tggacgcccc 120

gttctgcctt caaattcgtc tacaatggcc tacgcgaccg tgggaggaac tccgctggac 180

gccgcgacct ccgccgccgc ctccgccgcc gccgcgaccg cgcgcagcat ggctacggac 240

ctttacagct ctttggtggc gagcggcgcg gcctctcgcg cgtctgctcg ggatgagaaa 300

ctgaccgctc tgctgcttaa actggaagac ttgacccggg agctgggtca actgacccag 360

caggtctcca gcttgcgtga gagcagcctt gcctccccc 399

<210> 7
<211> 3168
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus DNA polymerase nucleotides

<400> 7
atggacagct ccaatgtgcg cgatgtcgtc atcaaactcc gcccgccgag cgccgagatc 60

tggacctgcg gctctcgcgg cgtggtggtc tgctccacca tcgccctcca ggagacagat 120

gctggcggcc agacaaccaa agtagaagac caccagccac acgggacccc aggcgggga 180

cttagattcc cgctgcgctt cctcgtcaga ggtcgccagg ttcacctcgt gcaagatata 240

caacccgtgc agcgctgcca gtactgcggt cgcttttaca aaagccagca cgagtgctcg 300

gcccgcagac gggacttcta ctttcaccac atcaacagcc aatcctccaa ctggtggcgg 360

gagatccagt tcttcccgat cggctctcat cctcgcacgg agcgcctctt tgtcacctac 420

gatgtagaga cctacacttg gatgggagcc tttggcaagc agctcgtgcc cttcatgctg 480

gtcatgaaac tgggggggcga cgaggctctg gtcgccgccg cgcgcgacct cgcccgagag 540

ctcagatggg acccctggga gaaagacccc ctcaccttct actgcatcac ccccgaaaag 600

atggccgtgg ggcgacagtt cagaaccttc cgcgaccgcc tgcagaccct catggcccgc 660

gacctctggc gatccttcct ggcggccaac cctcacttgc aagactgggc cctggaggag 720

cacggcctgg aatcgcccga ggagctcacc tacgaggaac tcaaaaagct cccctccatc 780

aagggccagc cccgcttttt ggagctctac atcgtgggcc acaacataaa cggctttgac 840

gagatcgtcc tggccgccca ggtcatcaac aaccgctcct cggtcccagg gccctttcgc 900

atcaccagaa acttcatgcc tcgagcgggg aagatcctct tcaatgacct caccttctcc 960

ctgcccaacc cgcgctccaa aaagcgcacg gactacaccc tgtgggaaca gggcggctgc 1020

gatgacacag acttcaaaca tcaatacctc aaagtcatgg tcagggacac tttcgccctc 1080

acccacacct ccctccgcaa ggcggcgcag gcctacgcgc tgcccgtgga gaagggctgt 1140

tgcccctacc aggccgtcaa ccagttctac atgctaggct cttaccgttc ggacacggac 1200

gggtttcccc tccaagagta ctggaaagac cgcgaagagt tcgtcctcaa ccgcgagctg 1260

tggaaaaaga agggggagga taagtatgac atcatccgcg agaccctcga ctactgcgcg 1320

ctcgacgtcc aggtcaccgc cgagctggtg cacaagctgc gcgagtccta cgcctccttc 1380

gtcagggact cggtgggctt gcaagaagca agcttcaacg tcttccagcg gcccaccatc 1440

tcctccaact cccatgccat cttcaggcag atcgccttcc gcgccgagcg cccccagcgc 1500

accaacctcg ggcccaacat gctggccccc tcccacgagc tctatgacta cgtgcgcgcc 1560

agcatccgcg gggggcgctg ctaccccacc tacctcggca tcctcaggga acccctgtac 1620

gtgtatgaca tctgcggcat gtacgcctcc gcgctcaccc accccatgcc ctggggcccg 1680

cccctcaacc cctacgagcg cgcgctcgcc gcccgcgaat ggcagcgggc tctggacatg 1740

caagcttgca agatcgacta ctttgacccg cgcttgctcc ccggggtctt caccatcgac 1800

gcggaccccc caaacgagga ccagctggac cccctacccc ccttctgctc gcgcaagggc 1860

ggccgcctct gctggaccaa cgagcgcctg cgcggcgagg tcgccaccag cgtcgacatg 1920

gtcaccctgc acaaccgagg ctggagggtg cgcctaatcc cagacgagcg caccaccgtc 1980

ttccccgagt ggaagtgcgt ggcccgcgag tacgtgcaac tcaacatcgc ggccaaggag 2040

cgagccgacc gcgacaaaaa ccagaccctg cgctccatcg ccaagctgct ctccaacgcc 2100

ctctacgggt cgttcgccac caagcttgac aacaaaaaaa tagtgttttc tgaccagatg 2160

gacccaggta ccctcaaagg tatcacctcc ggacaggtga acatcaaatc ctcctcattt 2220

ttagaaactg acaacctgag cgctgaggtc atgcccgcct tcgagaggga atacttaccc 2280

cagcagctgg ccctcgcaga cagcgatgcg gaagagagtg aagatgaaag ggcgcccacc 2340

ccctttttata ccccccccgtc gggaaccccc ggtcacgtgt cctacaccta caagccaatc 2400

acttttctgg acgcggagga gggggacatg tgcctgcaca ccctggagaa ggtggacccg 2460

ctagtggaca acgaccgcta cccctcccac gtggcctcct tcgtcctggc ctggacgcgg 2520

gccttcgtct cagagtggtc agagtttctc tacgaggagg acagaggcac tccgctggaa 2580

gacaggcccc tgaagtcggt ctacggggac acggacagcc tcttcgtcac cgagaaggga 2640

caccgcctca tggagagccg aggtaagaaa cgcatcaaaa agcatggggg caacctggtt 2700

tttgaccctg accgcccgga gctcacttgg ctggtggaat gcgagacggt ctgcgcttcc 2760

tgcggcgcgg acgcctactc cccagagtcc gtgtttctcg ctcccaagct ctacgccctg 2820

aagagcctgc agtgcccctc gtgcggcgcc acctccaagg gaaagctccg cgccaagggg 2880

cacgccgccg agggtctcga ctacgagacc atggtcaaat gctacctggc cgacgcgcag 2940

ggcgaagagc ggcagcgatt cagcaccagc agaaccagcc tcaagcgcac cctggccagc 3000

gcccaacccg gagcgcaccc cttcaccgtg acccagacca ccctgacgag gaccctgcgc 3060

ccatggaagg acatgactct ggccccgctg gacgcccatc ggctggtgcc ctacagcgaa 3120

agccgcccca acccgcgaaa cgaggagatc tgctggatcg agatgccg 3168

<210> 8
<211> 1974
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus penton base protein nucleotides

<400> 8
atgcggcgcg cggcgatgtt cgaggagggg cctccccccc cttacgagag cgcgatgggg 60

atttctcctg cggcgccccc gcagcctccc tacgtgcctc ctcggtacct gcaacctaca 120

ggggggagaa atagcatctg ttactctgag ctgcagcccc tgtacgatac caccagactg 180

tacctggtgg acaacaagtc cgcggacgtg gcctccctga actaccagaa cgaccacagc 240

gatttttga ccacggtgat ccaaaacaac gacttcaccc caaccgaggc cagcacccag 300

accataaacc tggataacag gtcgaactgg ggcggcgacc tgaagaccat cttgcacacc 360

aacatgccca acgtgaacga gttcatgttc accaactctt ttaaggcgcg ggtgatggtg 420

gcgcgcgagc agggggaggc gaagtacgag tgggtggact tcacgctgcc cgagggcaac 480

tactcagaga ccatgactct cgacctgatg aacaatgcga tcgtggaaca ctatctgaaa 540

gtgggcaggc agaacggggt gaaggaaagc gatatcgggg tcaagtttga caccagaaac 600

ttccgtctgg gctgggaccc cgtgaccggg ctggtcatgc cgggggtcta caccaacgag 660

gcctttcatc ccgacatagt gcttctgccc ggctgtgggg tggacttcac ccagagccgg 720

ctgagcaacc tgctgggcat tcgcaagcgg cagcctttcc aggagggttt caagatcacc 780

tatgaggatc tgaaggggg caacattccc gcgctccttg atctggacgc ctacgaggag 840

agcttgaaac ccgaggagag cgctggcgac agcggcgaga gtggcgagga gcaagccggc 900

ggcggtggcg gcgcgtcggt agaaaacgaa agtacgcccg cagtggcggc ggacgctgcg 960

gaggtcgagc cggaggccat gcagcaggac gcagaggagg gcgcacagga gggcgcgcag 1020

aaggacatga acgatgggga gatcagggga gacacattcg ccacccgggg cgaagaaaaa 1080

gaggcagagg cggcggcggc ggcgacggcg gaggccgaaa ccgaggttga ggcagaggca 1140

gagcccgaga ccgaagttat ggaagacatg aatgatggag aacgtagggg cgacacgttc 1200

gccacccggg gcgaagagaa ggcggcggag gcagaagccg cggctgagga ggcggctgcg 1260

gctgcggcca agactgaggc tgcggctaag gctgaggtcg aagccaatgt tgcggttgag 1320

gctcaggctg aggaggaggc ggcggctgaa gcagttaagg aaaaggccca ggcagagcag 1380

gaagagaaaa aacctgtcat tcaacctcta aaagaagata gcaaaaagcg cagttacaac 1440

gtcatcgagg gcagcacctt tacccagtac cgcagctggt acctggcgta caactacggc 1500

gacccggtca agggggtgcg ctcgtggacc ctgctctgca cgccggacgt cacctgcggc 1560

tccgagcaga tgtactggtc gctgccgaac atgatgcaag acccggtgac cttccgctcc 1620

acgcggcagg ttagcaactt cccggtggtg ggcgccgaac tgctgcccgt gcactccaag 1680

agtttttaca acgagcaggc cgtctactcc cagctgatcc gccaggccac ctctctgacc 1740

cacgtgttca atcgctttcc cgagaaccag attttggcgc gcccgccggc ccccaccatc 1800

accaccgtga gtgaaaacgt tcctgccctc acagatcacg ggacgctacc gctgcgcaac 1860

agcatctcag gagtccagcg agtgaccatt actgacgcca gacgccggac ctgcccctac 1920

gtttacaagg ccttgggcat agtctcgccg cgcgtcctct ccagtcgcac tttt 1974

<210> 9
<211> 2877
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus hexon protein nucleotides

<400> 9
atggcgaccc catcgatgat gcctcagtgg tcgtacatgc acatctcggg ccaggacgct 60

tcggagtacc tgagccccgg gctggtgcag ttcgcccgcg ccacagacac ctacttcaac 120

atgagtaaca agttcaggaa ccccactgtg gcgcccaccc acgatgtgac cacggaccgg 180

tcgcagcgcc tgacgctgcg gttcatcccc gtggatcggg aggacaccgc ctactcttac 240

aaggcgcggt tcacgctggc cgtgggcgac aaccgcgtgc tggacatggc ctccacttac 300

tttgacatca ggggggtgct ggacaggggc cccaccttca agccctactc gggtactgcc 360

tacaactccc tggcccccaa gggcgctccc aattcttgcg agtgggaaca agatgaacca 420

gctcaggcag caatagctga agatgaagaa gaacttgaag aagaacaagc tcaggacgaa 480

caggcgccca ctaagaaaac ccatgtatac gcccaggcac ctctttctgg tgaaaaaatt 540

actaaggatg gtttgcaaat aggtgtggat gccacacagg cgggagataa ccctatatat 600

gctgataaaa cattccaacc cgaacctcag ataggtgagt ctcagtggaa cgaggctgat 660

gccacagtag caggaggcag agtcttaaaa aagaccaccc ctatgagacc ttgctatgga 720

tcctatgcca aacctactaa tgccaatggc ggtcaaggga tcatggtggc caatgatcag 780

ggagcgcttg aatctaaagt tgagatgcaa tttttctcca ccacaacgtc tcttaatgta 840

agggaaggtg aaaacaatct tcagccaaaa gtagtgctat acagcgaaga tgttaacttg 900

gaatcccctg acactcattt gtcttacaaa cctaaaaagg atgacaccaa ctctaaaatc 960

atgttgggtc agcaagccat gcccaacaga cccaacctca ttgcttttag ggacaacttt 1020

attggactta tgtactacaa cagcacaggc aacatgggag tgctggcagg acaggcctcc 1080

cagctaaacg ctgtggtaga cttgcaagac agaaacacag agctgtcata ccaactgatg 1140

cttgattcca ttggagacag atcaagatac ttttccatgt ggaaccaggc agtggacagc 1200

tatgacccag atgtcagaat cattgaaaac catggggttg aagatgagct gcccaactat 1260

tgctttcccc tgggcggtat tggaattaca gacacatacc agtgcataaa accaaccgca 1320

gctgctaata acactacatg gtctaaggat gaagaattta gtgatcgcaa tgaaataggg 1380

gtgggaaaca acttcgccat ggagatcaac atccaggcca acctctggag gaacttcctc 1440

tatgcgaacg tggggctcta cctgccagac aagctcaagt acaaccccac caacgtggac 1500

atctctgaca accccaacac ctatgactac atgaacaagc gtgtggtggc tcccggcctg 1560

gtggactgct ttgtcaatgt gggagccagg tggtccctgg actacatgga caacgtcaac 1620

cccttcaacc accaccgcaa tgcgggtctg cgctaccgct ccatgatcct gggcaacggg 1680

cgctacgtgc ccttccacat tcaggtgccc cagaagttct ttgccatcaa gaacctcctc 1740

ctcctgccgg gctcctacac ttacgagtgg aacttcagga aggatgtcaa catggtcctg 1800

cagagctctc tgggcaatga ccttagggtg gacggggcca gcatcaagtt tgacagcgtc 1860

accctctatg ctaccttctt ccccatggct cacaacaccg cctccacgct cgaggccatg 1920

ctgaggaacg acaccaacga ccagtccttc aatgactacc tctctggggc caacatgctc 1980

taccccatcc ccgccaaggc caccaacgtg cccatctcca ttccctctcg caactgggcc 2040

gccttcagag gctgggcctt tacccgcctt aagaccaagg aaaccccctc cctgggctcg 2100

ggttttgacc cctactttgt ctactcggga tccatcccct acctggatgg caccttctac 2160

ctcaaccaca cttttaagaa gatatccatc atgtatgact cctccgtcag ctggccgggc 2220

aatgaccgcc tgctcacccc caatgagttc gaggtcaagc gcgccgtgga cggcgagggc 2280

tacaacgtgg cccagtgcaa catgaccaag gactggttcc tggtgcagat gctggccaac 2340

tacaacatag gctaccaggg cttctacatc ccagagagct acaaggacag gatgtactcc 2400

ttcttcagaa atttccaacc catgagcagg caggtggtgg acgagaccaa atacaaggac 2460

tatcaggcca ttggcatcac tcaccagcac aacaactcgg gattcgtggg ctacctggct 2520

cccaccatgc gcgaggggca ggcctacccc gccaacttcc cctacccgtt gataggcaaa 2580

accgcggtcg acagcgtcac ccagaaaaag ttcctctgcg accgcaccct ctggcgcatc 2640

cccttctcta gcaacttcat gtccatgggt gcgctcacgg acctgggcca gaacctgctc 2700

tatgccaact ccgcccatgc gctggacatg acttttgagg tggaccccat ggacgagccc 2760

acccttctct atattgtgtt tgaagtgttc gacgtggtca gagtgcacca gccgcaccgc 2820

ggtgtcatcg agaccgtgta cctgcgcacg cccttctcgg ccggcaacgc caccacc 2877

<210> 10
<211> 1749
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus fiber protein nucleotides

<400> 10
atgaaacgcg cgagatcgtc tgacgagacc ttcaaccccg tgtaccccta cgataccgag 60

atcgctccga cttctgtccc tttccttacc cctccctttg tgtcatccgc aggaatgcaa 120

gaaaatccag ctggggtgct gtccctgcac ttgtcagagc cccttaccac ccacaatggg 180

gccctgactc taaaaatggg gggcggcctg accctggaca aggaagggaa tctcacttcc 240

caaaacatca ccagtgtcga tccccctctc aaaaaaagca agaacaacat cagccttcag 300

accgccgcac ccctcgccgt cagctccggg gccctaacac tttttgccac tccccccta 360

gcggtcagtg gtgacaacct tactgtgcag tctcaggccc ctctcacttt ggaagactca 420

aaactaactc tggccaccaa aggacccta actgtgtccg aaggcaaact tgtcctagaa 480

acagaggctc ccctgcatgc aagtgacagc agcagcctgg gccttagcgt tacggcccca 540

cttagcatta acaatgacag cctaggacta gatctgcagg cacccattgt ctctcaaaat 600

ggaaaactgg ctctaaatgt agcaggcccc ctagctgtgg ccaatggcat taatgctttg 660

acagtaggca caggcaaagg tattggtcta aatgaaacca gcactcactt gcaagcaaag 720

ttggtcgccc ccctaggctt tgataccaat ggcaacatta agctaagcgt tgcaggaggc 780

atgagactaa ataatgacac acttatacta gatgtaaact acccatttga agctcaaggc 840

caactaagtc taagagtggg ccagggtccg ctgtatgtag attctagcag ccataacctg 900

accattagat gccttagagg attatacata acatcgtcta ataaccaaac cggtctagag 960

gccaacataa aactaacaaa aggccttgtc tatgatggaa atgccatagc agtcaatgtt 1020

ggtcaaggat tgcaatacag cactactgcc acatcggaag gtgtgtatcc tatacagtct 1080

aagataggtt tgggaatgga atatgatacc aacggagcca tgatgacaaa actaggctct 1140

ggactaagct ttgacaattc aggagccatt gtagtgggaa acaaaaatga tgacaggctt 1200

actctgtgga ctacaccaga cccatctcct aactgtagaa tttattctga aaaagatact 1260

aaactaacct tggtgctgac taagtgtggc agccaaatcc taggcacagt atctgccctt 1320

gctgtcagag gcagccttgc gcccatcact aatgcatcca gcatagtcca aatatttcta 1380

agatttgatg aaaatggact attgatgagc aactcatcgc tagacggtga ttactggaat 1440

tacagaaatg gggactccac taatagcaca ccatatacaa atgcagtagg ctttatgcct 1500

aatctagcag cctatcctaa aggtcaggct acagctgcaa aaagcagtat tgtaagccag 1560

gtatacatgg atggtgacac tactaaacct ataacactaa aaataaactt caatggcatt 1620

gatgaaacaa cagaaaatac ccctgttagt aaatattcca tgacattctc atggagctgg 1680

cccaccgcaa gctacatagg ccacactttt gcaacaaact cttttacttt ctcctacatc 1740

gcccaagaa 1749

<210> 11
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus pIX protein fragment

<400> 11

Ser Ser Leu Val Ala Ser Gly Ala Ala Ser
1 5 10

<210> 12
<211> 147
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus DNA polymerase fragment

<400> 12

Lys His Gln Tyr Leu Lys Val Met Val Arg Asp Thr Phe Ala Leu Thr
1 5 10 15

His Thr Ser Leu Arg Lys Ala Ala Gln Ala Tyr Ala Leu Pro Val Glu
20 25 30

Lys Gly Cys Cys Pro Tyr Gln Ala Val Asn Gln Phe Tyr Met Leu Gly
35 40 45

Ser Tyr Arg Ser Asp Thr Asp Gly Phe Pro Leu Gln Glu Tyr Trp Lys
50 55 60

```
Asp Arg Glu Glu Phe Val Leu Asn Arg Glu Leu Trp Lys Lys Lys Gly
65                  70                  75                  80


Glu Asp Lys Tyr Asp Ile Ile Arg Glu Thr Leu Asp Tyr Cys Ala Leu
                85                  90                  95


Asp Val Gln Val Thr Ala Glu Leu Val His Lys Leu Arg Glu Ser Tyr
            100                 105                 110


Ala Ser Phe Val Arg Asp Ser Val Gly Leu Gln Glu Ala Ser Phe Asn
        115                 120                 125


Val Phe Gln Arg Pro Thr Ile Ser Ser Asn Ser His Ala Ile Phe Arg
    130                 135                 140


Gln Ile Ala
145
```

<210> 13
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus penton base protein fragment

<400> 13

```
Lys Thr Glu Ala Ala Ala Lys Ala Glu Val Glu Ala Asn Val Ala
1               5                   10                  15
```

<210> 14
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus hexon protein fragment

<400> 14

```
Ile Gly Val Asp Ala Thr Gln Ala Gly Asp Asn Pro Ile Tyr Ala
1               5                   10                  15
```

<210> 15

<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus fiber protein fragment

<400> 15

Leu Asn Val Ala Gly Pro Leu Ala Val Ala Asn Gly Ile Asn Ala
1 5 10 15

<210> 16
<211> 133
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus pIX amino acids

<400> 16

Met Ser Asp Thr Gly Asn Ser Phe Asp Gly Ser Ile Phe Ser Pro Tyr
1 5 10 15

Leu Thr Val Arg Met Pro His Trp Ala Gly Val Arg Gln Asn Val Met
20 25 30

Gly Ser Asn Val Asp Gly Arg Pro Val Leu Pro Ser Asn Ser Ser Thr
35 40 45

Met Ala Tyr Ala Thr Val Gly Gly Thr Pro Leu Asp Ala Ala Thr Ser
50 55 60

Ala Ala Ala Ser Ala Ala Ala Ala Thr Ala Arg Ser Met Ala Thr Asp
65 70 75 80

Leu Tyr Ser Ser Leu Val Ala Ser Gly Ala Ala Ser Arg Ala Ser Ala
85 90 95

Arg Asp Glu Lys Leu Thr Ala Leu Leu Leu Lys Leu Glu Asp Leu Thr
100 105 110

Arg Glu Leu Gly Gln Leu Thr Gln Gln Val Ser Ser Leu Arg Glu Ser
115 120 125

Ser Leu Ala Ser Pro
    130

<210> 17
<211> 1056
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus DNA polymerase amino acids

<400> 17

Met Asp Ser Ser Asn Val Arg Asp Val Val Ile Lys Leu Arg Pro Pro
1   5   10   15

Ser Ala Glu Ile Trp Thr Cys Gly Ser Arg Gly Val Val Val Cys Ser
            20   25   30

Thr Ile Ala Leu Gln Glu Thr Asp Ala Gly Gly Gln Thr Thr Lys Val
        35   40   45

Glu Asp His Gln Pro His Gly Thr Pro Gly Gly Gly Leu Arg Phe Pro
    50   55   60

Leu Arg Phe Leu Val Arg Gly Arg Gln Val His Leu Val Gln Asp Ile
65   70   75   80

Gln Pro Val Gln Arg Cys Gln Tyr Cys Gly Arg Phe Tyr Lys Ser Gln
                85   90   95

His Glu Cys Ser Ala Arg Arg Arg Asp Phe Tyr Phe His His Ile Asn
            100   105   110

Ser Gln Ser Ser Asn Trp Trp Arg Glu Ile Gln Phe Phe Pro Ile Gly
        115   120   125

Ser His Pro Arg Thr Glu Arg Leu Phe Val Thr Tyr Asp Val Glu Thr
    130   135   140

Tyr Thr Trp Met Gly Ala Phe Gly Lys Gln Leu Val Pro Phe Met Leu

```
145                 150                 155                 160

Val Met Lys Leu Gly Gly Asp Glu Ala Leu Val Ala Ala Ala Arg Asp
                165                 170                 175

Leu Ala Arg Glu Leu Arg Trp Asp Pro Trp Glu Lys Asp Pro Leu Thr
            180                 185                 190

Phe Tyr Cys Ile Thr Pro Glu Lys Met Ala Val Gly Arg Gln Phe Arg
        195                 200                 205

Thr Phe Arg Asp Arg Leu Gln Thr Leu Met Ala Arg Asp Leu Trp Arg
    210                 215                 220

Ser Phe Leu Ala Ala Asn Pro His Leu Gln Asp Trp Ala Leu Glu Glu
225                 230                 235                 240

His Gly Leu Glu Ser Pro Glu Glu Leu Thr Tyr Glu Glu Leu Lys Lys
                245                 250                 255

Leu Pro Ser Ile Lys Gly Gln Pro Arg Phe Leu Glu Leu Tyr Ile Val
            260                 265                 270

Gly His Asn Ile Asn Gly Phe Asp Glu Ile Val Leu Ala Ala Gln Val
        275                 280                 285

Ile Asn Asn Arg Ser Ser Val Pro Gly Pro Phe Arg Ile Thr Arg Asn
    290                 295                 300

Phe Met Pro Arg Ala Gly Lys Ile Leu Phe Asn Asp Leu Thr Phe Ser
305                 310                 315                 320

Leu Pro Asn Pro Arg Ser Lys Lys Arg Thr Asp Tyr Thr Leu Trp Glu
                325                 330                 335

Gln Gly Gly Cys Asp Asp Thr Asp Phe Lys His Gln Tyr Leu Lys Val
            340                 345                 350

Met Val Arg Asp Thr Phe Ala Leu Thr His Thr Ser Leu Arg Lys Ala
        355                 360                 365
```

```
Ala Gln Ala Tyr Ala Leu Pro Val Glu Lys Gly Cys Cys Pro Tyr Gln
    370                 375                 380

Ala Val Asn Gln Phe Tyr Met Leu Gly Ser Tyr Arg Ser Asp Thr Asp
385                 390                 395                 400

Gly Phe Pro Leu Gln Glu Tyr Trp Lys Asp Arg Glu Glu Phe Val Leu
                405                 410                 415

Asn Arg Glu Leu Trp Lys Lys Lys Gly Glu Asp Lys Tyr Asp Ile Ile
            420                 425                 430

Arg Glu Thr Leu Asp Tyr Cys Ala Leu Asp Val Gln Val Thr Ala Glu
        435                 440                 445

Leu Val His Lys Leu Arg Glu Ser Tyr Ala Ser Phe Val Arg Asp Ser
    450                 455                 460

Val Gly Leu Gln Glu Ala Ser Phe Asn Val Phe Gln Arg Pro Thr Ile
465                 470                 475                 480

Ser Ser Asn Ser His Ala Ile Phe Arg Gln Ile Ala Phe Arg Ala Glu
                485                 490                 495

Arg Pro Gln Arg Thr Asn Leu Gly Pro Asn Met Leu Ala Pro Ser His
            500                 505                 510

Glu Leu Tyr Asp Tyr Val Arg Ala Ser Ile Arg Gly Gly Arg Cys Tyr
        515                 520                 525

Pro Thr Tyr Leu Gly Ile Leu Arg Glu Pro Leu Tyr Val Tyr Asp Ile
    530                 535                 540

Cys Gly Met Tyr Ala Ser Ala Leu Thr His Pro Met Pro Trp Gly Pro
545                 550                 555                 560

Pro Leu Asn Pro Tyr Glu Arg Ala Leu Ala Ala Arg Glu Trp Gln Arg
                565                 570                 575
```

```
Ala Leu Asp Met Gln Ala Cys Lys Ile Asp Tyr Phe Asp Pro Arg Leu
            580                 585                 590

Leu Pro Gly Val Phe Thr Ile Asp Ala Asp Pro Pro Asn Glu Asp Gln
        595                 600                 605

Leu Asp Pro Leu Pro Pro Phe Cys Ser Arg Lys Gly Gly Arg Leu Cys
    610                 615                 620

Trp Thr Asn Glu Arg Leu Arg Gly Glu Val Ala Thr Ser Val Asp Met
625                 630                 635                 640

Val Thr Leu His Asn Arg Gly Trp Arg Val Arg Leu Ile Pro Asp Glu
                645                 650                 655

Arg Thr Thr Val Phe Pro Glu Trp Lys Cys Val Ala Arg Glu Tyr Val
            660                 665                 670

Gln Leu Asn Ile Ala Ala Lys Glu Arg Ala Asp Arg Asp Lys Asn Gln
        675                 680                 685

Thr Leu Arg Ser Ile Ala Lys Leu Leu Ser Asn Ala Leu Tyr Gly Ser
    690                 695                 700

Phe Ala Thr Lys Leu Asp Asn Lys Lys Ile Val Phe Ser Asp Gln Met
705                 710                 715                 720

Asp Pro Gly Thr Leu Lys Gly Ile Thr Ser Gly Gln Val Asn Ile Lys
                725                 730                 735

Ser Ser Ser Phe Leu Glu Thr Asp Asn Leu Ser Ala Glu Val Met Pro
            740                 745                 750

Ala Phe Glu Arg Glu Tyr Leu Pro Gln Gln Leu Ala Leu Ala Asp Ser
        755                 760                 765

Asp Ala Glu Glu Ser Glu Asp Glu Arg Ala Pro Thr Pro Phe Tyr Thr
    770                 775                 780
```

```
Pro Pro Ser Gly Thr Pro Gly His Val Ser Tyr Thr Tyr Lys Pro Ile
785                 790                 795                 800


Thr Phe Leu Asp Ala Glu Glu Gly Asp Met Cys Leu His Thr Leu Glu
                805                 810                 815


Lys Val Asp Pro Leu Val Asp Asn Asp Arg Tyr Pro Ser His Val Ala
            820                 825                 830


Ser Phe Val Leu Ala Trp Thr Arg Ala Phe Val Ser Glu Trp Ser Glu
        835                 840                 845


Phe Leu Tyr Glu Glu Asp Arg Gly Thr Pro Leu Glu Asp Arg Pro Leu
    850                 855                 860


Lys Ser Val Tyr Gly Asp Thr Asp Ser Leu Phe Val Thr Glu Lys Gly
865                 870                 875                 880


His Arg Leu Met Glu Ser Arg Gly Lys Lys Arg Ile Lys Lys His Gly
                885                 890                 895


Gly Asn Leu Val Phe Asp Pro Asp Arg Pro Glu Leu Thr Trp Leu Val
            900                 905                 910


Glu Cys Glu Thr Val Cys Ala Ser Cys Gly Ala Asp Ala Tyr Ser Pro
        915                 920                 925


Glu Ser Val Phe Leu Ala Pro Lys Leu Tyr Ala Leu Lys Ser Leu Gln
    930                 935                 940


Cys Pro Ser Cys Gly Ala Thr Ser Lys Gly Lys Leu Arg Ala Lys Gly
945                 950                 955                 960


His Ala Ala Glu Gly Leu Asp Tyr Glu Thr Met Val Lys Cys Tyr Leu
                965                 970                 975


Ala Asp Ala Gln Gly Glu Glu Arg Gln Arg Phe Ser Thr Ser Arg Thr
            980                 985                 990


Ser Leu Lys Arg Thr Leu Ala Ser  Ala Gln Pro Gly Ala  His Pro Phe
```

995 1000 1005

Thr Val Thr Gln Thr Thr Leu Thr Arg Thr Leu Arg Pro Trp Lys
1010 1015 1020

Asp Met Thr Leu Ala Pro Leu Asp Ala His Arg Leu Val Pro Tyr
1025 1030 1035

Ser Glu Ser Arg Pro Asn Pro Arg Asn Glu Glu Ile Cys Trp Ile
1040 1045 1050

Glu Met Pro
1055

<210> 18
<211> 658
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus penton base protein

<400> 18

Met Arg Arg Ala Ala Met Phe Glu Glu Gly Pro Pro Pro Ser Tyr Glu
1 5 10 15

Ser Ala Met Gly Ile Ser Pro Ala Ala Pro Leu Gln Pro Pro Tyr Val
20 25 30

Pro Pro Arg Tyr Leu Gln Pro Thr Gly Gly Arg Asn Ser Ile Cys Tyr
35 40 45

Ser Glu Leu Gln Pro Leu Tyr Asp Thr Thr Arg Leu Tyr Leu Val Asp
50 55 60

Asn Lys Ser Ala Asp Val Ala Ser Leu Asn Tyr Gln Asn Asp His Ser
65 70 75 80

Asp Phe Leu Thr Thr Val Ile Gln Asn Asn Asp Phe Thr Pro Thr Glu
85 90 95

```
Ala Ser Thr Gln Thr Ile Asn Leu Asp Asn Arg Ser Asn Trp Gly Gly
            100                 105                 110

Asp Leu Lys Thr Ile Leu His Thr Asn Met Pro Asn Val Asn Glu Phe
        115                 120                 125

Met Phe Thr Asn Ser Phe Lys Ala Arg Val Met Val Ala Arg Glu Gln
    130                 135                 140

Gly Glu Ala Lys Tyr Glu Trp Val Asp Phe Thr Leu Pro Glu Gly Asn
145                 150                 155                 160

Tyr Ser Glu Thr Met Thr Leu Asp Leu Met Asn Asn Ala Ile Val Glu
                165                 170                 175

His Tyr Leu Lys Val Gly Arg Gln Asn Gly Val Lys Glu Ser Asp Ile
            180                 185                 190

Gly Val Lys Phe Asp Thr Arg Asn Phe Arg Leu Gly Trp Asp Pro Val
        195                 200                 205

Thr Gly Leu Val Met Pro Gly Val Tyr Thr Asn Glu Ala Phe His Pro
    210                 215                 220

Asp Ile Val Leu Leu Pro Gly Cys Gly Val Asp Phe Thr Gln Ser Arg
225                 230                 235                 240

Leu Ser Asn Leu Leu Gly Ile Arg Lys Arg Gln Pro Phe Gln Glu Gly
                245                 250                 255

Phe Lys Ile Thr Tyr Glu Asp Leu Lys Gly Gly Asn Ile Pro Ala Leu
            260                 265                 270

Leu Asp Leu Asp Ala Tyr Glu Glu Ser Leu Lys Pro Glu Glu Ser Ala
        275                 280                 285

Gly Asp Ser Gly Glu Ser Gly Glu Glu Gln Ala Gly Gly Gly Gly Gly
    290                 295                 300

Ala Ser Val Glu Asn Glu Ser Thr Pro Ala Val Ala Ala Asp Ala Ala
```

```
305                 310                 315                 320

Glu Val Glu Pro Glu Ala Met Gln Gln Asp Ala Glu Glu Gly Ala Gln
                325                 330                 335

Glu Gly Ala Gln Lys Asp Met Asn Asp Gly Glu Ile Arg Gly Asp Thr
            340                 345                 350

Phe Ala Thr Arg Gly Glu Glu Lys Glu Ala Glu Ala Ala Ala Ala Ala
        355                 360                 365

Thr Ala Glu Ala Glu Thr Glu Val Glu Ala Glu Ala Glu Pro Glu Thr
    370                 375                 380

Glu Val Met Glu Asp Met Asn Asp Gly Glu Arg Arg Gly Asp Thr Phe
385                 390                 395                 400

Ala Thr Arg Gly Glu Glu Lys Ala Ala Glu Ala Glu Ala Ala Ala Glu
                405                 410                 415

Glu Ala Ala Ala Ala Ala Ala Lys Thr Glu Ala Ala Ala Lys Ala Glu
            420                 425                 430

Val Glu Ala Asn Val Ala Val Glu Ala Gln Ala Glu Glu Glu Ala Ala
        435                 440                 445

Ala Glu Ala Val Lys Glu Lys Ala Gln Ala Glu Gln Glu Glu Lys Lys
    450                 455                 460

Pro Val Ile Gln Pro Leu Lys Glu Asp Ser Lys Lys Arg Ser Tyr Asn
465                 470                 475                 480

Val Ile Glu Gly Ser Thr Phe Thr Gln Tyr Arg Ser Trp Tyr Leu Ala
                485                 490                 495

Tyr Asn Tyr Gly Asp Pro Val Lys Gly Val Arg Ser Trp Thr Leu Leu
            500                 505                 510

Cys Thr Pro Asp Val Thr Cys Gly Ser Glu Gln Met Tyr Trp Ser Leu
        515                 520                 525
```

```
Pro Asn Met Met Gln Asp Pro Val Thr Phe Arg Ser Thr Arg Gln Val
    530                 535                 540

Ser Asn Phe Pro Val Val Gly Ala Glu Leu Leu Pro Val His Ser Lys
545                 550                 555                 560

Ser Phe Tyr Asn Glu Gln Ala Val Tyr Ser Gln Leu Ile Arg Gln Ala
                565                 570                 575

Thr Ser Leu Thr His Val Phe Asn Arg Phe Pro Glu Asn Gln Ile Leu
            580                 585                 590

Ala Arg Pro Pro Ala Pro Thr Ile Thr Thr Val Ser Glu Asn Val Pro
        595                 600                 605

Ala Leu Thr Asp His Gly Thr Leu Pro Leu Arg Asn Ser Ile Ser Gly
    610                 615                 620

Val Gln Arg Val Thr Ile Thr Asp Ala Arg Arg Arg Thr Cys Pro Tyr
625                 630                 635                 640

Val Tyr Lys Ala Leu Gly Ile Val Ser Pro Arg Val Leu Ser Ser Arg
                645                 650                 655

Thr Phe
```

<210> 19
<211> 959
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus hexon protein

<400> 19

```
Met Ala Thr Pro Ser Met Met Pro Gln Trp Ser Tyr Met His Ile Ser
1               5                   10                  15

Gly Gln Asp Ala Ser Glu Tyr Leu Ser Pro Gly Leu Val Gln Phe Ala
```

```
            20                  25                  30

Arg Ala Thr Asp Thr Tyr Phe Asn Met Ser Asn Lys Phe Arg Asn Pro
        35                  40                  45

Thr Val Ala Pro Thr His Asp Val Thr Thr Asp Arg Ser Gln Arg Leu
    50                  55                  60

Thr Leu Arg Phe Ile Pro Val Asp Arg Glu Asp Thr Ala Tyr Ser Tyr
65                  70                  75                  80

Lys Ala Arg Phe Thr Leu Ala Val Gly Asp Asn Arg Val Leu Asp Met
                85                  90                  95

Ala Ser Thr Tyr Phe Asp Ile Arg Gly Val Leu Asp Arg Gly Pro Thr
            100                 105                 110

Phe Lys Pro Tyr Ser Gly Thr Ala Tyr Asn Ser Leu Ala Pro Lys Gly
        115                 120                 125

Ala Pro Asn Ser Cys Glu Trp Glu Gln Asp Glu Pro Ala Gln Ala Ala
    130                 135                 140

Ile Ala Glu Asp Glu Glu Glu Leu Glu Glu Glu Gln Ala Gln Asp Glu
145                 150                 155                 160

Gln Ala Pro Thr Lys Lys Thr His Val Tyr Ala Gln Ala Pro Leu Ser
                165                 170                 175

Gly Glu Lys Ile Thr Lys Asp Gly Leu Gln Ile Gly Val Asp Ala Thr
            180                 185                 190

Gln Ala Gly Asp Asn Pro Ile Tyr Ala Asp Lys Thr Phe Gln Pro Glu
        195                 200                 205

Pro Gln Ile Gly Glu Ser Gln Trp Asn Glu Ala Asp Ala Thr Val Ala
    210                 215                 220

Gly Gly Arg Val Leu Lys Lys Thr Thr Pro Met Arg Pro Cys Tyr Gly
225                 230                 235                 240
```

```
Ser Tyr Ala Lys Pro Thr Asn Ala Asn Gly Gly Gln Gly Ile Met Val
                245                 250                 255

Ala Asn Asp Gln Gly Ala Leu Glu Ser Lys Val Glu Met Gln Phe Phe
            260                 265                 270

Ser Thr Thr Thr Ser Leu Asn Val Arg Glu Gly Glu Asn Asn Leu Gln
        275                 280                 285

Pro Lys Val Val Leu Tyr Ser Glu Asp Val Asn Leu Glu Ser Pro Asp
    290                 295                 300

Thr His Leu Ser Tyr Lys Pro Lys Lys Asp Asp Thr Asn Ser Lys Ile
305                 310                 315                 320

Met Leu Gly Gln Gln Ala Met Pro Asn Arg Pro Asn Leu Ile Ala Phe
                325                 330                 335

Arg Asp Asn Phe Ile Gly Leu Met Tyr Tyr Asn Ser Thr Gly Asn Met
            340                 345                 350

Gly Val Leu Ala Gly Gln Ala Ser Gln Leu Asn Ala Val Val Asp Leu
        355                 360                 365

Gln Asp Arg Asn Thr Glu Leu Ser Tyr Gln Leu Met Leu Asp Ser Ile
    370                 375                 380

Gly Asp Arg Ser Arg Tyr Phe Ser Met Trp Asn Gln Ala Val Asp Ser
385                 390                 395                 400

Tyr Asp Pro Asp Val Arg Ile Ile Glu Asn His Gly Val Glu Asp Glu
                405                 410                 415

Leu Pro Asn Tyr Cys Phe Pro Leu Gly Gly Ile Gly Ile Thr Asp Thr
            420                 425                 430

Tyr Gln Cys Ile Lys Pro Thr Ala Ala Ala Asn Asn Thr Thr Trp Ser
        435                 440                 445
```

```
Lys Asp Glu Glu Phe Ser Asp Arg Asn Glu Ile Gly Val Gly Asn Asn
    450                 455                 460

Phe Ala Met Glu Ile Asn Ile Gln Ala Asn Leu Trp Arg Asn Phe Leu
465                 470                 475                 480

Tyr Ala Asn Val Gly Leu Tyr Leu Pro Asp Lys Leu Lys Tyr Asn Pro
                485                 490                 495

Thr Asn Val Asp Ile Ser Asp Asn Pro Asn Thr Tyr Asp Tyr Met Asn
            500                 505                 510

Lys Arg Val Val Ala Pro Gly Leu Val Asp Cys Phe Val Asn Val Gly
        515                 520                 525

Ala Arg Trp Ser Leu Asp Tyr Met Asp Asn Val Asn Pro Phe Asn His
    530                 535                 540

His Arg Asn Ala Gly Leu Arg Tyr Arg Ser Met Ile Leu Gly Asn Gly
545                 550                 555                 560

Arg Tyr Val Pro Phe His Ile Gln Val Pro Gln Lys Phe Phe Ala Ile
                565                 570                 575

Lys Asn Leu Leu Leu Leu Pro Gly Ser Tyr Thr Tyr Glu Trp Asn Phe
            580                 585                 590

Arg Lys Asp Val Asn Met Val Leu Gln Ser Ser Leu Gly Asn Asp Leu
        595                 600                 605

Arg Val Asp Gly Ala Ser Ile Lys Phe Asp Ser Val Thr Leu Tyr Ala
    610                 615                 620

Thr Phe Phe Pro Met Ala His Asn Thr Ala Ser Thr Leu Glu Ala Met
625                 630                 635                 640

Leu Arg Asn Asp Thr Asn Asp Gln Ser Phe Asn Asp Tyr Leu Ser Gly
                645                 650                 655
```

```
Ala Asn Met Leu Tyr Pro Ile Pro Ala Lys Ala Thr Asn Val Pro Ile
            660                 665                 670

Ser Ile Pro Ser Arg Asn Trp Ala Ala Phe Arg Gly Trp Ala Phe Thr
        675                 680                 685

Arg Leu Lys Thr Lys Glu Thr Pro Ser Leu Gly Ser Gly Phe Asp Pro
    690                 695                 700

Tyr Phe Val Tyr Ser Gly Ser Ile Pro Tyr Leu Asp Gly Thr Phe Tyr
705                 710                 715                 720

Leu Asn His Thr Phe Lys Lys Ile Ser Ile Met Tyr Asp Ser Ser Val
                725                 730                 735

Ser Trp Pro Gly Asn Asp Arg Leu Leu Thr Pro Asn Glu Phe Glu Val
            740                 745                 750

Lys Arg Ala Val Asp Gly Glu Gly Tyr Asn Val Ala Gln Cys Asn Met
        755                 760                 765

Thr Lys Asp Trp Phe Leu Val Gln Met Leu Ala Asn Tyr Asn Ile Gly
    770                 775                 780

Tyr Gln Gly Phe Tyr Ile Pro Glu Ser Tyr Lys Asp Arg Met Tyr Ser
785                 790                 795                 800

Phe Phe Arg Asn Phe Gln Pro Met Ser Arg Gln Val Val Asp Glu Thr
                805                 810                 815

Lys Tyr Lys Asp Tyr Gln Ala Ile Gly Ile Thr His Gln His Asn Asn
            820                 825                 830

Ser Gly Phe Val Gly Tyr Leu Ala Pro Thr Met Arg Glu Gly Gln Ala
        835                 840                 845

Tyr Pro Ala Asn Phe Pro Tyr Pro Leu Ile Gly Lys Thr Ala Val Asp
    850                 855                 860

Ser Val Thr Gln Lys Lys Phe Leu Cys Asp Arg Thr Leu Trp Arg Ile
```

865 870 875 880

Pro Phe Ser Ser Asn Phe Met Ser Met Gly Ala Leu Thr Asp Leu Gly
885 890 895

Gln Asn Leu Leu Tyr Ala Asn Ser Ala His Ala Leu Asp Met Thr Phe
900 905 910

Glu Val Asp Pro Met Asp Glu Pro Thr Leu Leu Tyr Ile Val Phe Glu
915 920 925

Val Phe Asp Val Val Arg Val His Gln Pro His Arg Gly Val Ile Glu
930 935 940

Thr Val Tyr Leu Arg Thr Pro Phe Ser Ala Gly Asn Ala Thr Thr
945 950 955

<210> 20
<211> 583
<212> PRT
<213> Artificial sequence

<220>
<223> Adenovirus fiber protein

<400> 20

Met Lys Arg Ala Arg Ser Ser Asp Glu Thr Phe Asn Pro Val Tyr Pro
1 5 10 15

Tyr Asp Thr Glu Ile Ala Pro Thr Ser Val Pro Phe Leu Thr Pro Pro
20 25 30

Phe Val Ser Ser Ala Gly Met Gln Glu Asn Pro Ala Gly Val Leu Ser
35 40 45

Leu His Leu Ser Glu Pro Leu Thr Thr His Asn Gly Ala Leu Thr Leu
50 55 60

Lys Met Gly Gly Gly Leu Thr Leu Asp Lys Glu Gly Asn Leu Thr Ser
65 70 75 80

```
Gln Asn Ile Thr Ser Val Asp Pro Pro Leu Lys Lys Ser Lys Asn Asn
                85                  90                  95

Ile Ser Leu Gln Thr Ala Ala Pro Leu Ala Val Ser Ser Gly Ala Leu
            100                 105                 110

Thr Leu Phe Ala Thr Pro Pro Leu Ala Val Ser Gly Asp Asn Leu Thr
        115                 120                 125

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

Ala Thr Lys Gly Pro Leu Thr Val Ser Glu Gly Lys Leu Val Leu Glu
145                 150                 155                 160

Thr Glu Ala Pro Leu His Ala Ser Asp Ser Ser Ser Leu Gly Leu Ser
                165                 170                 175

Val Thr Ala Pro Leu Ser Ile Asn Asn Asp Ser Leu Gly Leu Asp Leu
            180                 185                 190

Gln Ala Pro Ile Val Ser Gln Asn Gly Lys Leu Ala Leu Asn Val Ala
        195                 200                 205

Gly Pro Leu Ala Val Ala Asn Gly Ile Asn Ala Leu Thr Val Gly Thr
    210                 215                 220

Gly Lys Gly Ile Gly Leu Asn Glu Thr Ser Thr His Leu Gln Ala Lys
225                 230                 235                 240

Leu Val Ala Pro Leu Gly Phe Asp Thr Asn Gly Asn Ile Lys Leu Ser
                245                 250                 255

Val Ala Gly Gly Met Arg Leu Asn Asn Asp Thr Leu Ile Leu Asp Val
            260                 265                 270

Asn Tyr Pro Phe Glu Ala Gln Gly Gln Leu Ser Leu Arg Val Gly Gln
        275                 280                 285

Gly Pro Leu Tyr Val Asp Ser Ser Ser His Asn Leu Thr Ile Arg Cys
```

```
    290                 295                 300

Leu Arg Gly Leu Tyr Ile Thr Ser Ser Asn Asn Gln Thr Gly Leu Glu
305                 310                 315                 320

Ala Asn Ile Lys Leu Thr Lys Gly Leu Val Tyr Asp Gly Asn Ala Ile
                325                 330                 335

Ala Val Asn Val Gly Gln Gly Leu Gln Tyr Ser Thr Thr Ala Thr Ser
            340                 345                 350

Glu Gly Val Tyr Pro Ile Gln Ser Lys Ile Gly Leu Gly Met Glu Tyr
        355                 360                 365

Asp Thr Asn Gly Ala Met Met Thr Lys Leu Gly Ser Gly Leu Ser Phe
    370                 375                 380

Asp Asn Ser Gly Ala Ile Val Val Gly Asn Lys Asn Asp Asp Arg Leu
385                 390                 395                 400

Thr Leu Trp Thr Thr Pro Asp Pro Ser Pro Asn Cys Arg Ile Tyr Ser
                405                 410                 415

Glu Lys Asp Thr Lys Leu Thr Leu Val Leu Thr Lys Cys Gly Ser Gln
            420                 425                 430

Ile Leu Gly Thr Val Ser Ala Leu Ala Val Arg Gly Ser Leu Ala Pro
        435                 440                 445

Ile Thr Asn Ala Ser Ser Ile Val Gln Ile Phe Leu Arg Phe Asp Glu
    450                 455                 460

Asn Gly Leu Leu Met Ser Asn Ser Ser Leu Asp Gly Asp Tyr Trp Asn
465                 470                 475                 480

Tyr Arg Asn Gly Asp Ser Thr Asn Ser Thr Pro Tyr Thr Asn Ala Val
                485                 490                 495

Gly Phe Met Pro Asn Leu Ala Ala Tyr Pro Lys Gly Gln Ala Thr Ala
            500                 505                 510
```

Ala Lys Ser Ser Ile Val Ser Gln Val Tyr Met Asp Gly Asp Thr Thr
515 520 525

Lys Pro Ile Thr Leu Lys Ile Asn Phe Asn Gly Ile Asp Glu Thr Thr
530 535 540

Glu Asn Thr Pro Val Ser Lys Tyr Ser Met Thr Phe Ser Trp Ser Trp
545 550 555 560

Pro Thr Ala Ser Tyr Ile Gly His Thr Phe Ala Thr Asn Ser Phe Thr
565 570 575

Phe Ser Tyr Ile Ala Gln Glu
580

<210> 21
<211> 32728
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus vector nucleotide sequences

<400> 21
catcatcaat aatatacctt attttggatt gtggccaata tgataatgag gtgggcgggg 60

agaggcgggg cgggtgacgt aggacgcgcg agtagggttg ggaggtgtgg cggaagtgtg 120

gcatttgcaa gtgggaggag ctcacatgca agcttccgtc gcggaaaatg tgacgttttt 180

gatgagcgcc gcctacctcc ggaagtgcca attttcgcgc gcttttcacc ggatatcgta 240

gtaattttgg gcgggaccat gtaagatttg gccattttcg cgcgaaaagt gaaacgggga 300

agtgaaaact gaataatagg gcgttagtca tagcgcgtaa tatttaccga gggccgaggg 360

actttgaccg attacgtgga ggactcgccc aggtgttttt tacgtgaatt tccgcgttcc 420

gggtcaaagt ctccgttttt attgtcaccg tcatttgacg cggagggtat ttaaacccgc 480

tgcgctcctc aagaggccac tcttgagtgc cagcgagaag agttttctcc tctgctccgc 540

ttcggtgatc gaaaaatgag acacatagcc tgcactccgg gtcttttgtc cggtcgggcg 600

gcggccgagc ttttggacgc tttgatcaat gatgtcctaa gcgatgattt tccgtctact 660

acccacttta gcccacctac tcttcacgaa ctgtacgatc tggatgtact ggtggatgtg 720

aacgatccca acgaggaggc ggtttctgcg ttttttcccg agtctgcgct gttggccgct 780

caggagggat ttgacctaca cactccgccg cctattttag agtctccgct gccggagccc 840

agtggtatac cttatatgcc tgaactgctt cccgaagtgg tagacctgac ctgccacgag 900

cctggctttc cgcccagcga cgatgagggt gagccttttg ttttagactt tgctgagata 960

cctgggcacg gttgcaggtc ttgtgcatat catcagaggg ttaccggaga ccccgaggtt 1020

aagtgttcgc tgtgctatat gaggatgacc tcttccttta tctacagtaa gtttttgtct 1080

aggtgggctt ttgggtaggt gggttttgtg tcagaacagg tgtaaacgtt gcttgtgttt 1140

tttgtacctg taggtccggt gtccgagcca gacccggagc ccgaccgcga tcccgagccg 1200

gatcccgagc ctcctcgcag gacaaggaaa ctaccttcca ttctgtgcaa gtctcagaca 1260

cctgtaagga ccagcgaggc agacagcacc gactctggca cttctacctc tccccctgaa 1320

attcacccag tggttcctct gggtatacat aaacctgttg ctgttaaagt ttgcgggcga 1380

cgccctgcag tacagtgcat tgaggacttg cttcacgatc ccgaggaacc tttggacttg 1440

agccttaaac gccctaggca ataaacccca cctaagtaat aaaccccacc taagtaataa 1500

accctgccgc ccttggttat tgagatgacg cccaatgttt gcttttgaat gacttcatgt 1560

gtgtaataaa agtgagtgtg atcataggtc tcttgtttgt ctgggcgggg cttaagggta 1620

tataagtctc ttggggctaa acttggttac acttgacccc aatggaggcg tgggggtgct 1680

tggaggagtt tgcggacgtg cgccgtttgc tggacgagag ctctagcaat acctatacta 1740

tttggaggta tctgtggggc tctactcagg ccaagttggt ttccagaatt aagcaggatt 1800

acaagtgcga ttttgaagag ctttttagtt cctgcggtga gcttttgcaa tccttgaatc 1860

tgggccatca ggctattttc caggaaaagg ttctctcgac tttggatttt tccactcccg 1920

ggcgcaccgc cgcttgtgtg gcttttgtgt cttttgtgca agataaatgg agcgaggaga 1980

cccacctgag tcacggctac gtactggatt tcatggcgat ggctctttgg agggctcaca 2040

acaaatggaa gattcagaag gaactgtacg gttccgccct acgtcgtcca cttctgtcgc 2100

gacaggggct gaggtttccc gaccatcggc agcatcagaa tctggaagac gagtcggagg 2160

agcgagcgga ggagaagatc agcttgagag ccggcctgga ccctcctcag gaggaatgaa 2220

tctcccgcag gtggttgacc tgtttccaga actgagacgg gtcctgacta tcagggagga 2280

tggtcagttt gtgaagaagt ttaagaggga tcggggtgag ggagatgatg aggcggctag 2340

caatttagct tttagtctga tgactcgcca ccgaccggaa tgtattacct atcagcagat 2400

taaggagagt tgtgccaacg agctggatct tttgggtcag aagtatagca tagaacagct 2460

taccacttac tggcttcagc ctggggatga ttgggaagag gcgatcaggg tgtatgcaaa 2520

ggtggccctg cggcccgatt gcaagtataa gattactaag ttggttaata ttagaaactg 2580

ctgctatatt tctgggaacg gggccgaagt ggagatagat actcaggaca gggtggcttt 2640

taggtgttgc atgataaaca tgtggcccgg gatactgggg atggatgggg tggtattcat 2700

gaatgtgagg tttacgggcc ccaactttaa tggcacggtg ttcatgggca acaccaactt 2760

gctcctgcat ggtgcgagtt tctatgggtt taataacacc tgtatagagg cctggaccga 2820

tgtaaaggtt cgaggttgtt ccttttatag ctgttggaag gcggtggtgt gtcgccctaa 2880

aagcaggggt tctgtgaaaa aatgcttgtt tgaaaggtgc accttaggca tcctctctga 2940

gggcaactcc agggtgcgcc ataatgtggc ttcgaactgc ggttgcttca tgcaagtgaa 3000

gggggtgagc gttatcaagc ataactcggt gtgtggaaac tgcgaggatc gcgcctccca 3060

gatgctgacc tgctttgatg gcaactgtca cctgttgaag accattcata taagcagcca 3120

ccccagaaag gcctggcccg tgtttgagca taacatcttg acccgctgct ccttgcatct 3180

gggggtcagg aggggtatgt tcctgcctta ccagtgtaac tttagccaca ctaaaatcct 3240

gctggaaccc gagtgcatga ccaaggtcag cctgaatggt gtgtttgatg tgactctgaa 3300

aatctggaag gtgctgaggt atgatgagac caggaccagg tgccgaccct gcgagtgcgg 3360

cggcaagcac atgagaaatc agcctgtgat gttggatgtg accgaggagc ttaggcctga 3420

ccatctggtg ctggcctgca ccagggccga gtttgggtct agcgatgagg ataccgattg 3480

aggtgggtaa ggtgggcgtg gctagaaggg tggggcgtgt ataaattggg ggtctaaggg 3540

tctctctgtt ttgtcttgca acagccgccg ccatgagcga caccggcaac agctttgatg 3600

gaagcatctt tagcccctat ctgacagtgc gcatgcctca ctgggctgga gtgcgtcaga 3660

atgtgatggg ttccaacgtg gatggacgcc ccgttctgcc ttcaaattcg tctacaatgg 3720

cctacgcgac cgtgggagga actccgctgg acgccgcgac ctccgccgcc gcctccgccg 3780

ccgccgcgac cgcgcgcagc atggctacgg acctttacag ctctttggtg gcgagcggcg 3840

cggcctctcg cgcgtctgct cgggatgaga aactgaccgc tctgctgctt aaactggaag 3900

acttgacccg ggagctgggt caactgaccc agcaggtctc cagcttgcgt gagagcagcc 3960

ttgcctcccc ctaatggccc ataatataaa taaaagccag tctgtttgga ttaagcaagt 4020

gtatgttctt tatttaactc tccgcgcgcg gtaagcccgg gaccagcggt ctcggtcgtt 4080

tagggtgcgg tggattcttt ccaacacgtg gtacaggtgg ctctggatgt ttagatacat 4140

gggcatgagt ccatccctgg ggtggaggta gcaccactgc agagcttcgt gctcgggggt 4200

ggtgttgtat atgatccagt cgtagcagga gcgctgggcg tggtgctgaa aaatgtcctt 4260

aagcaagagg cttatagcta gggggaggcc cttggtgtaa gtgtttacaa atctgctcag 4320

ttgggagggg tgcatccggg gggatataat gtgcatcttg gactggattt ttaggttggc 4380

tatgttccca cccagatccc ttctgggatt catgttgtgc aggaccacca gcacggtata 4440

tccagtgcac ttgggaaatt tatcgtggag cttagacggg aatgcatgga agaacttgga 4500

gacgcccttg tggcctccca gattttccat acattcgtcc atgatgatgg caatgggccc 4560

gtgggaagct gcctgagcaa aaatgtttct gggatcgctc acatcgtagt tatgttccag 4620

ggtgaggtca tcataggaca tctttacgaa tcgggggcgg agggtcccgg actgggggat 4680

gatggtaccc tcgggccccg gggcgtagtt cccctcacag atctgcatct cccaggcttt 4740

catttcagag ggagggatca tatccacctg cggagcgatg aaaaacacag tttctggcgc 4800

aggggagatt aactgggatg agagcaggtt tctgagcagc tgtgactttc cacagccggt 4860

gggcccatat atcacgccta tcaccggctg cagctggtag ttaagagagc tgcagctgcc 4920

gtcctcccgg agcaggggggg ccacctcgtt cagcatatcc ctgacgtgga tgttctccct 4980

gaccaattcc gccagaaggc gctcgccgcc cagcgaaagc agctcttgca aggaagcaaa 5040

atttttcagc ggttttaggc cgtcggccgt gggcatgttt ttcagcgtct gggtcagcag 5100

ttccagcctg tcccacagct cggtgatgtg ctctacggca tctcgatcca gcagatctcc 5160

tcgtttcgcg ggttggggcg gctttcgctg tagggcacca gccgatgggc gtccagcggg 5220

gccagagtca tgtccttcca tgggcgcagg gtcctcgtca gggtggtctg ggtcacggtg 5280

aaggggtgcg ctccgggttg ggcgctggcc agggtgcgct tgaggctggt tctgctggtg 5340

ctgaatcgct gccgctcttc gccctgcgcg tcggccaggt agcatttgac catggtctcg 5400

tagtcgagac cctcggcggc gtgccccttg gcgcggagct ttcccttgga ggtggcgccg 5460

cacgaggggc actgcaggct cttcagggcg tagagcttgg gagcgagaaa cacggactct 5520

ggggagtagg cgtccgcgcc gcaggaagcg cagaccgtct cgcattccac cagccaagtg 5580

agctccgggc ggtcagggtc aaaaaccagg ttgcccccat gctttttgat gcgtttctta 5640

cctcggctct ccatgaggcg gtgtcccttc tcggtgacga agaggctgtc cgtgtccccg 5700

tagaccgact tcaggggcct gtcttccagc ggagtgcctc tgtcctcctc gtagagaaac 5760

tctgaccact ctgagacgaa ggcccgcgtc caggccagga cgaaggaggc cacgtgggag 5820

gggtagcggt cgttgtccac tagcgggtcc accttctcca gggtgtgcag gcacatgtcc 5880

ccctcctccg cgtccagaaa agtgattggc ttgtaggtgt aggacacgtg accgggggtt 5940

cccgacgggg gggtataaaa gggggtgggc gccctttcat cttcactctc ttccgcatcg 6000

ctgtctgcga gggccagctg ctggggtaag tattccctct cgaaggcggg catgacctca 6060

gcgctcaggt tgtcagtttc taaaaatgag gaggatttga tgttcacctg tccggaggtg 6120

ataccttga gggtacctgg gtccatctgg tcagaaaaca ctatttttt gttgtcaagc 6180

ttggtggcga acgacccgta gagggcgttg gagagcagct tggcgatgga gcgcagggtc 6240

tggtttttgt cgcggtcggc tcgctccttg gccgcgatgt tgagttgcac gtactcgcgg 6300

gccacgcact tccactcggg gaagacggtg gtgcgctcgt ctgggattag gcgcaccctc 6360

cagcctcggt tgtgcagggt gaccatgtcg acgctggtgg cgacctcgcc gcgcaggcgc 6420

tcgttggtcc agcagaggcg gccgcccttg cgcgagcaga agggggggtag ggggtccagc 6480

tggtcctcgt ttgggggggtc cgcgtcgatg gtgaagaccc cggggagcaa gcgcgggtca 6540

aagtagtcga tcttgcaagc ttgcatgtcc agagcccgct gccattcgcg ggcggcgagc 6600

gcgcgctcgt aggggttgag gggcgggccc cagggcatgg ggtgggtgag cgcggaggcg 6660

tacatgccgc agatgtcata cacgtacagg ggttccctga ggatgccgag gtaggtgggg 6720

tagcagcgcc ccccgcggat gctggcgcgc acgtagtcat agagctcgtg ggagggggcc 6780

agcatgttgg gcccgaggtt ggtgcgctgg gggcgctcgg cgcggaaggc gatctgcctg 6840

aagatggcat gggagttgga ggagatggtg ggccgctgga agacgttgaa gcttgcttct 6900

tgcaagccca ccgagtccct gacgaaggag gcgtaggact cgcgcagctt gtgcaccagc 6960

tcggcggtga cctggacgtc gagcgcgcag tagtcgaggg tctcgcggat gatgtcatac 7020

ttatcctccc ccttcttttt ccacagctcg cggttgagga cgaactcttc gcggtctttc 7080

cagtactctt ggaggggaaa cccgtccgtg tccgaacggt aagagcctag catgtagaac 7140

tggttgacgg cctggtaggg gcaacagccc ttctccacgg gcagcgcgta ggcctgcgcc 7200

gccttgcgga gggaggtgtg ggtgagggcg aaagtgtccc tgaccatgac tttgaggtat 7260

tgatgtttga agtctgtgtc atcgcagccg ccctgttccc acagggtgta gtccgtgcgc 7320

tttttggagc gcgggttggg cagggagaag gtgaggtcat tgaagaggat cttccccgct 7380

cgaggcatga agtttctggt gatgcgaaag ggccctggga ccgaggagcg gttgttgatg 7440

acctgggcgg ccaggacgat ctcgtcaaag ccgtttatgt tgtggcccac gatgtagagc 7500

tccaaaaagc ggggctggcc cttgatggag gggagctttt tgagttcctc gtaggtgagc 7560

tcctcgggcg attccaggcc gtgctcctcc agggcccagt cttgcaagtg agggttggcc 7620

gccaggaagg atcgccagag gtcgcgggcc atgagggtct gcaggcggtc gcggaaggtt 7680

ctgaactgtc gccccacggc catcttttcg ggggtgatgc agtagaaggt gagggggtct 7740

ttctcccagg ggtcccatct gagctctcgg gcgaggtcgc gcgcggcggc gaccagagcc 7800

tcgtcgcccc ccagtttcat gaccagcatg aagggcacga gctgcttgcc aaaggctccc 7860

atccaagtgt aggtctctac atcgtaggtg acaaagaggc gctccgtgcg aggatgagag 7920

ccgatcggga agaactggat ctcccgccac cagttggagg attggctgtt gatgtggtga 7980

aagtagaagt cccgtctgcg ggccgagcac tcgtgctggc ttttgtaaaa gcgaccgcag 8040

tactggcagc gctgcacggg ttgtatatct tgcacgaggt gaacctggcg acctctgacg 8100

aggaagcgca gcgggaatct aagtcccccg cctggggtcc cgtgtggctg gtggtcttct 8160

actttggttg tctggccgcc agcatctgtc tcctggaggg cgatggtgga gcagaccacc 8220

acgccgcgag agccgcaggt ccagatctcg gcgctcggcg ggcggagttt gatgacgaca 8280

tcgcgcacat tggagctgtc catggtctcc agctcccgcg gcggcaggtc agctgggagt 8340

tcctggaggt tcacctcgca gagacgggtc aaggcgcggg cagtgttgag atggtatctg 8400

atttcaaggg gcgtgttggc ggcggagtcg atggcttgca ggaggccgca gccccggggg 8460

gccacgatgg ttccccgcgg ggcgcgaggg gaggcggaag ctgggggtgt gttcagaagc 8520

ggtgacgcgg gcgggccccc ggaggtaggg ggggttccgg ccccacaggc atgggcggca 8580

ggggcacgtc ttcgccgcgc gcgggcaggg gctggtgctg gctccgaaga gcgcttgcgt 8640

gcgcgacgac gcgacggttg gtgtcctgta tctgacgcct ctgagtgaag accacgggtc 8700

ccgtgacctt gaacctgaaa gagagttcga cagaatcaat ctcggcatcg ttgacagcgg 8760

cctggcgcag gatctcctgc acgtcgcccg agttgtcctg gtaggcgatc tctgccatga 8820

actgctcgat ctcttcttcc tggagatctc ctcgtccggc gcgctccacg gtggccgcca 8880

ggtcgttgga gatgcgaccc atgagctgtg agaaggcgtt gagcccgccc tcgttccaga 8940

cccggctgta gaccacgccc ccctcggcgt cgcgagcgcg catgaccacc tgggccaggt 9000

tgagctccac gtgtcgcgtg aagacggcgt agttgcgcag gcgctggaaa aggtagttca 9060

gggtggtggc ggtgtgctcg gcgacgaaga agtacatgac ccagcgccgc aacgtggatt 9120

cattgatgtc ccccaaggcc tccaggcgct ccatggcctc gtagaagtcc acggcgaagt 9180

tgaaaaactg ggagttgcga gcggacacgg tcaactcctc ctccagaaga cggatgagct 9240

cggcgacagt gttgcgcacc tcgcgctcga aggccacggg gggcgcttct tcctcttcca 9300

cctcttcttc catgatcgct tcttcttctt cctcagccgg gacgggaggg ggcggcggcg 9360

gcgggggagg ggcgcggcgg cggcggcggc gcaccgggag gcggtcgatg aagcgctcga 9420

tcatctcccc ccgcatgcgg cgcatggtct cggtgacggc gcggccgttc tcccgggggc 9480

gcagctcgaa gacgccgcct ctcatctcgc cgcggggcga gcggccgtga ggtagcgaga 9540

cggcgctgac tatgcatctt aacaattgct gtgtaggtac accgccgagg gacctgattg 9600

agtccagatc caccggatcc gaaaaccttt ggaggaaagc gtctatccag tcgcagtcgc 9660

aaggtaggct gagcaccgtg gcgggcgggg gcgggtctgg agagttcctg gcggagatgc 9720

tgctgatgat gtaattaaag taggcggtct tgagaaggcg gatggtggac aggagcacca 9780

tgtctttggg tccggcctgt tggatgcgga ggcggtcggc catgccccag gcctcgttct 9840

gacaccggcg caggtctttg tagtagtctt gcatgagtct ttccaccggc acctcttctc 9900

cttcctcttc tccatctcgc cggtggtttc tcgcgccgcc catgcgcgtg accccaaagc 9960

ccctgagcgg ctgcagcagg gccaggtcgg cgaccacgcg ctcggccaag atggcctgct 10020

gcacctgagt gagggtcctc tcgaagtcat ccatgtccac gaagcggtgg taggcgcccg 10080

tgttgatggt gtaggtgcag ttggccatga cggaccagtt gacggtctgg tgtcccggct 10140

gcgagagctc cgtgtaccgc aggcgcgaga aggcgcggga atcgaacacg tagtcgttgc 10200

aagtccgcac cagatactgg tagcccacca ggaagtgcgg cggaggttgg cgatagaggg 10260

gccagcgctg ggtggcgggg gcgccgggcg ccaggtcttc cagcatgagg cggtggtatc 10320

cgtagatgta cctggacatc caggtgatgc cggcggcggt ggtggtggcg cgcgcgtagt 10380

cgcggacccg gttccagatg tttcgcaggg gcgagaagtg ttccatggtc ggcacgctct 10440

ggccggtgag gcgcgcgcag tcgttgacgc tctatacaca cacaaaaacg aaagcgttta 10500

cagggctttc gttctgtagc ctggaggaaa gtaaatgggt tgggttgcgg tgtgccccgg 10560

ttcgagacca agctgagctc ggccggctga agccgcagct aacgtggtat tggcagtccc 10620

gtctcgaccc aggccctgta tcctccagga tacggtcgag agccctttg ctttcttggc 10680

caagcgcccg tggcgcgatc tgggatagat ggtcgcgatg agaggacaaa agcggctcgc 10740

ttccgtagtc tggagaaaca atcgccaggg ttgcgttgcg gcgtaccccg gttcgagccc 10800

ctatggcggc ttgaatcggc cggaaccgcg gctaacgagg gccgtggcag ccccgtcctc 10860

aggaccccgc cagccgactt ctccagttac gggagcgagc ccctttgtt ttttattttt 10920

tagatgcatc ccgtgctgcg gcagatgcgc ccctcgcccc ggcccgatca gcagcagcaa 10980

cagcaggcat gcagaccccc ctctcccctt tccgccccgg tcaccacggc cgcggcggcc 11040

gtgtcgggcg cgggggcgc gctggagtca gatgagccac cgcggcggcg acctaggcag 11100

tatctggact tggaagaggg cgagggactg gcgcggctgg gggcgaactc tccagagcgc 11160

cacccgcggg tgcagttgaa aagggacgcg cgcgaggcgt acctgccgcg gcagaacctg 11220

tttcgcgacc gcgggggcga ggagcccgag gagatgcgag actgcaggtt ccaagcgggg 11280

cgcgagctgc ggcgcgggct ggacagacag cgcctgctgc gcgaggagga ctttgagccc 11340

gacacgcaga cgggcatcag ccccgcgcgc gcgcacgtag ccgcggccga cctggtgacc 11400

gcctacgagc agacggtaaa ccaggagcgc aacttccaaa agagcttcaa caaccacgtg 11460

cgcacgctgg tggcgcgcga ggaggtgacc ctgggtctca tgcatctgtg ggacctggtg 11520

gaggcgatcg tgcagaaccc cagcagcaag cccctgaccg cgcagctgtt cctggtggtg 11580

cagcacagca gggacaacga ggccttcagg gaggcgctgc tgaacatcac cgagccggag 11640

gggcgctggc tcctggacct gataaacatc ctgcagagca tagtggtgca ggagcgcagc 11700

ctgagcctgg ccgagaaggt ggcggccatc aactactcta tgctgagcct gggcaagttc 11760

tacgcccgca agatctacaa gacccctac gtgcccatag acaaggaggt gaagatagac 11820

agcttctaca tgcgcatggc gctgaaggtg ctgaccctga gcgacgacct gggagtgtac 11880

cgcaacgagc gcatccacaa ggccgtgagc gccagccggc ggcgcgagct gagcgaccgc 11940

gagctgatgc acagtctgca gcgcgcgctg accggcgcgg gcgagggcga cagggaggtc 12000

gagtcctact tcgacatggg ggccgacctg cactggcagc cgagccgccg cgccctggag 12060

gcggcggggg cgtacggcgg ccccctggcg gccgatgacc aggaagagga ggactatgag 12120

ctagaggagg gcgagtacct ggaggactga cctggctggt ggtgttttgg tatagatgca 12180

agatccgaac gtggcggacc cggcggtccg ggcggcgctg caaagccagc cgtccggcat 12240

taactcctct gacgactggg ccgcggccat gggtcgcatc atggccctga ccgcgcgcaa 12300

ccccgaggct ttcaggcagc agcctcaggc caaccggctg gcggccatct tggaagcggt 12360

agtgcccgcg cgctccaacc ccacccacga gaaggtgctg gccatagtca acgcgctggc 12420

ggagagcagg gccatccgcg cggacgaggc cggactggtg tacgatgcgc tgctgcagcg 12480

ggtggcgcgg tacaacagcg gcaacgtgca gaccaacctg gaccgcctgg tgacggacgt 12540

gcgcgaggcc gtggcgcagc gcgagcgctt gcatcaggac ggtaacctgg gctcgctggt 12600

ggcgctaaac gccttcctca gcacccagcc ggccaacgta ccgcgggggc aggaggacta 12660

caccaacttt ttgagcgcgc tgcggctgat ggtgaccgag gtccctcaga gcgaggtgta 12720

ccagtcgggg cccgactact tcttccagac cagcagacag ggcttgcaaa ccgtgaacct 12780

gagccaggct ttcaagaacc tgcgggggct gtggggagtg aaggcgccca ccggcgaccg 12840

ggctacggtg tccagcctgc taacccccaa ctcgcgcctg ctgctgctgc tgatcgcgcc 12900

cttcacggac agcgggagcg tctcgcggga gacctatctg ggccacctgc tgacgctgta 12960

ccgcgaggcc atcgggcagg cgcaggtgga cgagcacacc ttccaagaga tcaccagcgt 13020

gagccacgcg ctggggcagg aggacacggg cagcctgcag gcgaccctga actacctgct 13080

gaccaacagg cggcagaaga ttcccacgct gcacagcctg acccaggagg aggagcgcat 13140

cttgcgctac gtgcagcaga gcgtgagcct gaacctgatg cgcgacggcg tgacgcccag 13200

cgtggcgctg gacatgaccg cgcgcaacat ggaaccgggc atgtacgcct cccaccggcc 13260

gtttatcaac cgcctgatgg actacttgca tcgggcggcg gccgtgaacc ccgagtactt 13320

cactaatgcc attctgaatc cccactggat gccccctccg ggtttctaca acggggactt 13380

tgaggtgccc gaggtcaacg acgggttcct ctgggatgac atggatgaca gtgtgttctc 13440

acccaacccg ctgcgcgccg cgtctctgcg attgaaggag ggctctgaca gggaaggacc 13500

gaggagtctg gcctcctccc tggctctggg agcggtgggc gccacgggcg cggcggcgcg 13560

gggcagtagc cccttcccca gcctggcaga ctctctgaac agcgggcggg tgagcaggcc 13620

ccgcttgcta ggcgaggagg agtatctgaa caactccctg ctgcagcccg cgagggacaa 13680

gaacgctcag cggcagcagt ttcccaacaa tgggatagag agcctggtgg acaagatgtc 13740

cagatggaag acgtatgcgc aggagtacaa ggagtgggag gaccgccagc cgcggccctt 13800

gccgcccccc aggcagcgct ggcagcggcg cgcgtccaac cgccgctgga ggcaggggcc 13860

cgaggacgat gatgactctg cagatgacag cagcgtgttg gacctgggcg ggagcgggaa 13920

ccccttttcg cacctgcgcc cacgcctggg caagatgttt taaaagaaaa aaaaaataaa 13980

actcaccaag gccatggcga cgagcgttgg ttttttgttc ccttccttag tatgcggcgc 14040

gcggcgatgt tcgaggaggg gcctcccccc tcttacgaga gcgcgatggg gatttctcct 14100

gcggcgcccc tgcagcctcc ctacgtgcct cctcggtacc tgcaacctac agggggggaga 14160

aatagcatct gttactctga gctgcagccc ctgtacgata ccaccagact gtacctggtg 14220

gacaacaagt ccgcggacgt ggcctccctg aactaccaga acgaccacag cgatttttg 14280

accacggtga tccaaaacaa cgacttcacc ccaaccgagg ccagcaccca gaccataaac 14340

ctggataaca ggtcgaactg gggcggcgac ctgaagacca tcttgcacac caacatgccc 14400

aacgtgaacg agttcatgtt caccaactct tttaaggcgc gggtgatggt ggcgcgcgag 14460

caggggggagg cgaagtacga gtgggtggac ttcacgctgc ccgagggcaa ctactcagag 14520

accatgactc tcgacctgat gaacaatgcg atcgtggaac actatctgaa agtgggcagg 14580

cagaacgggg tgaaggaaag cgatatcggg gtcaagtttg acaccagaaa cttccgtctg 14640

ggctgggacc ccgtgaccgg gctggtcatg ccgggggtct acaccaacga ggcctttcat 14700

cccgacatag tgcttctgcc cggctgtggg gtggacttca cccagagccg gctgagcaac 14760

ctgctgggca ttcgcaagcg gcagcctttc caggagggtt tcaagatcac ctatgaggat 14820

ctgaaggggg gcaacattcc cgcgctcctt gatctggacg cctacgagga gagcttgaaa 14880

cccgaggaga gcgctggcga cagcggcgag agtggcgagg agcaagccgg cggcggtggc 14940

ggcgcgtcgg tagaaaacga aagtacgccc gcagtggcgg cggacgctgc ggaggtcgag 15000

ccggaggcca tgcagcagga cgcagaggag ggcgcacagg agggcgcgca gaaggacatg 15060

aacgatgggg agatcagggg agacacattc gccacccggg gcgaagaaaa agaggcagag 15120

gcggcggcgg cggcgacggc ggaggccgaa accgaggttg aggcagaggc agagcccgag 15180

accgaagtta tggaagacat gaatgatgga gaacgtaggg gcgacacgtt cgccacccgg 15240

ggcgaagaga aggcggcgga ggcagaagcc gcggctgagg aggcggctgc ggctgcggcc 15300

aagactgagg ctgcggctaa ggctgaggtc gaagccaatg ttgcggttga ggctcaggct 15360

gaggaggagg cggcggctga agcagttaag gaaaaggccc aggcagagca ggaagagaaa 15420

aaacctgtca ttcaacctct aaaagaagat agcaaaaagc gcagttacaa cgtcatcgag 15480

ggcagcacct ttacccagta ccgcagctgg tacctggcgt acaactacgg cgacccggtc 15540

aaggggggtgc gctcgtggac cctgctctgc acgccggacg tcacctgcgg ctccgagcag 15600

atgtactggt cgctgccgaa catgatgcaa gacccggtga ccttccgctc cacgcggcag 15660

gttagcaact tcccggtggt gggcgccgaa ctgctgcccg tgcactccaa gagtttttac 15720

aacgagcagg ccgtctactc ccagctgatc cgccaggcca cctctctgac ccacgtgttc 15780

aatcgctttc ccgagaacca gattttggcg cgcccgccgg cccccaccat caccaccgtg 15840

agtgaaaacg ttcctgccct cacagatcac gggacgctac cgctgcgcaa cagcatctca 15900

ggagtccagc gagtgaccat tactgacgcc agacgccgga cctgccccta cgtttacaag 15960

gccttgggca tagtctcgcc gcgcgtcctc tccagtcgca ctttttaaaa cacatctacc 16020

cacacgttcc aaaatcatgt ccgtactcat ctcacccagc aacaacaccg gctgggggct 16080

gcgcgcgccc agcaagatgt ttggaggggc gaggaagcgc tccgaccagc accctgtgcg 16140

cgtgcgcggc cactaccgcg cgccctgggg agcgcacaag cgcgggcgca cagggcgcac 16200

cactgtggac gacgtcattg actccgtagt ggagcaagcg cgccactaca cacccggcgc 16260

gccgaccgcc cccgccgtgt ccaccgtgga ccaggcgatc gaaagcgtgg tacagggcgc 16320

gcggcactat gccaacctta aaagtcgccg ccgccgcgtg gcccgccgcc atcgccggag 16380

accccgggcc accgccgccg cgcgccttac taaggctctg ctcaggcgcg ccaggcgaac 16440

tggccaccgg gccgccatga gggccgcacg gcgggctgcc gctgccgcaa gcgtcgtggc 16500

cccgcgggca cgaaggcgcg cggccgctgc cgccgccgcc gccatttcca gcttggcctc 16560

gacgcggcgc ggtaacatat actgggtgcg cgactcggta accggcacgc gggtacccgt 16620

gcgctttcgc cccccgcgga attagcacaa gacaacatac acactgagtc tcctgctgtt 16680

gtgtatccca gcggcgaccg tcagcagcgg cgacatgtcc aagcgcaaaa ttaaagaaga 16740

gatgctccag gtcatcgcgc cggagatcta tgggcccccg aagaaggagg aggatgatta 16800

caagccccgc aagctaaagc gggtcaaaaa gaaaaagaaa gatgatgatg acgaggcggt 16860

ggagtttgtc cgccgcatgg cacccaggcg ccccgtgcag tggaagggcc ggcgcgtgca 16920

gcgcgttttg cgccccggca ccgcggtggt cttcacgccc ggcgagcgct ccacgcgcac 16980

tttcaagcgg gtgtacgatg aggtgtacgg cgacgaggac ctgttggagc aggccaacca 17040

gcgctttggg gagtttgcat atgggaaacg gccccgcgag agtctaaaag aggacctgct 17100

ggcgctaccg ctggacgagg gcaatcccac cccgagtctg aagccggtaa ccctgcaaca 17160

ggtgctgcct ttgagcgcgc ccagcgagca taagcgaggg ttgaagcgcg aaggcgggga 17220

cctggcgccc accgtgcagt tgatggtgcc caagcggcag aagctggagg acgtgctgga 17280

gaaaatgaaa gtagagcccg ggatccagcc cgagatcaag gtccgcccca tcaagcaggt 17340

ggcgcccggc gtgggagtcc agaccgtgga cgttaggatt cccacggagg agatggaaac 17400

ccaaaccgcc actccctctt cggcggccag cgccaccacc ggcaccgctt cggtagaggt 17460

gcagacggac ccctggctac ccgccaccgc tgttgccgcc gccgcccccc gttcgcgcgg 17520

gcgcaagaga aattatccag cggccagcgc gctcatgccc cagtacgcac tgcatccatc 17580

catcgtgccc acccccggct accgcgggta ctcgtaccgc ccgcgcagat cagccggcac 17640

tcgcggccgc cgccgccgtg cgaccacaac cagccgccgc cgtcgccgcc gccgccagcc 17700

agtgctgacc cccgtgtctg taaggaaggt ggctcgctcg gggagcacgc tggtggtgcc 17760

cagagcgcgc taccacccca gcatcgttta aagccggtct ctgtatggtt cttgcagata 17820

tggccctcac ttgtcgcctc cgcttcccgg tgccgggata ccgaggaaga actcaccgcc 17880

gcagaggcat ggcgggcagc ggtctccgcg gcggccgtcg ccatcgccgg cgcgcaaaaa 17940

gcaggcgcat gcgcggcggt gtgctgcctc tgctaatccc gctaatcgcc gcggcgatcg 18000

gtgccgtacc cgggatcgcc tccgtggccc tgcaggcgtc ccagaaacgt tgactcttgc 18060

aaccttgcaa gcttgcattt tttggaggaa aaataaaaaa aagtctagac tctcacgctc 18120

gcttggtcct gtgactattt tgtagaaaaa aagatggaag acatcaactt tgcgtcgctg 18180

gccccgcgtc acggctcgcg cccgttcatg ggagactgga cagatatcgg caccagcaat 18240

atgagcggtg gcgccttcag ctggggcagt ctgtggagcg gccttaaaaa ttttggttcc 18300

accattaaga actatggcaa caaagcgtgg aacagcagca cgggccagat gctgagagac 18360

aagttgaaag agcagaactt ccaggagaag gtggcgcagg gcctggcctc tggcatcagc 18420

ggggtggtgg acatagctaa ccaggccgtg cagaaaaaga taaacagtca tctggacccc 18480

cgtcctcagg tggaggaaat gcctccagcg atggagacgg tgtctcccga gggcaaaggc 18540

gaaaagcgcc cgcggcccga cagagaagag accctggtgt cacacaccga ggagccgccc 18600

tcttacgagg aggcagtcaa ggccggcctg cccaccactc gccccatagc ccccatggcc 18660

accggtgtgg tgggccacag gcaacacact cccgcaacac tagatctgcc cccgccgtcc 18720

gagccgccgc gccagccaaa ggcggcgacg gtgcccgctc cctccacttc cgccgccaac 18780

agagtgcccc tgcgccgcgc cgcgagcggc ccccgggcct cgcgagttag cggcaactgg 18840

cagagcacac tgaacagcat cgtgggcctg ggagtgagga gtgtgaagcg ccgccgttgc 18900

tactgaatga gcaagctagc taacgtgttg tatgtgtgta tgcgtcctat gtcgccgcca 18960

gaggagctgt tgagccgccg gcgccgtctg cactccagcg aatttcaaga tggcgacccc 19020

atcgatgatg cctcagtggt cgtacatgca catctcgggc caggacgctt cggagtacct 19080

gagccccggg ctggtgcagt tcgcccgcgc cacagacacc tacttcaaca tgagtaacaa 19140

gttcaggaac cccactgtgg cgcccaccca cgatgtgacc acggaccggt cgcagcgcct 19200

gacgctgcgg ttcatccccg tggatcggga ggacaccgcc tactcttaca aggcgcggtt 19260

cacgctggcc gtgggcgaca accgcgtgct ggacatggcc tccacttact ttgacatcag 19320

gggggtgctg gacaggggcc ccaccttcaa gccctactcg ggtactgcct acaactccct 19380

ggcccccaag ggcgctccca attcttgcga gtgggaacaa gatgaaccag ctcaggcagc 19440

aatagctgaa gatgaagaag aacttgaaga agaacaagct caggacgaac aggcgcccac 19500

taagaaaacc catgtatacg cccaggcacc tctttctggt gaaaaaatta ctaaggatgg 19560

tttgcaaata ggtgtggatg ccacacaggc gggagataac cctatatatg ctgataaaac 19620

attccaaccc gaacctcaga taggtgagtc tcagtggaac gaggctgatg ccacagtagc 19680

aggaggcaga gtcttaaaaa agaccacccc tatgagacct tgctatggat cctatgccaa 19740

acctactaat gccaatggcg gtcaagggat catggtggcc aatgatcagg gagcgcttga 19800

atctaaagtt gagatgcaat ttttctccac cacaacgtct cttaatgtaa gggaaggtga 19860

aaacaatctt cagccaaaag tagtgctata cagcgaagat gttaacttgg aatcccctga 19920

cactcatttg tcttacaaac ctaaaaagga tgacaccaac tctaaaatca tgttgggtca 19980

gcaagccatg cccaacagac ccaacctcat tgcttttagg gacaacttta ttggacttat 20040

gtactacaac agcacaggca acatgggagt gctggcagga caggcctccc agctaaacgc 20100

tgtggtagac ttgcaagaca gaaacacaga gctgtcatac caactgatgc ttgattccat 20160

tggagacaga tcaagatact tttccatgtg gaaccaggca gtggacagct atgacccaga 20220

tgtcagaatc attgaaaacc atggggttga agatgagctg cccaactatt gctttcccct 20280

gggcggtatt ggaattacag acacatacca gtgcataaaa ccaaccgcag ctgctaataa 20340

cactacatgg tctaaggatg aagaatttag tgatcgcaat gaaatagggg tgggaaacaa 20400

cttcgccatg gagatcaaca tccaggccaa cctctggagg aacttcctct atgcgaacgt 20460

ggggctctac ctgccagaca agctcaagta caaccccacc aacgtggaca tctctgacaa 20520

ccccaacacc tatgactaca tgaacaagcg tgtggtggct cccggcctgg tggactgctt 20580

tgtcaatgtg ggagccaggt ggtccctgga ctacatggac aacgtcaacc ccttcaacca 20640

ccaccgcaat gcgggtctgc gctaccgctc catgatcctg ggcaacgggc gctacgtgcc 20700

cttccacatt caggtgcccc agaagttctt tgccatcaag aacctcctcc tcctgccggg 20760

ctcctacact tacgagtgga acttcaggaa ggatgtcaac atggtcctgc agagctctct 20820

gggcaatgac cttagggtgg acggggccag catcaagttt gacagcgtca ccctctatgc 20880

taccttcttc cccatggctc acaacaccgc ctccacgctc gaggccatgc tgaggaacga 20940

caccaacgac cagtccttca atgactacct ctctggggcc aacatgctct accccatccc 21000

cgccaaggcc accaacgtgc ccatctccat tccctctcgc aactgggccg ccttcagagg 21060

ctgggccttt acccgcctta agaccaagga aacccccctcc ctgggctcgg gttttgaccc 21120

ctactttgtc tactcgggat ccatccccta cctggatggc accttctacc tcaaccacac 21180

ttttaagaag atatccatca tgtatgactc ctccgtcagc tggccgggca atgaccgcct 21240

gctcaccccc aatgagttcg aggtcaagcg cgccgtggac ggcgagggct acaacgtggc 21300

ccagtgcaac atgaccaagg actggttcct ggtgcagatg ctggccaact acaacatagg 21360

ctaccagggc ttctacatcc cagagagcta caaggacagg atgtactcct tcttcagaaa 21420

tttccaaccc atgagcaggc aggtggtgga cgagaccaaa tacaaggact atcaggccat 21480

tggcatcact caccagcaca acaactcggg attcgtgggc tacctggctc ccaccatgcg 21540

cgaggggcag gcctaccccg ccaacttccc ctacccgttg ataggcaaaa ccgcggtcga 21600

cagcgtcacc cagaaaaagt tcctctgcga ccgcaccctc tggcgcatcc ccttctctag 21660

caacttcatg tccatgggtg cgctcacgga cctgggccag aacctgctct atgccaactc 21720

cgcccatgcg ctggacatga cttttgaggt ggaccccatg gacgagccca cccttctcta 21780

tattgtgttt gaagtgttcg acgtggtcag agtgcaccag ccgcaccgcg gtgtcatcga 21840

gaccgtgtac ctgcgcacgc ccttctcggc cggcaacgcc accacctaag gagacagcgc 21900

cgccgcctgc atgacgggtt ccaccgagca agagctcagg gccatcgcca gagacctggg 21960

atgcggaccc tatttttgg gcacctatga caaacgcttc ccgggcttca tctcccgaga 22020

caagctcgcc tgcgccatcg tcaacacggc cgcgcgcgag accgggggcg tgcactggct 22080

ggcctttggc tgggacccgc gctccaaaac ctgctacctc ttcgacccct ttggcttctc 22140

cgatcagcgc ctcagacaga tctatgagtt tgagtacgag gggctgctgc gccgcagcgc 22200

gcttgcctcc tcgcccgacc gctgcatcac ccttgagaag tccaccgaga ccgtgcaggg 22260

gccccactcg gccgcctgcg gtctcttctg ctgcatgttt ttgcacgcct ttgtgcgctg 22320

gccccagagt cccatggatc gcaaccccac catgaacttg ctcaagggag tgcccaacgc 22380

catgctccag agcccccagg tccagcccac cctgcgccac aaccaggaac agctctaccg 22440

cttcctggag cgccactccc cctacttccg cagtcacagc gcgcacatcc ggggggccac 22500

ctctttctgc cacttgcaag aaaacatgca agacggaaaa tgatgtacag ctcgcttttt 22560

aataaatgta aagactgtgc actttattta tacacgggct ctttctggtt atttattcaa 22620

caccgccgtc gccatctaga aatcgaaagg gttctgccgc gcgtcgccgt gcgccacggg 22680

cagagacacg ttgcgatact ggaagcggct cgcccactta aactcgggca ccaccatgcg 22740

gggcagtggt tcctcgggga agttctcgcc ccacagggtg cgggtcagct gcagcgcgct 22800

caggaggtcg ggagccgaga tcttgaagtc gcagttgggg ccggaaccct gcgcgcgcga 22860

gttgcggtac acggggttgc agcactggaa caccagcagg gccggattat gcacgctggc 22920

cagcaggctc tcgtcgctga tcatgtcgct gtccagatcc tccgcgttgc tcagggcgaa 22980

cggggtcatc ttgcagacct gcctgcccag gaaaggcggc agcccgggct tgccgttgca 23040

gtcgcagcgc aggggcatca gcaggtgccc gcggcccgac tgcgcctgcg ggtacagcgc 23100

gcgcatgaag gcttcgatct gcctgaaagc cacctgcgtc ttggctccct ccgaaaagaa 23160

catcccacag gacttgctgg agaactggtt cgcgggacag ctggcatcgt gcaggcagca 23220

gcgcgcgtcg gtgttggcga tctgcaccac gttgcgaccc caccggttct tcactatctt 23280

ggccttggaa gcctgctcct tcagcgcgcg ctggccgttc tcgctggtca catccatctc 23340

tatcacctgc tccttgttga tcatgtttgt accgtgcaga cacttcaggt cgccctccgt 23400

ctgggtgcag cggtgctccc acagcgcgca accggtgggc tcccaatttt tgtgggtcac 23460

ccccgcgtag gcctgcaggt aggcctgcaa gaagcgcccc atcatggcca caaaggtctt 23520

ctggctcgta aaggtcagct gcaggccgcg atgctcttcg ttcagccagg tcttgcagat 23580

ggcggccagc gcctcggtct gctcgggcag catcctaaaa tttgtcttca ggtcgttatc 23640

cacgtggtac ttgtccatca tggcgcgcgc cgcctccatg cccttctccc aggcggacac 23700

catgggcagg cttagggggt ttatcacttc caccggcgag gacaccgtac tttcgatttc 23760

ttcttcctcc ccctcttccc ggcgcgcgcc cacgctgctg cgcgctctca ccgcctgcac 23820

caaggggtcg tcttcaggca agcgccgcac cgagcgcttg ccgcccttga cctgcttaat 23880

cagcaccggc gggttgctga agcccaccat ggtcagcgcc gcctgctctt cttcgtcttc 23940

gctgtctacc actatctctg gggaagggct tctccgctct gcggcggcgc gcttcttttt 24000

tttcttggga gcggccgtga tggagtccgc cacggcgacg gaggtcgagg gcgtggggct 24060

gggggtgcgc ggtaccaggg cctcgtcgcc ctcggactct tcctctgact ccaggcggcg 24120

gcggagtcgc ttctttgggg gcgcgcgcgt cagcggcggc ggagacgggg acggggacgg 24180

ggacgggacg ccctccacag ggggtggtct tcgcgcagac ccgcggccgc gctcgggggt 24240

cttctcgagc tggtcttggt cccgactggc cattgtatcc tcctcctcct aggcagagag 24300

acataaggag tctatcatgc aagtcgagaa ggaggagagc ttaaccaccc cctctgagac 24360

cgccgatgcg cccgccgtcg ccgtcgcccc cgctgccgcc gacgcgcccg ccacaccgag 24420

cgacaccccc gcggaccccc ccgccgacgc acccctgttc gaggaagcgg ccgtggagca 24480

ggacccgggc tttgtctcgg cagaggagga tttgcgagag gaggaggata aggagaagaa 24540

gccctcagtg ccaaaagatg ataaagagca agacgagcac gacgcagatg cacaccaggg 24600

tgaagtcggg cgggggggacg gagggcatga cggcgccgac tacctagacg aagggaacga 24660

cgtgctcttg aagcacctgc atcgtcagtg cgccattgtt tgcgacgctc tgcaggagcg 24720

cagcgaagtg cccctcagcg tggcggaggt cagccacgcc tacgagctca gcctcttctc 24780

ccccgggtg ccccccgcc gccgcgaaaa cggcacatgc gagcccaacc cgcgcctcaa 24840

cttctacccc gcctttgtgg tacccgaggt cctggccacc tatcacatct tctttcaaaa 24900

ttgcaagatc cccctctcgt gccgcgccaa ccgtagccgc gccgataaga tgctggccct 24960

gcgccagggc gaccacatac ctgatatcgc cgctttggaa gatgtaccaa agatcttcga 25020

gggtctgggt cgcaacgaga agcgggcagc aaactctctg caacaggaaa acagcgaaaa 25080

tgagagtcac accggggtac tggtggagct cgagggcgac aacgcccgcc tggcggtggt 25140

caagcgcagc atcgaggtca cccactttgc ctaccccgcg ctaaacctgc cccccaaagt 25200

catgaacgcg gccatggacg ggctgatcat gcgccgcggc cggcccctcg ctccagatgc 25260

aaacttgcat gaggagaccg aggacggcca gcccgtggtc agcgacgagc agctggcgcg 25320

ctggctggag accgcggacc ccgccgaact ggaggagcgg cgcaagatga tgatggccgt 25380

ggtgctggtc accgtagagc tggagtgtct gcagcgcttc ttcggcgacc ccgagatgca 25440

gagaaaggtc gaggagaccc tgcactacac cttccgccag ggctacgtgc gccaggcttg 25500

caagatctcc aacgtggagc tcagcaacct ggtgtcctac ctgggcatct tgcatgagaa 25560

ccgcctcggg cagagcgtgc tgcactccac cctgcgcggg gaggcgcgcc gcgactacgt 25620

gcgcgactgc gtttacctct tcctctgcta cacctggcag acggccatgg gggtctggca 25680

gcagtgcctg gaggagcgca acctcaagga gctggagaag ctcctgcagc gcgcgctcaa 25740

agatctctgg acgggctaca acgagcgctc ggtggccgcc gcgctggccg acctcatctt 25800

ccccgagcgc ctgctcaaaa ccctccagca ggggctgccc gacttcacca gccaaagcat 25860

gttgcaaaac ttcaggaact ttatcctgga gcgttctggc atcctacccg ccacctgctg 25920

cgccctgccc agcgactttg tccccctcgt gtaccgcgag tgcccccgc cgctgtgggg 25980

tcactgctac ctgttccaac tggccaacta cctgtcctac cacgcggacc tcatggagga 26040

ctccagcggc gaggggctca tggagtgcca ctgccgctgc aacctctgca cgccccaccg 26100

ctccctggtc tgcaacaccc aactgctcag cgagagtcag attatcggta ccttcgagct 26160

acagggtccg tcctcctcag acgagaagtc cgcggctccg gggctaaaac tcactccggg 26220

gctgtggact tccgcctacc tgcgcaaatt tgtacctgaa gactaccacg cccacgagat 26280

caggttttac gaagaccaat cccgcccgcc caaggcggag ctgaccgcct gcgtcatcac 26340

ccagggcgag atcctaggcc aattgcaagc catccaaaaa gcccgccaag acttttgct 26400

gaagaagggt cgggggtgt atctggaccc ccagtcgggt gaggagctca acccggttcc 26460

cccgctgccg ccgccgcggg accttgcttc ccaggataag catcgccatg gctcccagaa 26520

agaagcagca gcggccgcca ctgccgccac cccacatgct ggaggaagag gaggaatact 26580

gggacagtca ggcagaggag gtttcggacg aggaggagcc ggagacggag atggaagagt 26640

gggaggagga cagcttagac gaggaggctt ccgaagccga agaggcagac gcaacaccgt 26700

caccctcggc cgcagccccc tcgcaggcgc ccccgaagtc cgctcccagc atcagcagca 26760

acagcagcgc tataacctcc gctcctccac cgccgcgacc cacggccgac cgcagaccca 26820

accgtagatg ggacaccacc ggaaccgggg ccggtaagtc ctccgggaga ggcaagcaag 26880

cgcagcgcca aggctaccgc tcgtggcgcg ctcacaagaa cgccatagtc gcttgcttgc 26940

aagactgcgg ggggaacatc tccttcgccc gccgcttcct gctcttccac cacggtgtgg 27000

ccttcccccg taacgtcctg cattactacc gtcatctcta cagcccctac tgcggcggca 27060

gtgagccaga gacggtcggc ggcggcggcg gcgcccgttt cggcgcctag gaagacccag 27120

ggcaagactt cagccaagaa actcgcggcg gccgcggcga acgcggtcgc gggggccctg 27180

cgcctgacgg tgaacgaacc cctgtcgacc cgcgaactga ggaaccgaat cttccccact 27240

ctctatgcca tcttccagca gagcagaggg caggatcagg aactgaaagt aaaaaacagg 27300

tctctgcgct ccctcacccg cagctgtctg tatcacaaga gcgaagacca gcttcggcgc 27360

acgctggagg acgctgaggc actcttcagc aaatactgcg cgctcactct taaggactag 27420

ctccgcgccc ttctcgaatt taggcgggaa cgcctacgtc atcgcagcgc cgccgtcatg 27480

agcaaggaca ttcccacgcc atacatgtgg agctatcagc cgcagatggg actcgcggcg 27540

ggcgcctccc aagactactc cacccgcatg aactggctca gtgccggccc acacatgatc 27600

tcacaggtta atgatatccg cacccatcga aaccaaatat tggtggagca ggcggcaatt 27660

accaccacgc cccgcaataa tcccaacccc agggagtggc ccgcgtccct ggtgtatcag 27720

gaaattcccg gccccaccac cgtactactt ccgcgtgatt cccaggccga agtccaaatg 27780

actaactcag gggcacagct cgcgggcggc tgtcgtcaca gggtgcggcc tcctcgccag 27840

ggtataactc acctggagat ccgaggcaga ggtattcagc tcaacgacga gtcggtgagc 27900

tcctcgctcg gtctcagacc tgacgggacc ttccagatag ccggagccgg ccgatcttcc 27960

ttcacgcccc gccaggcgta cctgactctg caaagctcgt cctcggcgcc gcgctcgggc 28020

ggcatcggga ctctccagtt cgtgcaggag tttgtgccct cggtctactt caaccccttc 28080

tcgggctctc ccggtcgcta cccggaccag ttcatctcga actttgacgc cgcgagggac 28140

tcggtggacg gctacgactg aatgtcgggt ggacccggtg cagagcaact tcgcctgaag 28200

cacctcgacc actgccgccg ccctcagtgc tttgcccgct gtcagaccgg tgagttccag 28260

tacttttccc tgcccgactc gcacccggac ggcccggcgc acggggtgcg ctttttcatc 28320

ccgagtcagg tgcgctctac cctaatcagg gagtttaccg cccgtcccct actggcggag 28380

ttggaaaagg ggccttctat cctaaccatt gcctgcatct gctctaaccc tggattgcac 28440

caagatcttt gctgtcattt gtgtgctgag tataataaag gctgagatca gaatctactc 28500

gggctcctgt cgccatcctg tcaacgccac cgtccaagcc cggcccgatc agcccgaggt 28560

gaacctcacc tgcggtctgc accggcgcct gaggaaatac ctagcttggt actacaacag 28620

cactcccttt gtggtttaca acagctttga ccaggacggg gtctcactga gggataacct 28680

ctcgaacctg agctactcca tcaggaagaa cagcaccctc gagctacttc ctccttacct 28740

gcccgggact taccagtgtg tcaccggtcc ctgcacccac acccacctgt tgatcgtaaa 28800

cgactctctt ccgagaacag acctcaataa ctcctcttcg cagttcccca gaacaggagg 28860

tgagctcagg aaaccccggg taaagaaggg tggacgagag ttaacacttg tggggtttct 28920

ggtgtatgtg acgctggtgg tggctctttt gattaaggct tttccttcca tgtctgaact 28980

ctccctcttc ttttatgaac aactcgacta gtgctaacgg gaccctaccc aacgaatcgg 29040

gattgaatat cggtaaccag gttgcagttt cacttttgat taccttcata gtcctcttcc 29100

tgctagtgct gtcgcttctg tgcctgcgga tcgggggctg ctgcatccac gtttatatct 29160

ggtgctggct gtttagaagg ttcggagacc atcgcaggta gaataaacat gctgctgctt 29220

accctctttg tcctggcgct ggccgccagc tgccaagcct tttccgaggc tgactttata 29280

gagccccagt gtaatgtgac ttttaaagcc catgcacagc gttgtcatac tataatcaaa 29340

tgtgccaccg aacacgatga ataccttatc cagtataaag ataaatcaca caaagtggca 29400

cttgttgaca tctggaaacc cgaagaccct ttggaataca atgtgaccgt tttccagggt 29460

gacctcttca aaatttacaa ttacactttc ccatttgacc agatgtgtga ctttgtcatg 29520

tacatggaaa agcagcacaa gctgtggcct ccgactcccc agggctgtgt ggaaaatcca 29580

ggctctttct gcatgatctc tctctgtgta actgtgctgg cactaatact cacgcttttg 29640

tatatcagat ttaaatcaag gcaaagcttc attgatgaaa agaaaatgcc ttaatcgctt 29700

tcacgcttga ttgctaacac cgggttttta tccgcagaat gattggaatc accctactaa 29760

tcacctccct ccttgcgatt gcccatgggt tggaacgaat cgaagtccct gtgggggcca 29820

atgttaccct ggtggggcct gtcggcaatg ctacattaat gtgggaaaaa tatactaaaa 29880

atcaatgggt ctcttactgc actaacaaaa atagccacaa gcccagagcc atctgcgatg 29940

ggcaaaatct aaccttgatt gatgttcaat tgctggatgc gggctactat tatgggcagc 30000

tgggtacaat gattaattac tggagacccc acagagatta catgctccac gtagtaaagg 30060

gtccccttag cagcccaccc actaccacct ctactacccc cactaccacc actactccca 30120

ccaccagcac tgccgcccag cctcctcata gcagaacaac cacttttatc aattccaagt 30180

cccactcccc ccacattgcc ggcgggccct ccgcctcaga ctccgaaacc accgagatct 30240

gcttctgcaa atgctctgac gccattgccc aggatttgga agatcacgag gaagatgagc 30300

atgacttcgc agatgcatgc caggcatcag agccagaagc gctgccggtg gccctcaaac 30360

agtatgcaga cccccacacc acccccgacc ttcctccacc ttcccagaag ccaagtttcc 30420

tgggggaaaa tgaaactctg cctctctcca tactcgctct gacatctgtt gctatgttga 30480

ccgctctgct ggtgcttcta tgctctatat gctacctgat ctgctgcaga aagaaaaaat 30540

ctcacggcca tgctcaccag cccctcatgc acttccctta ccctccagag ctgggcgacc 30600

acaaacttta agtctgcagt aactatctgc ccatcccttg tcagtcgaca gcgatgagcc 30660

ccactaatct aacggcctct ggacttacaa catcgtctct taatgagacc accgctcctc 30720

aagacctgta cgatggtgtc tccgcgctgg ttaaccagtg ggatcacctg ggcatatggt 30780

ggctcctcat aggagcagtg accctgtgcc taatcctggt ctggatcatc tgctgcatca 30840

aaagcagaag acccaggcgg cggcccatct acaggccctt tgtcatcaca cctgaagatg 30900

atgatgacac cacttccagg ctgcagaggc taaagcagct actcttctct tttacagcat 30960

ggtaaattga atcatgcctc gcattttcat ctacttgtct ctccttccac tttttctggg 31020

ctcttctaca ttggccgctg tgtcccacat cgaggtagac tgcctcacgc ccttcacagt 31080

ctacctgctt ttcggctttg tcatctgcac ctttgtctgc agcgttatca ctgtagtgat 31140

ctgcttcata cagtgcatcg actacgtctg cgtgcgggtg gcttacttta gacaccaccc 31200

ccagtatcgc aacagggaca tagcggctct cctaagactt gtttaaaatc atggccaaat 31260

taactgtgat tggtcttctg atcatctgct gcgtcctagc cgcgattggg actcaagctc 31320

ctaccaccac cagcgctccc agaaagagac atgtatcctg cagcttcaag cgtccctgga 31380

atatacccca atgctttact gatgaacctg aaatctcttt ggcttggtac ttcagcgtca 31440

ccgcccttct tatcttctgc agtacggtta ttgcccttgc catctaccct tcccttgacc 31500

tgggctggaa tgctgtcaac tctatggaat atcccacctt cccagaacca gacctgccag 31560

acctggttgt tctaaacgcg tttcctcctc ctgctcccgt tcaaaatcag tttcgccctc 31620

cgtcccccac gcccactgag gtcagctact ttaatctaac aggcggagat gactgaaaac 31680

ctagacctag aaatggacgg tctctgcagc gagcaacgca cactagagag gcgccggcaa 31740

aaagagctcg agcgtcttaa acaagagctc caagacgcgg tggccataca ccagtgcaaa 31800

aaaggtgtct tctgtctggt aaaacaggcc acgctcacct atgaaaaaac aggtgacacc 31860

caccgcctag gatacaagct gcccacacag cgccaaaagt tcgccctcat gataggcgaa 31920

caacccatca ccgtgaccca gcactccgtg gagacagaag gctgcataca tgctccctgt 31980

aggggcgctg actgcctcta caccttgatc aaaaccctct gcggtctcag agaccttatc 32040

cctttcaatt aatcataact gtaatcaata aaaaatcact tacttgaaat ctgatagcaa 32100

gcctctgtcc aatttttca gcaacacttc cttcccctcc tcccaactct ggtactctag 32160

gcgcctccta gctgcaaact tcctccacag tctgaaggga atgtcagatt cctcctcctg 32220

tccctccgca cccacgatct tcatgttgtt gcagatgaaa cgcgcgagat cgtctgacga 32280

gaccttcaac cccgtgtacc cctacgatac cgagatcgct ccgacttctg tccctttcct 32340

taccctccc tttgtgtcat ccgcaggaat gcaagaaaat ccagctgggg tgctgtccct 32400

gcacttgtca gagcccctta ccacccacaa tggggccctg actctaaaaa tgggggggcgg 32460

cctgaccctg gacaaggaag ggaatctcac ttcccaaaac atcaccagtg tcgatccccc 32520

tctcaaaaaa agcaagaaca acatcagcct tcagaccgcc gcacccctcg ccgtcagctc 32580

cggggcccta acacttttg ccactccccc cctagcggtc agtggtgaca accttactgt 32640

gcagtctcag gcccctctca ctttggaaga ctcaaaacta actctggcca ccaaaggacc 32700

cctaactgtg tccgaaggca aacttgtc 32728

<210> 22
<211> 32728
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus vector nucleotide sequences

<400> 22
catcatcaat aatatacctt attttggatt gtggccaata tgataatgag gtgggcgggg 60

agaggcgggg cgggtgacgt aggacgcgcg agtagggttg ggaggtgtgg cggaagtgtg 120

gcatttgcaa gtgggaggag ctcacatgca agcttccgtc gcggaaaatg tgacgttttt 180

gatgagcgcc gcctacctcc ggaagtgcca attttcgcgc gcttttcacc ggatatcgta 240

gtaattttgg gcgggaccat gtaagatttg gccattttcg cgcgaaaagt gaaacgggga 300

agtgaaaact gaataatagg gcgttagtca tagcgcgtaa tatttaccga gggccgaggg 360

actttgaccg attacgtgga ggactcgccc aggtgttttt tacgtgaatt tccgcgttcc 420

gggtcaaagt ctccgttttt attgtcaccg tcatttgacg cggagggtat ttaaacccgc 480

tgcgctcctc aagaggccac tcttgagtgc cagcgagaag agttttctcc tctgctccgc 540

ttcggtgatc gaaaaatgag acacatagcc tgcactccgg gtcttttgtc cggtcgggcg 600

gcggccgagc ttttggacgc tttgatcaat gatgtcctaa gcgatgattt tccgtctact 660

acccacttta gcccacctac tcttcacgaa ctgtacgatc tggatgtact ggtggatgtg 720

aacgatccca acgaggaggc ggtttctgcg ttttttcccg agtctgcgct gttggccgct 780

caggagggat ttgacctaca cactccgccg cctattttag agtctccgct gccggagccc 840

agtggtatac cttatatgcc tgaactgctt cccgaagtgg tagacctgac ctgccacgag 900

cctggctttc cgcccagcga cgatgagggt gagccttttg ttttagactt tgctgagata 960

cctgggcacg gttgcaggtc ttgtgcatat catcagaggg ttaccggaga ccccgaggtt 1020

aagtgttcgc tgtgctatat gaggatgacc tcttccttta tctacagtaa gtttttgtct 1080

aggtgggctt ttgggtaggt gggttttgtg tcagaacagg tgtaaacgtt gcttgtgttt 1140

tttgtacctg taggtccggt gtccgagcca gacccggagc ccgaccgcga tcccgagccg 1200

gatcccgagc ctcctcgcag gacaaggaaa ctaccttcca ttctgtgcaa gtctcagaca 1260

cctgtaagga ccagcgaggc agacagcacc gactctggca cttctacctc tccccctgaa 1320

attcacccag tggttcctct gggtatacat aaacctgttg ctgttaaagt ttgcgggcga 1380

cgccctgcag tacagtgcat tgaggacttg cttcacgatc ccgaggaacc tttggacttg 1440

agccttaaac gccctaggca ataaacccca cctaagtaat aaaccccacc taagtaataa 1500

accctgccgc ccttggttat tgagatgacg cccaatgttt gcttttgaat gacttcatgt 1560

gtgtaataaa agtgagtgtg atcataggtc tcttgtttgt ctgggcgggg cttaagggta 1620

tataagtctc ttggggctaa acttggttac acttgacccc aatggaggcg tgggggtgct 1680

tggaggagtt tgcggacgtg cgccgtttgc tggacgagag ctctagcaat acctatacta 1740

tttggaggta tctgtggggc tctactcagg ccaagttggt ttccagaatt aagcaggatt 1800

acaagtgcga ttttgaagag ctttttagtt cctgcggtga gcttttgcaa tccttgaatc 1860

tgggccatca ggctattttc caggaaaagg ttctctcgac tttggatttt tccactcccg 1920

ggcgcaccgc cgcttgtgtg gcttttgtgt cttttgtgca agataaatgg agcgaggaga 1980

cccacctgag tcacggctac gtactggatt tcatggcgat ggctctttgg agggctcaca 2040

acaaatggaa gattcagaag gaactgtacg gttccgccct acgtcgtcca cttctgtcgc 2100

gacaggggct gaggtttccc gaccatcggc agcatcagaa tctggaagac gagtcggagg 2160

agcgagcgga ggagaagatc agcttgagag ccggcctgga ccctcctcag gaggaatgaa 2220

tctcccgcag gtggttgacc tgtttccaga actgagacgg gtcctgacta tcagggagga 2280

tggtcagttt gtgaagaagt ttaagaggga tcggggtgag ggagatgatg aggcggctag 2340

caatttagct tttagtctga tgactcgcca ccgaccggaa tgtattacct atcagcagat 2400

taaggagagt tgtgccaacg agctggatct tttgggtcag aagtatagca tagaacagct 2460

taccacttac tggcttcagc ctggggatga ttgggaagag gcgatcaggg tgtatgcaaa 2520

ggtggccctg cggcccgatt gcaagtataa gattactaag ttggttaata ttagaaactg 2580

ctgctatatt tctgggaacg gggccgaagt ggagatagat actcaggaca gggtggcttt 2640

taggtgttgc atgataaaca tgtggcccgg gatactgggg atggatgggg tggtattcat 2700

gaatgtgagg tttacgggcc ccaactttaa tggcacggtg ttcatgggca acaccaactt 2760

gctcctgcat ggtgcgagtt tctatgggtt taataacacc tgtatagagg cctggaccga 2820

tgtaaaggtt cgaggttgtt ccttttatag ctgttggaag gcggtggtgt gtcgccctaa 2880

aagcaggggt tctgtgaaaa aatgcttgtt tgaaaggtgc accttaggca tcctctctga 2940

gggcaactcc agggtgcgcc ataatgtggc ttcgaactgc ggttgcttca tgcaagtgaa 3000

gggggtgagc gttatcaagc ataactcggt gtgtggaaac tgcgaggatc gcgcctccca 3060

gatgctgacc tgctttgatg gcaactgtca cctgttgaag accattcata taagcagcca 3120

ccccagaaag gcctggcccg tgtttgagca taacatcttg acccgctgct ccttgcatct 3180

gggggtcagg aggggtatgt tcctgcctta ccagtgtaac tttagccaca ctaaaatcct 3240

gctggaaccc gagtgcatga ccaaggtcag cctgaatggt gtgtttgatg tgactctgaa 3300

aatctggaag gtgctgaggt atgatgagac caggaccagg tgccgaccct gcgagtgcgg 3360

cggcaagcac atgagaaatc agcctgtgat gttggatgtg accgaggagc ttaggcctga 3420

ccatctggtg ctggcctgca ccagggccga gtttgggtct agcgatgagg ataccgattg 3480

aggtgggtaa ggtgggcgtg gctagaaggg tggggcgtgt ataaattggg ggtctaaggg 3540

tctctctgtt ttgtcttgca acagccgccg ccatgagcga caccggcaac agctttgatg 3600

gaagcatctt tagcccctat ctgacagtgc gcatgcctca ctgggctgga gtgcgtcaga 3660

atgtgatggg ttccaacgtg gatggacgcc ccgttctgcc ttcaaattcg tctacaatgg 3720

cctacgcgac cgtgggagga actccgctgg acgccgcgac ctccgccgcc gcctccgccg 3780

ccgccgcgac cgcgcgcagc atggctacgg acctttacag ctctttggtg gcgagcggcg 3840

cggcctctcg cgcgtctgct cgggatgaga aactgaccgc tctgctgctt aaactggaag 3900

acttgacccg ggagctgggt caactgaccc agcaggtctc cagcttgcgt gagagcagcc 3960

ttgcctcccc ctaatggccc ataatataaa taaaagccag tctgtttgga ttaagcaagt 4020

gtatgttctt tatttaactc tccgcgcgcg gtaagcccgg gaccagcggt ctcggtcgtt 4080

tagggtgcgg tggattcttt ccaacacgtg gtacaggtgg ctctggatgt ttagatacat 4140

gggcatgagt ccatccctgg ggtggaggta gcaccactgc agagcttcgt gctcgggggt 4200

ggtgttgtat atgatccagt cgtagcagga gcgctgggcg tggtgctgaa aaatgtcctt 4260

aagcaagagg cttatagcta gggggaggcc cttggtgtaa gtgtttacaa atctgctcag 4320

ttgggagggg tgcatccggg gggatataat gtgcatcttg gactggattt ttaggttggc 4380

tatgttccca cccagatccc ttctgggatt catgttgtgc aggaccacca gcacggtata 4440

tccagtgcac ttgggaaatt tatcgtggag cttagacggg aatgcatgga agaacttgga 4500

gacgcccttg tggcctccca gattttccat acattcgtcc atgatgatgg caatgggccc 4560

gtgggaagct gcctgagcaa aaatgtttct gggatcgctc acatcgtagt tatgttccag 4620

ggtgaggtca tcataggaca tctttacgaa tcgggggcgg agggtcccgg actgggggat 4680

gatggtaccc tcgggccccg gggcgtagtt cccctcacag atctgcatct cccaggcttt 4740

catttcagag ggagggatca tatccacctg cggagcgatg aaaaacacag tttctggcgc 4800

aggggagatt aactgggatg agagcaggtt tctgagcagc tgtgactttc cacagccggt 4860

gggcccatat atcacgccta tcaccggctg cagctggtag ttaagagagc tgcagctgcc 4920

gtcctcccgg agcaggggggg ccacctcgtt cagcatatcc ctgacgtgga tgttctccct 4980

gaccaattcc gccagaaggc gctcgccgcc cagcgaaagc agctcttgca aggaagcaaa 5040

atttttcagc ggttttaggc cgtcggccgt gggcatgttt ttcagcgtct gggtcagcag 5100

ttccagcctg tcccacagct cggtgatgtg ctctacggca tctcgatcca gcagatctcc 5160

tcgtttcgcg ggttggggcg gctttcgctg tagggcacca gccgatgggc gtccagcggg 5220

gccagagtca tgtccttcca tgggcgcagg gtcctcgtca gggtggtctg ggtcacggtg 5280

aaggggtgcg ctccgggttg ggcgctggcc agggtgcgct tgaggctggt tctgctggtg 5340

ctgaatcgct gccgctcttc gccctgcgcg tcggccaggt agcatttgac catggtctcg 5400

tagtcgagac cctcggcggc gtgccccttg gcgcggagct ttcccttgga ggtggcgccg 5460

cacgaggggc actgcaggct cttcagggcg tagagcttgg gagcgagaaa cacggactct 5520

ggggagtagg cgtccgcgcc gcaggaagcg cagaccgtct cgcattccac cagccaagtg 5580

agctccgggc ggtcagggtc aaaaaccagg ttgcccccat gctttttgat gcgtttctta 5640

cctcggctct ccatgaggcg gtgtcccttc tcggtgacga agaggctgtc cgtgtccccg 5700

tagaccgact tcaggggcct gtcttccagc ggagtgcctc tgtcctcctc gtagagaaac 5760

tctgaccact ctgagacgaa ggcccgcgtc caggccagga cgaaggaggc cacgtgggag 5820

gggtagcggt cgttgtccac tagcgggtcc accttctcca gggtgtgcag gcacatgtcc 5880

ccctcctccg cgtccagaaa agtgattggc ttgtaggtgt aggacacgtg accgggggtt 5940

cccgacgggg gggtataaaa gggggtgggc gccctttcat cttcactctc ttccgcatcg 6000

ctgtctgcga gggccagctg ctggggtaag tattccctct cgaaggcggg catgacctca 6060

gcgctcaggt tgtcagtttc taaaaatgag gaggatttga tgttcacctg tccggaggtg 6120

ataccttga gggtacctgg gtccatctgg tcagaaaaca ctatttttt gttgtcaagc 6180

ttggtggcga acgacccgta gagggcgttg gagagcagct tggcgatgga gcgcagggtc 6240

tggtttttgt cgcggtcggc tcgctccttg gccgcgatgt tgagttgcac gtactcgcgg 6300

gccacgcact tccactcggg gaagacggtg gtgcgctcgt ctgggattag gcgcaccctc 6360

cagcctcggt tgtgcagggt gaccatgtcg acgctggtgg cgacctcgcc gcgcaggcgc 6420

tcgttggtcc agcagaggcg gccgcccttg cgcgagcaga agggggggtag ggggtccagc 6480

tggtcctcgt ttgggggggtc cgcgtcgatg gtgaagaccc cggggagcaa gcgcgggtca 6540

aagtagtcga tcttgcaagc ttgcatgtcc agagcccgct gccattcgcg ggcggcgagc 6600

gcgcgctcgt aggggttgag gggcgggccc cagggcatgg ggtgggtgag cgcggaggcg 6660

tacatgccgc agatgtcata cacgtacagg ggttccctga ggatgccgag gtaggtgggg 6720

tagcagcgcc ccccgcggat gctggcgcgc acgtagtcat agagctcgtg ggaggggggcc 6780

agcatgttgg gcccgaggtt ggtgcgctgg gggcgctcgg cgcggaaggc gatctgcctg 6840

aagatggcat gggagttgga ggagatggtg ggccgctgga agacgttgaa gcttgcttct 6900

tgcaagccca ccgagtccct gacgaaggag gcgtaggact cgcgcagctt gtgcaccagc 6960

tcggcggtga cctggacgtc gagcgcgcag tagtcgaggg tctcgcggat gatgtcatac 7020

ttatcctccc ccttcttttt ccacagctcg cggttgagga cgaactcttc gcggtctttc 7080

cagtactctt ggaggggaaa cccgtccgtg tccgaacggt aagagcctag catgtagaac 7140

tggttgacgg cctggtaggg gcaacagccc ttctccacgg gcagcgcgta ggcctgcgcc 7200

gccttgcgga gggaggtgtg ggtgagggcg aaagtgtccc tgaccatgac tttgaggtat 7260

tgatgtttga agtctgtgtc atcgcagccg ccctgttccc acagggtgta gtccgtgcgc 7320

tttttggagc gcgggttggg cagggagaag gtgaggtcat tgaagaggat cttccccgct 7380

cgaggcatga agtttctggt gatgcgaaag ggccctggga ccgaggagcg gttgttgatg 7440

acctgggcgg ccaggacgat ctcgtcaaag ccgtttatgt tgtggcccac gatgtagagc 7500

tccaaaaagc ggggctggcc cttgatggag gggagctttt tgagttcctc gtaggtgagc 7560

tcctcgggcg attccaggcc gtgctcctcc agggcccagt cttgcaagtg agggttggcc 7620

gccaggaagg atcgccagag gtcgcgggcc atgagggtct gcaggcggtc gcggaaggtt 7680

ctgaactgtc gccccacggc catcttttcg ggggtgatgc agtagaaggt gaggggtct 7740

ttctcccagg ggtcccatct gagctctcgg gcgaggtcgc gcgcggcggc gaccagagcc 7800

tcgtcgcccc ccagtttcat gaccagcatg aagggcacga gctgcttgcc aaaggctccc 7860

atccaagtgt aggtctctac atcgtaggtg acaaagaggc gctccgtgcg aggatgagag 7920

ccgatcggga agaactggat ctcccgccac cagttggagg attggctgtt gatgtggtga 7980

aagtagaagt cccgtctgcg ggccgagcac tcgtgctggc ttttgtaaaa gcgaccgcag 8040

tactggcagc gctgcacggg ttgtatatct tgcacgaggt gaacctggcg acctctgacg 8100

aggaagcgca gcgggaatct aagtcccccg cctggggtcc cgtgtggctg gtggtcttct 8160

actttggttg tctggccgcc agcatctgtc tcctggaggg cgatggtgga gcagaccacc 8220

acgccgcgag agccgcaggt ccagatctcg gcgctcggcg ggcggagttt gatgacgaca 8280

tcgcgcacat tggagctgtc catggtctcc agctcccgcg gcggcaggtc agctgggagt 8340

tcctggaggt tcacctcgca gagacgggtc aaggcgcggg cagtgttgag atggtatctg 8400

atttcaaggg gcgtgttggc ggcggagtcg atggcttgca ggaggccgca gccccggggg 8460

gccacgatgg ttccccgcgg ggcgcgaggg gaggcggaag ctgggggtgt gttcagaagc 8520

ggtgacgcgg gcgggccccc ggaggtaggg ggggttccgg ccccacaggc atgggcggca 8580

ggggcacgtc ttcgccgcgc gcgggcaggg gctggtgctg gctccgaaga gcgcttgcgt 8640

gcgcgacgac gcgacggttg gtgtcctgta tctgacgcct ctgagtgaag accacgggtc 8700

ccgtgacctt gaacctgaaa gagagttcga cagaatcaat ctcggcatcg ttgacagcgg 8760

cctggcgcag gatctcctgc acgtcgcccg agttgtcctg gtaggcgatc tctgccatga 8820

actgctcgat ctcttcttcc tggagatctc ctcgtccggc gcgctccacg gtggccgcca 8880

ggtcgttgga gatgcgaccc atgagctgtg agaaggcgtt gagcccgccc tcgttccaga 8940

cccggctgta gaccacgccc ccctcggcgt cgcgagcgcg catgaccacc tgggccaggt 9000

tgagctccac gtgtcgcgtg aagacggcgt agttgcgcag gcgctggaaa aggtagttca 9060

gggtggtggc ggtgtgctcg gcgacgaaga agtacatgac ccagcgccgc aacgtggatt 9120

cattgatgtc ccccaaggcc tccaggcgct ccatggcctc gtagaagtcc acggcgaagt 9180

tgaaaaactg ggagttgcga gcggacacgg tcaactcctc ctccagaaga cggatgagct 9240

cggcgacagt gttgcgcacc tcgcgctcga aggccacggg gggcgcttct tcctcttcca 9300

cctcttcttc catgatcgct tcttcttctt cctcagccgg gacgggaggg ggcggcggcg 9360

gcgggggagg ggcgcggcgg cggcggcggc gcaccgggag gcggtcgatg aagcgctcga 9420

tcatctcccc ccgcatgcgg cgcatggtct cggtgacggc gcggccgttc tcccgggggc 9480

gcagctcgaa gacgccgcct ctcatctcgc cgcggggcga gcggccgtga ggtagcgaga 9540

cggcgctgac tatgcatctt aacaattgct gtgtaggtac accgccgagg gacctgattg 9600

agtccagatc caccggatcc gaaaaccttt ggaggaaagc gtctatccag tcgcagtcgc 9660

aaggtaggct gagcaccgtg gcgggcgggg gcgggtctgg agagttcctg gcggagatgc 9720

tgctgatgat gtaattaaag taggcggtct tgagaaggcg gatggtggac aggagcacca 9780

tgtctttggg tccggcctgt tggatgcgga ggcggtcggc catgccccag gcctcgttct 9840

gacaccggcg caggtctttg tagtagtctt gcatgagtct ttccaccggc acctcttctc 9900

cttcctcttc tccatctcgc cggtggtttc tcgcgccgcc catgcgcgtg accccaaagc 9960

ccctgagcgg ctgcagcagg gccaggtcgg cgaccacgcg ctcggccaag atggcctgct 10020

gcacctgagt gagggtcctc tcgaagtcat ccatgtccac gaagcggtgg taggcgcccg 10080

tgttgatggt gtaggtgcag ttggccatga cggaccagtt gacggtctgg tgtcccggct 10140

gcgagagctc cgtgtaccgc aggcgcgaga aggcgcggga atcgaacacg tagtcgttgc 10200

aagtccgcac cagatactgg tagcccacca ggaagtgcgg cggaggttgg cgatagaggg 10260

gccagcgctg ggtggcgggg gcgccgggcg ccaggtcttc cagcatgagg cggtggtatc 10320

cgtagatgta cctggacatc caggtgatgc cggcggcggt ggtggtggcg cgcgcgtagt 10380

cgcggacccg gttccagatg tttcgcaggg gcgagaagtg ttccatggtc ggcacgctct 10440

ggccggtgag gcgcgcgcag tcgttgacgc tctatacaca cacaaaaacg aaagcgttta 10500

cagggctttc gttctgtagc ctggaggaaa gtaaatgggt tgggttgcgg tgtgccccgg 10560

ttcgagacca agctgagctc ggccggctga agccgcagct aacgtggtat tggcagtccc 10620

gtctcgaccc aggccctgta tcctccagga tacggtcgag agccctttg ctttcttggc 10680

caagcgcccg tggcgcgatc tgggatagat ggtcgcgatg agaggacaaa agcggctcgc 10740

ttccgtagtc tggagaaaca atcgccaggg ttgcgttgcg gcgtaccccg gttcgagccc 10800

ctatggcggc ttgaatcggc cggaaccgcg gctaacgagg gccgtggcag ccccgtcctc 10860

aggaccccgc cagccgactt ctccagttac gggagcgagc ccctttgtt ttttattttt 10920

tagatgcatc ccgtgctgcg gcagatgcgc ccctcgcccc ggcccgatca gcagcagcaa 10980

cagcaggcat gcagaccccc ctctcccctt tccgccccgg tcaccacggc cgcggcggcc 11040

gtgtcgggcg cgggggcgc gctggagtca gatgagccac cgcggcggcg acctaggcag 11100

tatctggact tggaagaggg cgagggactg gcgcggctgg gggcgaactc tccagagcgc 11160

cacccgcggg tgcagttgaa aagggacgcg cgcgaggcgt acctgccgcg gcagaacctg 11220

tttcgcgacc gcgggggcga ggagcccgag gagatgcgag actgcaggtt ccaagcgggg 11280

cgcgagctgc ggcgcgggct ggacagacag cgcctgctgc gcgaggagga ctttgagccc 11340

gacacgcaga cgggcatcag ccccgcgcgc gcgcacgtag ccgcggccga cctggtgacc 11400

gcctacgagc agacggtaaa ccaggagcgc aacttccaaa agagcttcaa caaccacgtg 11460

cgcacgctgg tggcgcgcga ggaggtgacc ctgggtctca tgcatctgtg ggacctggtg 11520

gaggcgatcg tgcagaaccc cagcagcaag cccctgaccg cgcagctgtt cctggtggtg 11580

cagcacagca gggacaacga ggccttcagg gaggcgctgc tgaacatcac cgagccggag 11640

gggcgctggc tcctggacct gataaacatc ctgcagagca tagtggtgca ggagcgcagc 11700

ctgagcctgg ccgagaaggt ggcggccatc aactactcta tgctgagcct gggcaagttc 11760

tacgcccgca agatctacaa gacccctac gtgcccatag acaaggaggt gaagatagac 11820

agcttctaca tgcgcatggc gctgaaggtg ctgaccctga gcgacgacct gggagtgtac 11880

cgcaacgagc gcatccacaa ggccgtgagc gccagccggc ggcgcgagct gagcgaccgc 11940

gagctgatgc acagtctgca gcgcgcgctg accggcgcgg gcgagggcga cagggaggtc 12000

gagtcctact tcgacatggg ggccgacctg cactggcagc cgagccgccg cgccctggag 12060

gcggcggggg cgtacggcgg ccccctggcg gccgatgacc aggaagagga ggactatgag 12120

ctagaggagg gcgagtacct ggaggactga cctggctggt ggtgttttgg tatagatgca 12180

agatccgaac gtggcggacc cggcggtccg ggcggcgctg caaagccagc cgtccggcat 12240

taactcctct gacgactggg ccgcggccat gggtcgcatc atggccctga ccgcgcgcaa 12300

ccccgaggct ttcaggcagc agcctcaggc caaccggctg gcggccatct tggaagcggt 12360

agtgcccgcg cgctccaacc ccacccacga gaaggtgctg gccatagtca acgcgctggc 12420

ggagagcagg gccatccgcg cggacgaggc cggactggtg tacgatgcgc tgctgcagcg 12480

ggtggcgcgg tacaacagcg gcaacgtgca gaccaacctg gaccgcctgg tgacggacgt 12540

gcgcgaggcc gtggcgcagc gcgagcgctt gcatcaggac ggtaacctgg gctcgctggt 12600

ggcgctaaac gccttcctca gcacccagcc ggccaacgta ccgcgggggc aggaggacta 12660

caccaacttt ttgagcgcgc tgcggctgat ggtgaccgag gtccctcaga gcgaggtgta 12720

ccagtcgggg cccgactact tcttccagac cagcagacag ggcttgcaaa ccgtgaacct 12780

gagccaggct ttcaagaacc tgcgggggct gtggggagtg aaggcgccca ccggcgaccg 12840

ggctacggtg tccagcctgc taacccccaa ctcgcgcctg ctgctgctgc tgatcgcgcc 12900

cttcacggac agcgggagcg tctcgcggga gacctatctg ggccacctgc tgacgctgta 12960

ccgcgaggcc atcgggcagg cgcaggtgga cgagcacacc ttccaagaga tcaccagcgt 13020

gagccacgcg ctggggcagg aggacacggg cagcctgcag gcgaccctga actacctgct 13080

gaccaacagg cggcagaaga ttcccacgct gcacagcctg acccaggagg aggagcgcat 13140

cttgcgctac gtgcagcaga gcgtgagcct gaacctgatg cgcgacggcg tgacgcccag 13200

cgtggcgctg gacatgaccg cgcgcaacat ggaaccgggc atgtacgcct cccaccggcc 13260

gtttatcaac cgcctgatgg actacttgca tcgggcggcg gccgtgaacc ccgagtactt 13320

cactaatgcc attctgaatc cccactggat gccccctccg ggtttctaca acggggactt 13380

tgaggtgccc gaggtcaacg acgggttcct ctgggatgac atggatgaca gtgtgttctc 13440

acccaacccg ctgcgcgccg cgtctctgcg attgaaggag ggctctgaca gggaaggacc 13500

gaggagtctg gcctcctccc tggctctggg agcggtgggc gccacgggcg cggcggcgcg 13560

gggcagtagc cccttcccca gcctggcaga ctctctgaac agcgggcggg tgagcaggcc 13620

ccgcttgcta ggcgaggagg agtatctgaa caactccctg ctgcagcccg cgagggacaa 13680

gaacgctcag cggcagcagt ttcccaacaa tgggatagag agcctggtgg acaagatgtc 13740

cagatggaag acgtatgcgc aggagtacaa ggagtgggag gaccgccagc cgcggccctt 13800

gccgccccct aggcagcgct ggcagcggcg cgcgtccaac cgccgctgga ggcaggggcc 13860

cgaggacgat gatgactctg cagatgacag cagcgtgttg gacctgggcg ggagcgggaa 13920

ccccttttcg cacctgcgcc cacgcctggg caagatgttt taaaagaaaa aaaaaaataa 13980

aactcaccaa ggccatggcg acgagcgttg gttttttgtt cccttcctta gtatgcggcg 14040

cgcggcgatg ttcgaggagg ggcctccccc ctcttacgag agcgcgatgg ggatttctcc 14100

tgcggcgccc ctgcagcctc cctacgtgcc tcctcggtac ctgcaaccta cagggggggag 14160

aaatagcatc tgttactctg agctgcagcc cctgtacgat accaccagac tgtacctggt 14220

ggacaacaag tccgcggacg tggcctccct gaactaccag aacgaccaca gcgatttttt 14280

gaccacggtg atccaaaaca acgacttcac cccaaccgag gccagcaccc agaccataaa 14340

cctggataac aggtcgaact ggggcggcga cctgaagacc atcttgcaca ccaacatgcc 14400

caacgtgaac gagttcatgt tcaccaactc ttttaaggcg cgggtgatgg tggcgcgcga 14460

gcagggggag gcgaagtacg agtgggtgga cttcacgctg cccgagggca actactcaga 14520

gaccatgact ctcgacctga tgaacaatgc gatcgtggaa cactatctga aagtgggcag 14580

gcagaacggg gtgaaggaaa gcgatatcgg ggtcaagttt gacaccagaa acttccgtct 14640

gggctgggac cccgtgaccg ggctggtcat gccgggggtc tacaccaacg aggcctttca 14700

tcccgacata gtgcttctgc ccggctgtgg ggtggacttc acccagagcc ggctgagcaa 14760

cctgctgggc attcgcaagc ggcagccttt ccaggagggt ttcaagatca cctatgagga 14820

tctgaagggg ggcaacattc ccgcgctcct tgatctggac gcctacgagg agagcttgaa 14880

acccgaggag agcgctggcg acagcggcga gagtggcgag gagcaagccg gcggcggtgg 14940

cggcgcgtcg gtagaaaacg aaagtacgcc cgcagtggcg gcggacgctg cggaggtcga 15000

gccggaggcc atgcagcagg acgcagagga gggcgcacag gagggcgcgc agaaggacat 15060

gaacgatggg gagatcaggg gagacacatt cgccacccgg ggcgaagaaa aagaggcaga 15120

ggcggcggcg gcggcgacgg cggaggccga aaccgaggtt gaggcagagg cagagcccga 15180

gaccgaagtt atggaagaca tgaatgatgg agaacgtagg ggcgacacgt tcgccacccg 15240

gggcgaagag aaggcggcgg aggcagaagc cgcggctgag gaggcggctg cggctgcggc 15300

caagactgag gctgcggcta aggctgaggt cgaagccaat gttgcggttg aggctcaggc 15360

tgaggaggag gcggcggctg aagcagttaa ggaaaaggcc caggcagagc aggaagagaa 15420

aaaacctgtc attcaacctc taaaagaaga tagcaaaaag cgcagttaca acgtcatcga 15480

gggcagcacc tttacccagt accgcagctg gtacctggcg tacaactacg gcgacccggt 15540

caaggggtg cgctcgtgga ccctgctctg cacgccggac gtcacctgcg gctccgagca 15600

gatgtactgg tcgctgccga acatgatgca agacccggtg accttccgct ccacgcggca 15660

ggttagcaac ttcccggtgg tgggcgccga actgctgccc gtgcactcca agagtttta 15720

caacgagcag gccgtctact cccagctgat ccgccaggcc acctctctga cccacgtgtt 15780

caatcgcttt cccgagaacc agattttggc gcgcccgccg gcccccacca tcaccaccgt 15840

gagtgaaaac gttcctgccc tcacagatca cgggacgcta ccgctgcgca acagcatctc 15900

aggagtccag cgagtgacca ttactgacgc cagacgccgg acctgcccct acgtttacaa 15960

ggccttgggc atagtctcgc cgcgcgtcct ctccagtcgc acttttaaa acacatctac 16020

ccacacgttc caaaatcatg tccgtactca tctcacccag caacaacacc ggctgggggc 16080

tgcgcgcgcc cagcaagatg tttggagggg cgaggaagcg ctccgaccag caccctgtgc 16140

gcgtgcgcgg ccactaccgc gcgccctggg gagcgcacaa gcgcgggcgc acagggcgca 16200

ccactgtgga cgacgtcatt gactccgtag tggagcaagc gcgccactac acacccggcg 16260

cgccgaccgc ccccgccgtg tccaccgtgg accaggcgat cgaaagcgtg gtacagggcg 16320

cgcggcacta tgccaacctt aaaagtcgcc gccgccgcgt ggcccgccgc catcgccgga 16380

gaccccgggc caccgccgcc gcgcgcctta ctaaggctct gctcaggcgc gccaggcgaa 16440

ctggccaccg ggccgccatg agggccgcac ggcgggctgc cgctgccgca agcgtcgtgg 16500

ccccgcgggc acgaaggcgc gcggccgctg ccgccgccgc cgccatttcc agcttggcct 16560

cgacgcggcg cggtaacata tactgggtgc gcgactcggt aaccggcacg cgggtacccg 16620

tgcgctttcg ccccccgcgg aattagcaca agacaacata cacactgagt ctcctgctgt 16680

tgtgtatccc agcggcgacc gtcagcagcg gcgacatgtc caagcgcaaa attaaagaag 16740

agatgctcca ggtcatcgcg ccggagatct atgggccccc gaagaaggag gaggatgatt 16800

acaagccccg caagctaaag cgggtcaaaa agaaaaagaa agatgatgat gacgaggcgg 16860

tggagtttgt ccgccgcatg gcacccaggc gccccgtgca gtggaagggc cggcgcgtgc 16920

agcgcgtttt gcgccccggc accgcggtgg tcttcacgcc cggcgagcgc tccacgcgca 16980

ctttcaagcg ggtgtacgat gaggtgtacg gcgacgagga cctgttggag caggccaacc 17040

agcgctttgg ggagtttgca tatgggaaac ggccccgcga gagtctaaaa gaggacctgc 17100

tggcgctacc gctggacgag ggcaatccca ccccgagtct gaagccggta accctgcaac 17160

aggtgctgcc tttgagcgcg cccagcgagc ataagcgagg gttgaagcgc gaaggcgggg 17220

acctggcgcc caccgtgcag ttgatggtgc ccaagcggca gaagctggag gacgtgctgg 17280

agaaaatgaa agtagagccc gggatccagc ccgagatcaa ggtccgcccc atcaagcagg 17340

tggcgcccgg cgtgggagtc cagaccgtgg acgttaggat tcccacggag gagatggaaa 17400

cccaaaccgc cactccctct tcggcggcca gcgccaccac cggcaccgct tcggtagagg 17460

tgcagacgga cccctggcta cccgccaccg ctgttgccgc cgccgccccc cgttcgcgcg 17520

ggcgcaagag aaattatcca gcggccagcg cgctcatgcc ccagtacgca ctgcatccat 17580

ccatcgtgcc caccccggc taccgcgggt actcgtaccg cccgcgcaga tcagccggca 17640

ctcgcggccg ccgccgccgt gcgaccacaa ccagccgccg ccgtcgccgc cgccgccagc 17700

cagtgctgac ccccgtgtct gtaaggaagg tggctcgctc ggggagcacg ctggtggtgc 17760

ccagagcgcg ctaccacccc agcatcgttt aaagccggtc tctgtatggt tcttgcagat 17820

atggccctca cttgtcgcct ccgcttcccg gtgccgggat accgaggaag aactcaccgc 17880

cgcagaggca tggcgggcag cggtctccgc ggcggccgtc gccatcgccg gcgcgcaaaa 17940

agcaggcgca tgcgcggcgg tgtgctgcct ctgctaatcc cgctaatcgc cgcggcgatc 18000

ggtgccgtac ccgggatcgc ctccgtggcc ctgcaggcgt cccagaaacg ttgactcttg 18060

caaccttgca agcttgcatt ttttggagga aaaaataaaa aaaaagtcta gactctcacg 18120

ctcgcttggt cctgtgacta ttttgtagaa aaaaagatgg aagacatcaa ctttgcgtcg 18180

ctggccccgc gtcacggctc gcgcccgttc atgggagact ggacagatat cggcaccagc 18240

aatatgagcg gtggcgcctt cagctggggc agtctgtgga gcggccttaa aaattttggt 18300

tccaccatta agaactatgg caacaaagcg tggaacagca gcacgggcca gatgctgaga 18360

gacaagttga aagagcagaa cttccaggag aaggtggcgc agggcctggc ctctggcatc 18420

agcggggtgg tggacatagc taaccaggcc gtgcagaaaa agataaacag tcatctggac 18480

ccccgtcctc aggtggagga aatgcctcca gcgatggaga cggtgtctcc cgagggcaaa 18540

ggcgaaaagc gcccgcggcc cgacagagaa gagaccctgg tgtcacacac cgaggagccg 18600

ccctcttacg aggaggcagt caaggccggc ctgcccacca ctcgccccat agcccccatg 18660

gccaccggtg tggtgggcca caggcaacac actcccgcaa cactagatct gcccccgccg 18720

tccgagccgc cgcgccagcc aaaggcggcg acggtgcccg ctccctccac ttccgccgcc 18780

aacagagtgc ccctgcgccg cgccgcgagc ggcccccggg cctcgcgagt tagcggcaac 18840

tggcagagca cactgaacag catcgtgggc ctgggagtga ggagtgtgaa gcgccgccgt 18900

tgctactgaa tgagcaagct agctaacgtg ttgtatgtgt gtatgcgtcc tatgtcgccg 18960

ccagaggagc tgttgagccg ccggcgccgt ctgcactcca gcgaatttca agatggcgac 19020

cccatcgatg atgcctcagt ggtcgtacat gcacatctcg ggccaggacg cttcggagta 19080

cctgagcccc gggctggtgc agttcgcccg cgccacagac acctacttca acatgagtaa 19140

caagttcagg aaccccactg tggcgcccac ccacgatgtg accacggacc ggtcgcagcg 19200

cctgacgctg cggttcatcc ccgtggatcg ggaggacacc gcctactctt acaaggcgcg 19260

gttcacgctg gccgtgggcg acaaccgcgt gctggacatg gcctccactt actttgacat 19320

caggggggtg ctggacaggg gccccacctt caagccctac tcgggtactg cctacaactc 19380

cctggccccc aagggcgctc ccaattcttg cgagtgggaa caagatgaac cagctcaggc 19440

agcaatagct gaagatgaag aagaacttga agaagaacaa gctcaggacg aacaggcgcc 19500

cactaagaaa acccatgtat acgcccaggc acctctttct ggtgaaaaaa ttactaagga 19560

tggtttgcaa ataggtgtgg atgccacaca ggcgggagat aaccctatat atgctgataa 19620

aacattccaa cccgaacctc agataggtga gtctcagtgg aacgaggctg atgccacagt 19680

agcaggaggc agagtcttaa aaaagaccac ccctatgaga ccttgctatg gatcctatgc 19740

caaacctact aatgccaatg gcggtcaagg gatcatggtg gccaatgatc agggagcgct 19800

tgaatctaaa gttgagatgc aatttttctc caccacaacg tctcttaatg taagggaagg 19860

tgaaaacaat cttcagccaa aagtagtgct atacagcgaa gatgttaact tggaatcccc 19920

tgacactcat ttgtcttaca aacctaaaaa ggatgacacc aactctaaaa tcatgttggg 19980

tcagcaagcc atgcccaaca gacccaacct cattgctttt agggacaact ttattggact 20040

tatgtactac aacagcacag gcaacatggg agtgctggca ggacaggcct cccagctaaa 20100

cgctgtggta gacttgcaag acagaaacac agagctgtca taccaactga tgcttgattc 20160

cattggagac agatcaagat acttttccat gtggaaccag gcagtggaca gctatgaccc 20220

agatgtcaga atcattgaaa accatggggt tgaagatgag ctgcccaact attgctttcc 20280

cctgggcggt attggaatta cagacacata ccagtgcata aaaccaaccg cagctgctaa 20340

taacactaca tggtctaagg atgaagaatt tagtgatcgc aatgaaatag gggtgggaaa 20400

caacttcgcc atggagatca acatccaggc caacctctgg aggaacttcc tctatgcgaa 20460

cgtggggctc tacctgccag acaagctcaa gtacaacccc accaacgtgg acatctctga 20520

caaccccaac acctatgact acatgaacaa gcgtgtggtg gctcccggcc tggtggactg 20580

ctttgtcaat gtgggagcca ggtggtccct ggactacatg gacaacgtca acccttcaa 20640

ccaccaccgc aatgcgggtc tgcgctaccg ctccatgatc ctgggcaacg ggcgctacgt 20700

gcccttccac attcaggtgc cccagaagtt ctttgccatc aagaacctcc tcctcctgcc 20760

gggctcctac acttacgagt ggaacttcag gaaggatgtc aacatggtcc tgcagagctc 20820

tctgggcaat gaccttaggg tggacggggc cagcatcaag tttgacagcg tcaccctcta 20880

tgctaccttc ttccccatgg ctcacaacac cgcctccacg ctcgaggcca tgctgaggaa 20940

cgacaccaac gaccagtcct tcaatgacta cctctctggg gccaacatgc tctaccccat 21000

ccccgccaag gccaccaacg tgcccatctc cattccctct cgcaactggg ccgccttcag 21060

aggctgggcc tttacccgcc ttaagaccaa ggaaaccccc tccctgggct cgggttttga 21120

cccctacttt gtctactcgg gatccatccc ctacctggat ggcaccttct acctcaacca 21180

cacttttaag aagatatcca tcatgtatga ctcctccgtc agctggccgg gcaatgaccg 21240

cctgctcacc cccaatgagt tcgaggtcaa gcgcgccgtg gacggcgagg gctacaacgt 21300

ggcccagtgc aacatgacca aggactggtt cctggtgcag atgctggcca actacaacat 21360

aggctaccag ggcttctaca tcccagagag ctacaaggac aggatgtact ccttcttcag 21420

aaatttccaa cccatgagca ggcaggtggt ggacgagacc aaatacaagg actatcaggc 21480

cattggcatc actcaccagc acaacaactc gggattcgtg ggctacctgg ctcccaccat 21540

gcgcgagggg caggcctacc ccgccaactt cccctacccg ttgataggca aaaccgcggt 21600

cgacagcgtc acccagaaaa agttcctctg cgaccgcacc ctctggcgca tccccttctc 21660

tagcaacttc atgtccatgg gtgcgctcac ggacctgggc cagaacctgc tctatgccaa 21720

ctccgcccat gcgctggaca tgacttttga ggtggacccc atggacgagc ccacccttct 21780

ctatattgtg tttgaagtgt tcgacgtggt cagagtgcac cagccgcacc gcggtgtcat 21840

cgagaccgtg tacctgcgca cgcccttctc ggccggcaac gccaccacct aaggagacag 21900

cgccgccgcc tgcatgacgg gttccaccga gcaagagctc agggccatcg ccagagacct 21960

gggatgcgga ccctattttt tgggcaccta tgacaaacgc ttcccgggct tcatctcccg 22020

agacaagctc gcctgcgcca tcgtcaacac ggccgcgcgc gagaccgggg gcgtgcactg 22080

gctggccttt ggctgggacc cgcgctccaa aacctgctac ctcttcgacc cctttggctt 22140

ctccgatcag cgcctcagac agatctatga gtttgagtac gaggggctgc tgcgccgcag 22200

cgcgcttgcc tcctcgcccg accgctgcat caccccttgag aagtccaccg agaccgtgca 22260

ggggccccac tcggccgcct gcggtctctt ctgctgcatg tttttgcacg cctttgtgcg 22320

ctggccccag agtcccatgg atcgcaaccc caccatgaac ttgctcaagg gagtgcccaa 22380

cgccatgctc cagagccccc aggtccagcc caccctgcgc cacaaccagg aacagctcta 22440

ccgcttcctg gagcgccact ccccctactt ccgcagtcac agcgcgcaca tccgggggggc 22500

cacctctttc tgccacttgc aagaaaacat gcaagacgga aaatgatgta cagctcgctt 22560

tttaataaat gtaaagactg tgcactttat ttatacacgg gctctttctg gttatttatt 22620

caacaccgcc gtcgccatct agaaatcgaa agggttctgc cgcgcgtcgc cgtgcgccac 22680

gggcagagac acgttgcgat actggaagcg gctcgcccac ttaaactcgg gcaccaccat 22740

gcggggcagt ggttcctcgg ggaagttctc gccccacagg gtgcgggtca gctgcagcgc 22800

gctcaggagg tcgggagccg agatcttgaa gtcgcagttg gggccggaac cctgcgcgcg 22860

cgagttgcgg tacacggggt tgcagcactg gaacaccagc agggccggat tatgcacgct 22920

ggccagcagg ctctcgtcgc tgatcatgtc gctgtccaga tcctccgcgt tgctcagggc 22980

gaacggggtc atcttgcaga cctgcctgcc caggaaaggc ggcagcccgg gcttgccgtt 23040

gcagtcgcag cgcaggggca tcagcaggtg cccgcggccc gactgcgcct gcgggtacag 23100

cgcgcgcatg aaggcttcga tctgcctgaa agccacctgc gtcttggctc cctccgaaaa 23160

gaacatccca caggacttgc tggagaactg gttcgcggga cagctggcat cgtgcaggca 23220

gcagcgcgcg tcggtgttgg cgatctgcac cacgttgcga ccccaccggt tcttcactat 23280

cttggccttg gaagcctgct ccttcagcgc gcgctggccg ttctcgctgg tcacatccat 23340

ctctatcacc tgctccttgt tgatcatgtt tgtaccgtgc agacacttca ggtcgccctc 23400

cgtctgggtg cagcggtgct cccacagcgc gcaaccggtg ggctcccaat ttttgtgggt 23460

caccccgcg taggcctgca ggtaggcctg caagaagcgc cccatcatgg ccacaaaggt 23520

cttctggctc gtaaaggtca gctgcaggcc gcgatgctct tcgttcagcc aggtcttgca 23580

gatggcggcc agcgcctcgg tctgctcggg cagcatccta aaatttgtct tcaggtcgtt 23640

atccacgtgg tacttgtcca tcatggcgcg cgccgcctcc atgcccttct cccaggcgga 23700

caccatgggc aggcttaggg ggtttatcac ttccaccggc gaggacaccg tactttcgat 23760

ttcttcttcc tccccctctt cccggcgcgc gcccacgctg ctgcgcgctc tcaccgcctg 23820

caccaagggg tcgtcttcag gcaagcgccg caccgagcgc ttgccgccct tgacctgctt 23880

aatcagcacc ggcgggttgc tgaagcccac catggtcagc gccgcctgct cttcttcgtc 23940

ttcgctgtct accactatct ctggggaagg gcttctccgc tctgcggcgg cgcgcttctt 24000

ttttttcttg ggagcggccg tgatggagtc cgccacggcg acggaggtcg agggcgtggg 24060

gctgggggtg cgcggtacca gggcctcgtc gccctcggac tcttcctctg actccaggcg 24120

gcggcggagt cgcttctttg ggggcgcgcg cgtcagcggc ggcggagacg gggacgggga 24180

cggggacggg acgccctcca caggggtgg tcttcgcgca gacccgcggc cgcgctcggg 24240

ggtcttctcg agctggtctt ggtcccgact ggccattgta tcctcctcct cctaggcaga 24300

gagacataag gagtctatca tgcaagtcga gaaggaggag agcttaacca ccccctctga 24360

gaccgccgat gcgcccgccg tcgccgtcgc ccccgctgcc gccgacgcgc ccgccacacc 24420

gagcgacacc cccgcggacc cccccgccga cgcacccctg ttcgaggaag cggccgtgga 24480

gcaggacccg ggctttgtct cggcagagga ggatttgcga gaggaggagg ataaggagaa 24540

gaagccctca gtgccaaaag atgataaaga gcaagacgag cacgacgcag atgcacacca 24600

gggtgaagtc gggcgggggg acggagggca tgacggcgcc gactacctag acgaagggaa 24660

cgacgtgctc ttgaagcacc tgcatcgtca gtgcgccatt gtttgcgacg ctctgcagga 24720

gcgcagcgaa gtgcccctca gcgtggcgga ggtcagccac gcctacgagc tcagcctctt 24780

ctcccccggg gtgcccccc gccgccgcga aaacggcaca tgcgagccca acccgcgcct 24840

caacttctac cccgcctttg tggtacccga ggtcctggcc acctatcaca tcttctttca 24900

aaattgcaag atccccctct cgtgccgcgc caaccgtagc cgcgccgata agatgctggc 24960

cctgcgccag ggcgaccaca tacctgatat cgccgctttg gaagatgtac caaagatctt 25020

cgagggtctg ggtcgcaacg agaagcgggc agcaaactct ctgcaacagg aaaacagcga 25080

aaatgagagt cacaccgggg tactggtgga gctcgagggc gacaacgccc gcctggcggt 25140

ggtcaagcgc agcatcgagg tcacccactt tgcctacccc gcgctaaacc tgccccccaa 25200

agtcatgaac gcggccatgg acgggctgat catgcgccgc ggccggcccc tcgctccaga 25260

tgcaaacttg catgaggaga ccgaggacgg ccagcccgtg gtcagcgacg agcagctggc 25320

gcgctggctg gagaccgcgg accccgccga actggaggag cggcgcaaga tgatgatggc 25380

cgtggtgctg gtcaccgtag agctggagtg tctgcagcgc ttcttcggcg accccgagat 25440

gcagagaaag gtcgaggaga ccctgcacta caccttccgc cagggctacg tgcgccaggc 25500

ttgcaagatc tccaacgtgg agctcagcaa cctggtgtcc tacctgggca tcttgcatga 25560

gaaccgcctc gggcagagcg tgctgcactc caccctgcgc ggggaggcgc gccgcgacta 25620

cgtgcgcgac tgcgtttacc tcttcctctg ctacacctgg cagacggcca tgggggtctg 25680

gcagcagtgc ctggaggagc gcaacctcaa ggagctggag aagctcctgc agcgcgcgct 25740

caaagatctc tggacgggct acaacgagcg ctcggtggcc gccgcgctgg ccgacctcat 25800

cttccccgag cgcctgctca aaaccctcca gcaggggctg cccgacttca ccagccaaag 25860

catgttgcaa aacttcagga actttatcct ggagcgttct ggcatcctac ccgccacctg 25920

ctgcgccctg cccagcgact ttgtcccccc cgtgtaccgc gagtgccccc cgccgctgtg 25980

gggtcactgc tacctgttcc aactggccaa ctacctgtcc taccacgcgg acctcatgga 26040

ggactccagc ggcgaggggc tcatggagtg ccactgccgc tgcaacctct gcacgcccca 26100

ccgctccctg gtctgcaaca cccaactgct cagcgagagt cagattatcg gtaccttcga 26160

gctacagggt ccgtcctcct cagacgagaa gtccgcggct ccggggctaa aactcactcc 26220

ggggctgtgg acttccgcct acctgcgcaa atttgtacct gaagactacc acgcccacga 26280

gatcaggttt tacgaagacc aatcccgccc gcccaaggcg gagctgaccg cctgcgtcat 26340

cacccagggc gagatcctag gccaattgca agccatccaa aaagcccgcc aagacttttt 26400

gctgaagaag ggtcgggggg tgtatctgga cccccagtcg ggtgaggagc tcaacccggt 26460

tcccccgctg ccgccgccgc gggaccttgc ttcccaggat aagcatcgcc atggctccca 26520

gaaagaagca gcagcggccg ccactgccgc caccccacat gctggaggaa gaggaggaat 26580

actgggacag tcaggcagag gaggtttcgg acgaggagga gccggagacg gagatggaag 26640

agtgggagga ggacagctta gacgaggagg cttccgaagc cgaagaggca gacgcaacac 26700

cgtcaccctc ggccgcagcc ccctcgcagg cgcccccgaa gtccgctccc agcatcagca 26760

gcaacagcag cgctataacc tccgctcctc caccgccgcg acccacggcc gaccgcagac 26820

ccaaccgtag atgggacacc accggaaccg gggccggtaa gtcctccggg agaggcaagc 26880

aagcgcagcg ccaaggctac cgctcgtggc gcgctcacaa gaacgccata gtcgcttgct 26940

tgcaagactg cgggggggaac atctccttcg cccgccgctt cctgctcttc caccacggtg 27000

tggccttccc ccgtaacgtc ctgcattact accgtcatct ctacagcccc tactgcggcg 27060

gcagtgagcc agagacggtc ggcggcggcg gcggcgcccg tttcggcgcc taggaagacc 27120

cagggcaaga cttcagccaa gaaactcgcg gcggccgcgg cgaacgcggt cgcgggggcc 27180

ctgcgcctga cggtgaacga acccctgtcg acccgcgaac tgaggaaccg aatcttcccc 27240

actctctatg ccatcttcca gcagagcaga gggcaggatc aggaactgaa agtaaaaaac 27300

aggtctctgc gctccctcac ccgcagctgt ctgtatcaca agagcgaaga ccagcttcgg 27360

cgcacgctgg aggacgctga ggcactcttc agcaaatact gcgcgctcac tcttaaggac 27420

tagctccgcg cccttctcga atttaggcgg gaacgcctac gtcatcgcag cgccgccgtc 27480

atgagcaagg acattcccac gccatacatg tggagctatc agccgcagat gggactcgcg 27540

gcgggcgcct cccaagacta ctccacccgc atgaactggc tcagtgccgg cccacacatg 27600

atctcacagg ttaatgatat ccgcacccat cgaaaccaaa tattggtgga gcaggcggca 27660

attaccacca cgccccgcaa taatcccaac cccagggagt ggcccgcgtc cctggtgtat 27720

caggaaattc ccggccccac caccgtacta cttccgcgtg attcccaggc cgaagtccaa 27780

atgactaact caggggcaca gctcgcgggc ggctgtcgtc acagggtgcg gcctcctcgc 27840

cagggtataa ctcacctgga gatccgaggc agaggtattc agctcaacga cgagtcggtg 27900

agctcctcgc tcggtctcag acctgacggg accttccaga tagccggagc cggccgatct 27960

tccttcacgc cccgccaggc gtacctgact ctgcaaagct cgtcctcggc gccgcgctcg 28020

ggcggcatcg ggactctcca gttcgtgcag gagtttgtgc cctcggtcta cttcaacccc 28080

ttctcgggct ctcccggtcg ctacccggac cagttcatct cgaactttga cgccgcgagg 28140

gactcggtgg acggctacga ctgaatgtcg ggtggacccg gtgcagagca acttcgcctg 28200

aagcacctcg accactgccg ccgccctcag tgctttgccc gctgtcagac cggtgagttc 28260

cagtactttt ccctgcccga ctcgcacccg gacggcccgg cgcacggggt gcgctttttc 28320

atcccgagtc aggtgcgctc taccctaatc agggagttta ccgcccgtcc cctactggcg 28380

gagttggaaa aggggccttc tatcctaacc attgcctgca tctgctctaa ccctggattg 28440

caccaagatc tttgctgtca tttgtgtgct gagtataata aaggctgaga tcagaatcta 28500

ctcgggctcc tgtcgccatc ctgtcaacgc caccgtccaa gcccggcccg atcagcccga 28560

ggtgaacctc acctgcggtc tgcaccggcg cctgaggaaa tacctagctt ggtactacaa 28620

cagcactccc tttgtggttt acaacagctt tgaccaggac ggggtctcac tgagggataa 28680

cctctcgaac ctgagctact ccatcaggaa gaacagcacc ctcgagctac ttcctcctta 28740

cctgcccggg acttaccagt gtgtcaccgg tccctgcacc cacacccacc tgttgatcgt 28800

aaacgactct cttccgagaa cagacctcaa taactcctct tcgcagttcc ccagaacagg 28860

aggtgagctc aggaaacccc gggtaaagaa gggtggacga gagttaacac ttgtggggtt 28920

tctggtgtat gtgacgctgg tggtggctct tttgattaag gcttttcctt ccatgtctga 28980

actctccctc ttcttttatg aacaactcga ctagtgctaa cgggacccta cccaacgaat 29040

cgggattgaa tatcggtaac caggttgcag tttcactttt gattaccttc atagtcctct 29100

tcctgctagt gctgtcgctt ctgtgcctgc ggatcggggg ctgctgcatc cacgtttata 29160

tctggtgctg gctgtttaga aggttcggag accatcgcag gtagaataaa catgctgctg 29220

cttaccctct ttgtcctggc gctggccgcc agctgccaag ccttttccga ggctgacttt 29280

atagagcccc agtgtaatgt gacttttaaa gcccatgcac agcgttgtca tactataatc 29340

aaatgtgcca ccgaacacga tgaatacctt atccagtata aagataaatc acacaaagtg 29400

gcacttgttg acatctggaa acccgaagac cctttggaat acaatgtgac cgttttccag 29460

ggtgacctct tcaaaattta caattacact ttcccatttg accagatgtg tgactttgtc 29520

atgtacatgg aaaagcagca caagctgtgg cctccgactc cccagggctg tgtggaaaat 29580

ccaggctctt tctgcatgat ctctctctgt gtaactgtgc tggcactaat actcacgctt 29640

ttgtatatca gatttaaatc aaggcaaagc ttcattgatg aaaagaaaat gccttaatcg 29700

ctttcacgct tgattgctaa caccgggttt ttatccgcag aatgattgga atcaccctac 29760

taatcacctc cctccttgcg attgcccatg ggttggaacg aatcgaagtc cctgtggggg 29820

ccaatgttac cctggtgggg cctgtcggca atgctacatt aatgtgggaa aaatatacta 29880

aaaatcaatg ggtctcttac tgcactaaca aaaatagcca caagcccaga gccatctgcg 29940

atgggcaaaa tctaaccttg attgatgttc aattgctgga tgcgggctac tattatgggc 30000

agctgggtac aatgattaat tactggagac cccacagaga ttacatgctc cacgtagtaa 30060

agggtcccct tagcagccca cccactacca cctctactac ccccactacc accactactc 30120

ccaccaccag cactgccgcc cagcctcctc atagcagaac aaccactttt atcaattcca 30180

agtcccactc cccccacatt gccggcgggc cctccgcctc agactccgaa accaccgaga 30240

tctgcttctg caaatgctct gacgccattg cccaggattt ggaagatcac gaggaagatg 30300

agcatgactt cgcagatgca tgccaggcat cagagccaga agcgctgccg gtggccctca 30360

aacagtatgc agacccccac accacccccg accttcctcc accttcccag aagccaagtt 30420

tcctgggggа aaatgaaact ctgcctctct ccatactcgc tctgacatct gttgctatgt 30480

tgaccgctct gctggtgctt ctatgctcta tatgctacct gatctgctgc agaaagaaaa 30540

aatctcacgg ccatgctcac cagcccctca tgcacttccc ttaccctcca gagctgggcg 30600

accacaaact ttaagtctgc agtaactatc tgcccatccc ttgtcagtcg acagcgatga 30660

gccccactaa tctaacggcc tctggactta caacatcgtc tcttaatgag accaccgctc 30720

ctcaagacct gtacgatggt gtctccgcgc tggttaacca gtgggatcac ctgggcatat 30780

ggtggctcct cataggagca gtgaccctgt gcctaatcct ggtctggatc atctgctgca 30840

tcaaaagcag aagacccagg cggcggccca tctacaggcc ctttgtcatc acacctgaag 30900

atgatgatga caccacttcc aggctgcaga ggctaaagca gctactcttc tcttttacag 30960

catggtaaat tgaatcatgc ctcgcatttt catctacttg tctctccttc cacttttct 31020

gggctcttct acattggccg ctgtgtccca catcgaggta gactgcctca cgcccttcac 31080

agtctacctg cttttcggct ttgtcatctg caccttgtc tgcagcgtta tcactgtagt 31140

gatctgcttc atacagtgca tcgactacgt ctgcgtgcgg gtggcttact ttagacacca 31200

cccccagtat cgcaacaggg acatagcggc tctcctaaga cttgtttaaa atcatggcca 31260

aattaactgt gattggtctt ctgatcatct gctgcgtcct agccgcgatt gggactcaag 31320

ctcctaccac caccagcgct cccagaaaga gacatgtatc ctgcagcttc aagcgtccct 31380

ggaatatacc ccaatgcttt actgatgaac ctgaaatctc tttggcttgg tacttcagcg 31440

tcaccgccct tcttatcttc tgcagtacgg ttattgccct tgccatctac ccttcccttg 31500

acctgggctg gaatgctgtc aactctatgg aatatcccac cttcccagaa ccagacctgc 31560

cagacctggt tgttctaaac gcgtttcctc ctcctgctcc cgttcaaaat cagtttcgcc 31620

ctccgtcccc cacgcccact gaggtcagct actttaatct aacaggcgga gatgactgaa 31680

aacctagacc tagaaatgga cggtctctgc agcgagcaac gcacactaga gaggcgccgg 31740

caaaaagagc tcgagcgtct taaacaagag ctccaagacg cggtggccat acaccagtgc 31800

aaaaaaggtg tcttctgtct ggtaaaacag gccacgctca cctatgaaaa aacaggtgac 31860

acccaccgcc taggatacaa gctgcccaca cagcgccaaa agttcgccct catgataggc 31920

gaacaaccca tcaccgtgac ccagcactcc gtggagacag aaggctgcat acatgctccc 31980

tgtaggggcg ctgactgcct ctacaccttg atcaaaaccc tctgcggtct cagagacctt 32040

atccctttca attaatcata actgtaatca ataaaaaatc acttacttga aatctgatag 32100

caagcctctg tccaattttt tcagcaacac ttccttcccc tcctcccaac tctggtactc 32160

taggcgcctc ctagctgcaa acttcctcca cagtctgaag ggaatgtcag attcctcctc 32220

ctgtccctcc gcacccacga tcttcatgtt gttgcagatg aaacgcgcga gatcgtctga 32280

cgagaccttc aaccccgtgt acccctacga taccgagatc gctccgactt ctgtcccttt 32340

ccttacccct ccctttgtgt catccgcagg aatgcaagaa aatccagctg gggtgctgtc 32400

cctgcacttg tcagagcccc ttaccaccca caatggggcc ctgactctaa aaatgggggg 32460

cggcctgacc ctggacaagg aagggaatct cacttcccaa aacatcacca gtgtcgatcc 32520

ccctctcaaa aaaagcaaga acaacatcag ccttcagacc gccgcacccc tcgccgtcag 32580

ctccggggcc ctaacacttt ttgccactcc ccccctagcg gtcagtggtg acaaccttac 32640

tgtgcagtct caggcccctc tcactttgga agactcaaaa ctaactctgg ccaccaaagg 32700

acccctaact gtgtccgaag gcaaactt 32728

<210> 23
<211> 32728
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus vector nucleotide sequences

<400> 23
ataatatacc ttattttgga ttgtggccaa tatgataatg aggtgggcgg ggagaggcgg 60

ggcgggtgac gtaggacgcg cgagtagggt tgggaggtgt ggcggaagtg tggcatttgc 120

aagtgggagg agctcacatg caagcttccg tcgcggaaaa tgtgacgttt ttgatgagcg 180

ccgcctacct ccggaagtgc caattttcgc gcgcttttca ccggatatcg tagtaatttt 240

gggcgggacc atgtaagatt tggccatttt cgcgcgaaaa gtgaaacggg gaagtgaaaa 300

ctgaataata gggcgttagt catagcgcgt aatatttacc gagggccgag ggactttgac 360

cgattacgtg gaggactcgc ccaggtgttt tttacgtgaa tttccgcgtt ccgggtcaaa 420

gtctccgttt ttattgtcac cgtcatttga cgcggagggt atttaaaccc gctgcgctcc 480

tcaagaggcc actcttgagt gccagcgaga agagttttct cctctgctcc gcttcggtga 540

tcgaaaaatg agacacatag cctgcactcc gggtcttttg tccggtcggg cggcggccga 600

gcttttggac gctttgatca atgatgtcct aagcgatgat tttccgtcta ctacccactt 660

tagcccacct actcttcacg aactgtacga tctggatgta ctggtggatg tgaacgatcc 720

caacgaggag gcggtttctg cgtttttttcc cgagtctgcg ctgttggccg ctcaggaggg 780

atttgaccta cacactccgc cgcctatttt agagtctccg ctgccggagc ccagtggtat 840

accttatatg cctgaactgc ttcccgaagt ggtagacctg acctgccacg agcctggctt 900

tccgcccagc gacgatgagg gtgagccttt tgttttagac tttgctgaga tacctgggca 960

cggttgcagg tcttgtgcat atcatcagag ggttaccgga gaccccgagg ttaagtgttc 1020

gctgtgctat atgaggatga cctcttcctt tatctacagt aagtttttgt ctaggtgggc 1080

ttttgggtag gtgggttttg tgtcagaaca ggtgtaaacg ttgcttgtgt tttttgtacc 1140

tgtaggtccg gtgtccgagc cagacccgga gcccgaccgc gatcccgagc cggatcccga 1200

gcctcctcgc aggacaagga aactaccttc cattctgtgc aagtctcaga cacctgtaag 1260

gaccagcgag gcagacagca ccgactctgg cacttctacc tctccccctg aaattcaccc 1320

agtggttcct ctgggtatac ataaacctgt tgctgttaaa gtttgcgggc gacgccctgc 1380

agtacagtgc attgaggact tgcttcacga tcccgaggaa cctttggact tgagccttaa 1440

acgccctagg caataaaccc cacctaagta ataaacccca cctaagtaat aaaccctgcc 1500

gcccttggtt attgagatga cgcccaatgt ttgcttttga atgacttcat gtgtgtaata 1560

aaagtgagtg tgatcatagg tctcttgttt gtctgggcgg ggcttaaggg tatataagtc 1620

tcttggggct aaacttggtt acacttgacc ccaatggagg cgtgggggtg cttggaggag 1680

tttgcggacg tgcgccgttt gctggacgag agctctagca atacctatac tatttggagg 1740

tatctgtggg gctctactca ggccaagttg gtttccagaa ttaagcagga ttacaagtgc 1800

gattttgaag agctttttag ttcctgcggt gagcttttgc aatccttgaa tctgggccat 1860

caggctattt tccaggaaaa ggttctctcg actttggatt tttccactcc cgggcgcacc 1920

gccgcttgtg tggcttttgt gtcttttgtg caagataaat ggagcgagga gacccacctg 1980

agtcacggct acgtactgga tttcatggcg atggctcttt ggagggctca caacaaatgg 2040

aagattcaga aggaactgta cggttccgcc ctacgtcgtc cacttctgtc gcgacagggg 2100

ctgaggtttc ccgaccatcg gcagcatcag aatctggaag acgagtcgga ggagcgagcg 2160

gaggagaaga tcagcttgag agccggcctg gaccctcctc aggaggaatg aatctcccgc 2220

aggtggttga cctgtttcca gaactgagac gggtcctgac tatcagggag gatggtcagt 2280

ttgtgaagaa gtttaagagg gatcggggtg agggagatga tgaggcggct agcaatttag 2340

cttttagtct gatgactcgc caccgaccgg aatgtattac ctatcagcag attaaggaga 2400

gttgtgccaa cgagctggat cttttgggtc agaagtatag catagaacag cttaccactt 2460

actggcttca gcctggggat gattgggaag aggcgatcag ggtgtatgca aaggtggccc 2520

tgcggcccga ttgcaagtat aagattacta agttggttaa tattagaaac tgctgctata 2580

tttctgggaa cggggccgaa gtggagatag atactcagga cagggtggct tttaggtgtt 2640

gcatgataaa catgtggccc gggatactgg ggatggatgg ggtggtattc atgaatgtga 2700

ggtttacggg ccccaacttt aatggcacgg tgttcatggg caacaccaac ttgctcctgc 2760

atggtgcgag tttctatggg tttaataaca cctgtataga ggcctggacc gatgtaaagg 2820

ttcgaggttg ttccttttat agctgttgga aggcggtggt gtgtcgccct aaaagcaggg 2880

gttctgtgaa aaaatgcttg tttgaaaggt gcaccttagg catcctctct gagggcaact 2940

ccagggtgcg ccataatgtg gcttcgaact gcggttgctt catgcaagtg aaggggggtga 3000

gcgttatcaa gcataactcg gtgtgtggaa actgcgagga tcgcgcctcc cagatgctga 3060

cctgctttga tggcaactgt cacctgttga agaccattca tataagcagc caccccagaa 3120

aggcctggcc cgtgtttgag cataacatct tgacccgctg ctccttgcat ctgggggtca 3180

ggaggggtat gttcctgcct taccagtgta actttagcca cactaaaatc ctgctggaac 3240

ccgagtgcat gaccaaggtc agcctgaatg gtgtgtttga tgtgactctg aaaatctgga 3300

aggtgctgag gtatgatgag accaggacca ggtgccgacc ctgcgagtgc ggcggcaagc 3360

acatgagaaa tcagcctgtg atgttggatg tgaccgagga gcttaggcct gaccatctgg 3420

tgctggcctg caccagggcc gagtttgggt ctagcgatga ggataccgat tgaggtgggt 3480

aaggtgggcg tggctagaag ggtggggcgt gtataaattg ggggtctaag ggtctctctg 3540

ttttgtcttg caacagccgc cgccatgagc gacaccggca acagctttga tggaagcatc 3600

tttagcccct atctgacagt gcgcatgcct cactgggctg gagtgcgtca gaatgtgatg 3660

ggttccaacg tggatggacg ccccgttctg ccttcaaatt cgtctacaat ggcctacgcg 3720

accgtgggag gaactccgct ggacgccgcg acctccgccg ccgcctccgc cgccgccgcg 3780

accgcgcgca gcatggctac ggacctttac agctctttgg tggcgagcgg cgcggcctct 3840

cgcgcgtctg ctcgggatga gaaactgacc gctctgctgc ttaaactgga agacttgacc 3900

cgggagctgg gtcaactgac ccagcaggtc tccagcttgc gtgagagcag ccttgcctcc 3960

ccctaatggc ccataatata aataaaagcc agtctgtttg gattaagcaa gtgtatgttc 4020

tttatttaac tctccgcgcg cggtaagccc gggaccagcg gtctcggtcg tttagggtgc 4080

ggtggattct ttccaacacg tggtacaggt ggctctggat gtttagatac atgggcatga 4140

gtccatccct ggggtggagg tagcaccact gcagagcttc gtgctcgggg gtggtgttgt 4200

atatgatcca gtcgtagcag gagcgctggg cgtggtgctg aaaaatgtcc ttaagcaaga 4260

ggcttatagc taggggggagg cccttggtgt aagtgtttac aaatctgctc agttgggagg 4320

ggtgcatccg gggggatata atgtgcatct tggactggat ttttaggttg gctatgttcc 4380

cacccagatc ccttctggga ttcatgttgt gcaggaccac cagcacggta tatccagtgc 4440

acttgggaaa tttatcgtgg agcttagacg ggaatgcatg gaagaacttg gagacgccct 4500

tgtggcctcc cagattttcc atacattcgt ccatgatgat ggcaatgggc ccgtgggaag 4560

ctgcctgagc aaaaatgttt ctgggatcgc tcacatcgta gttatgttcc agggtgaggt 4620

catcatagga catctttacg aatcgggggc ggagggtccc ggactggggg atgatggtac 4680

cctcgggccc cggggcgtag ttcccctcac agatctgcat ctcccaggct ttcatttcag 4740

agggagggat catatccacc tgcggagcga tgaaaaacac agtttctggc gcaggggaga 4800

ttaactggga tgagagcagg tttctgagca gctgtgactt tccacagccg gtgggcccat 4860

atatcacgcc tatcaccggc tgcagctggt agttaagaga gctgcagctg ccgtcctccc 4920

ggagcagggg ggccacctcg ttcagcatat ccctgacgtg gatgttctcc ctgaccaatt 4980

ccgccagaag gcgctcgccg cccagcgaaa gcagctcttg caaggaagca aaatttttca 5040

gcggttttag gccgtcggcc gtgggcatgt ttttcagcgt ctgggtcagc agttccagcc 5100

tgtcccacag ctcggtgatg tgctctacgg catctcgatc cagcagatct cctcgtttcg 5160

cgggttgggg cggctttcgc tgtagggcac cagccgatgg gcgtccagcg gggccagagt 5220

catgtccttc catgggcgca gggtcctcgt cagggtggtc tgggtcacgg tgaaggggtg 5280

cgctccgggt tgggcgctgg ccagggtgcg cttgaggctg gttctgctgg tgctgaatcg 5340

ctgccgctct tcgccctgcg cgtcggccag gtagcatttg accatggtct cgtagtcgag 5400

accctcggcg gcgtgcccct tggcgcggag ctttcccttg gaggtggcgc cgcacgaggg 5460

gcactgcagg ctcttcaggg cgtagagctt gggagcgaga aacacggact ctggggagta 5520

ggcgtccgcg ccgcaggaag cgcagaccgt ctcgcattcc accagccaag tgagctccgg 5580

gcggtcaggg tcaaaaacca ggttgccccc atgctttttg atgcgtttct tacctcggct 5640

ctccatgagg cggtgtccct tctcggtgac gaagaggctg tccgtgtccc cgtagaccga 5700

cttcaggggc ctgtcttcca gcggagtgcc tctgtcctcc tcgtagagaa actctgacca 5760

ctctgagacg aaggcccgcg tccaggccag gacgaaggag gccacgtggg aggggtagcg 5820

gtcgttgtcc actagcgggt ccaccttctc cagggtgtgc aggcacatgt ccccctcctc 5880

cgcgtccaga aaagtgattg gcttgtaggt gtaggacacg tgaccggggg ttcccgacgg 5940

gggggtataa aaggggggtgg gcgccctttc atcttcactc tcttccgcat cgctgtctgc 6000

gagggccagc tgctggggta agtattccct ctcgaaggcg ggcatgacct cagcgctcag 6060

gttgtcagtt tctaaaaatg aggaggattt gatgttcacc tgtccggagg tgataccttt 6120

gagggtacct gggtccatct ggtcagaaaa cactattttt ttgttgtcaa gcttggtggc 6180

gaacgacccg tagagggcgt tggagagcag cttggcgatg gagcgcaggg tctggttttt 6240

gtcgcggtcg gctcgctcct tggccgcgat gttgagttgc acgtactcgc gggccacgca 6300

cttccactcg gggaagacgg tggtgcgctc gtctgggatt aggcgcaccc tccagcctcg 6360

gttgtgcagg gtgaccatgt cgacgctggt ggcgacctcg ccgcgcaggc gctcgttggt 6420

ccagcagagg cggccgccct tgcgcgagca gaaggggggt agggggtcca gctggtcctc 6480

gtttgggggg tccgcgtcga tggtgaagac cccggggagc aagcgcgggt caaagtagtc 6540

gatcttgcaa gcttgcatgt ccagagcccg ctgccattcg cgggcggcga gcgcgcgctc 6600

gtaggggttg aggggcgggc cccagggcat ggggtgggtg agcgcggagg cgtacatgcc 6660

gcagatgtca tacacgtaca ggggttccct gaggatgccg aggtaggtgg ggtagcagcg 6720

ccccccgcgg atgctggcgc gcacgtagtc atagagctcg tgggaggggg ccagcatgtt 6780

gggcccgagg ttggtgcgct gggggcgctc ggcgcggaag gcgatctgcc tgaagatggc 6840

atgggagttg gaggagatgg tgggccgctg gaagacgttg aagcttgctt cttgcaagcc 6900

caccgagtcc ctgacgaagg aggcgtagga ctcgcgcagc ttgtgcacca gctcggcggt 6960

gacctggacg tcgagcgcgc agtagtcgag ggtctcgcgg atgatgtcat acttatcctc 7020

ccccttcttt ttccacagct cgcggttgag gacgaactct tcgcggtctt tccagtactc 7080

ttggagggga aacccgtccg tgtccgaacg gtaagagcct agcatgtaga actggttgac 7140

ggcctggtag gggcaacagc ccttctccac gggcagcgcg taggcctgcg ccgccttgcg 7200

gagggaggtg tgggtgaggg cgaaagtgtc cctgaccatg actttgaggt attgatgttt 7260

gaagtctgtg tcatcgcagc cgccctgttc ccacagggtg tagtccgtgc gctttttgga 7320

gcgcgggttg ggcagggaga aggtgaggtc attgaagagg atcttccccg ctcgaggcat 7380

gaagtttctg gtgatgcgaa agggccctgg gaccgaggag cggttgttga tgacctgggc 7440

ggccaggacg atctcgtcaa agccgtttat gttgtggccc acgatgtaga gctccaaaaa 7500

gcggggctgg cccttgatgg aggggagctt tttgagttcc tcgtaggtga gctcctcggg 7560

cgattccagg ccgtgctcct ccagggccca gtcttgcaag tgagggttgg ccgccaggaa 7620

ggatcgccag aggtcgcggg ccatgagggt ctgcaggcgg tcgcggaagg ttctgaactg 7680

tcgccccacg gccatctttt cgggggtgat gcagtagaag gtgaggggggt ctttctccca 7740

ggggtcccat ctgagctctc gggcgaggtc gcgcgcggcg gcgaccagag cctcgtcgcc 7800

ccccagtttc atgaccagca tgaagggcac gagctgcttg ccaaaggctc ccatccaagt 7860

gtaggtctct acatcgtagg tgacaaagag gcgctccgtg cgaggatgag agccgatcgg 7920

gaagaactgg atctcccgcc accagttgga ggattggctg ttgatgtggt gaaagtagaa 7980

gtcccgtctg cgggccgagc actcgtgctg gcttttgtaa aagcgaccgc agtactggca 8040

gcgctgcacg ggttgtatat cttgcacgag gtgaacctgg cgacctctga cgaggaagcg 8100

cagcgggaat ctaagtcccc cgcctggggt cccgtgtggc tggtggtctt ctactttggt 8160

tgtctggccg ccagcatctg tctcctggag ggcgatggtg gagcagacca ccacgccgcg 8220

agagccgcag gtccagatct cggcgctcgg cgggcggagt ttgatgacga catcgcgcac 8280

attggagctg tccatggtct ccagctcccg cggcggcagg tcagctggga gttcctggag 8340

gttcacctcg cagagacggg tcaaggcgcg ggcagtgttg agatggtatc tgatttcaag 8400

gggcgtgttg gcggcggagt cgatggcttg caggaggccg cagccccggg gggccacgat 8460

ggttccccgc ggggcgcgag gggaggcgga agctgggggt gtgttcagaa gcggtgacgc 8520

gggcgggccc ccggaggtag gggggttcc ggccccacag gcatgggcgg caggggcacg 8580

tcttcgccgc gcgcgggcag gggctggtgc tggctccgaa gagcgcttgc gtgcgcgacg 8640

acgcgacggt tggtgtcctg tatctgacgc ctctgagtga agaccacggg tcccgtgacc 8700

ttgaacctga aagagagttc gacagaatca atctcggcat cgttgacagc ggcctggcgc 8760

aggatctcct gcacgtcgcc cgagttgtcc tggtaggcga tctctgccat gaactgctcg 8820

atctcttctt cctggagatc tcctcgtccg gcgcgctcca cggtggccgc caggtcgttg 8880

gagatgcgac ccatgagctg tgagaaggcg ttgagcccgc cctcgttcca gacccggctg 8940

tagaccacgc ccccctcggc gtcgcgagcg cgcatgacca cctgggccag gttgagctcc 9000

acgtgtcgcg tgaagacggc gtagttgcgc aggcgctgga aaaggtagtt cagggtggtg 9060

gcggtgtgct cggcgacgaa gaagtacatg acccagcgcc gcaacgtgga ttcattgatg 9120

tcccccaagg cctccaggcg ctccatggcc tcgtagaagt ccacggcgaa gttgaaaaac 9180

tgggagttgc gagcggacac ggtcaactcc tcctccagaa gacggatgag ctcggcgaca 9240

gtgttgcgca cctcgcgctc gaaggccacg gggggcgctt cttcctcttc cacctcttct 9300

tccatgatcg cttcttcttc ttcctcagcc gggacgggag ggggcggcgg cggcggggga 9360

ggggcgcggc ggcggcggcg gcgcaccggg aggcggtcga tgaagcgctc gatcatctcc 9420

ccccgcatgc ggcgcatggt ctcggtgacg gcgcggccgt tctcccgggg gcgcagctcg 9480

aagacgccgc ctctcatctc gccgcggggc gagcggccgt gaggtagcga gacggcgctg 9540

actatgcatc ttaacaattg ctgtgtaggt acaccgccga gggacctgat tgagtccaga 9600

tccaccggat ccgaaaacct ttggaggaaa gcgtctatcc agtcgcagtc gcaaggtagg 9660

ctgagcaccg tggcgggcgg gggcgggtct ggagagttcc tggcggagat gctgctgatg 9720

atgtaattaa agtaggcggt cttgagaagg cggatggtgg acaggagcac catgtctttg 9780

ggtccggcct gttggatgcg gaggcggtcg gccatgcccc aggcctcgtt ctgacaccgg 9840

cgcaggtctt tgtagtagtc ttgcatgagt ctttccaccg gcacctcttc tccttcctct 9900

tctccatctc gccggtggtt tctcgcgccg cccatgcgcg tgaccccaaa gcccctgagc 9960

ggctgcagca gggccaggtc ggcgaccacg cgctcggcca agatggcctg ctgcacctga 10020

gtgagggtcc tctcgaagtc atccatgtcc acgaagcggt ggtaggcgcc cgtgttgatg 10080

gtgtaggtgc agttggccat gacggaccag ttgacggtct ggtgtcccgg ctgcgagagc 10140

tccgtgtacc gcaggcgcga gaaggcgcgg gaatcgaaca cgtagtcgtt gcaagtccgc 10200

accagatact ggtagcccac caggaagtgc ggcggaggtt ggcgatagag gggccagcgc 10260

tgggtggcgg gggcgccggg cgccaggtct tccagcatga ggcggtggta tccgtagatg 10320

tacctggaca tccaggtgat gccggcggcg gtggtggtgg cgcgcgcgta gtcgcggacc 10380

cggttccaga tgtttcgcag gggcgagaag tgttccatgg tcggcacgct ctggccggtg 10440

aggcgcgcgc agtcgttgac gctctataca cacacaaaaa cgaaagcgtt tacagggctt 10500

tcgttctgta gcctggagga aagtaaatgg gttgggttgc ggtgtgcccc ggttcgagac 10560

caagctgagc tcggccggct gaagccgcag ctaacgtggt attggcagtc ccgtctcgac 10620

ccaggccctg tatcctccag gatacggtcg agagcccttt tgctttcttg gccaagcgcc 10680

cgtggcgcga tctgggatag atggtcgcga tgagaggaca aaagcggctc gcttccgtag 10740

tctggagaaa caatcgccag ggttgcgttg cggcgtaccc cggttcgagc ccctatggcg 10800

gcttgaatcg gccggaaccg cggctaacga gggccgtggc agccccgtcc tcaggacccc 10860

gccagccgac ttctccagtt acgggagcga gccccttttg ttttttattt tttagatgca 10920

tcccgtgctg cggcagatgc gcccctcgcc ccggcccgat cagcagcagc aacagcaggc 10980

atgcagaccc ccctctcccc tttccgcccc ggtcaccacg gccgcggcgg ccgtgtcggg 11040

cgcgggggcc gcgctggagt cagatgagcc accgcggcgg cgacctaggc agtatctgga 11100

cttggaagag ggcgagggac tggcgcggct gggggcgaac tctccagagc gccacccgcg 11160

ggtgcagttg aaaagggacg cgcgcgaggc gtacctgccg cggcagaacc tgtttcgcga 11220

ccgcgggggc gaggagcccg aggagatgcg agactgcagg ttccaagcgg ggcgcgagct 11280

gcggcgcggg ctggacagac agcgcctgct gcgcgaggag gactttgagc ccgacacgca 11340

gacgggcatc agccccgcgc gcgcgcacgt agccgcggcc gacctggtga ccgcctacga 11400

gcagacggta aaccaggagc gcaacttcca aaagagcttc aacaaccacg tgcgcacgct 11460

ggtggcgcgc gaggaggtga ccctgggtct catgcatctg tgggacctgg tggaggcgat 11520

cgtgcagaac cccagcagca agcccctgac cgcgcagctg ttcctggtgg tgcagcacag 11580

cagggacaac gaggccttca gggaggcgct gctgaacatc accgagccgg aggggcgctg 11640

gctcctggac ctgataaaca tcctgcagag catagtggtg caggagcgca gcctgagcct 11700

ggccgagaag gtggcggcca tcaactactc tatgctgagc ctgggcaagt tctacgcccg 11760

caagatctac aagacccccт acgtgcccat agacaaggag gtgaagatag acagcttcta 11820

catgcgcatg gcgctgaagg tgctgaccct gagcgacgac ctgggagtgt accgcaacga 11880

gcgcatccac aaggccgtga gcgccagccg gcggcgcgag ctgagcgacc gcgagctgat 11940

gcacagtctg cagcgcgcgc tgaccggcgc gggcgagggc gacagggagg tcgagtccta 12000

cttcgacatg ggggccgacc tgcactggca gccgagccgc cgcgccctgg aggcggcggg 12060

ggcgtacggc ggccccctgg cggccgatga ccaggaagag gaggactatg agctagagga 12120

gggcgagtac ctggaggact gacctggctg gtggtgtttt ggtatagatg caagatccga 12180

acgtggcgga cccggcggtc cgggcggcgc tgcaaagcca gccgtccggc attaactcct 12240

ctgacgactg ggccgcggcc atgggtcgca tcatggccct gaccgcgcgc aaccccgagg 12300

ctttcaggca gcagcctcag gccaaccggc tggcggccat cttggaagcg gtagtgcccg 12360

cgcgctccaa ccccacccac gagaaggtgc tggccatagt caacgcgctg gcggagagca 12420

gggccatccg cgcggacgag gccggactgg tgtacgatgc gctgctgcag cgggtggcgc 12480

ggtacaacag cggcaacgtg cagaccaacc tggaccgcct ggtgacggac gtgcgcgagg 12540

ccgtggcgca gcgcgagcgc ttgcatcagg acggtaacct gggctcgctg gtggcgctaa 12600

acgccttcct cagcacccag ccggccaacg taccgcgggg gcaggaggac tacaccaact 12660

ttttgagcgc gctgcggctg atggtgaccg aggtccctca gagcgaggtg taccagtcgg 12720

ggcccgacta cttcttccag accagcagac agggcttgca aaccgtgaac ctgagccagg 12780

ctttcaagaa cctgcggggg ctgtggggag tgaaggcgcc caccggcgac cgggctacgg 12840

tgtccagcct gctaaccccc aactcgcgcc tgctgctgct gctgatcgcg cccttcacgg 12900

acagcgggag cgtctcgcgg gagacctatc tgggccacct gctgacgctg taccgcgagg 12960

ccatcgggca ggcgcaggtg gacgagcaca ccttccaaga gatcaccagc gtgagccacg 13020

cgctggggca ggaggacacg ggcagcctgc aggcgaccct gaactacctg ctgaccaaca 13080

ggcggcagaa gattcccacg ctgcacagcc tgacccagga ggaggagcgc atcttgcgct 13140

acgtgcagca gagcgtgagc ctgaacctga tgcgcgacgg cgtgacgccc agcgtggcgc 13200

tggacatgac cgcgcgcaac atggaaccgg gcatgtacgc ctcccaccgg ccgtttatca 13260

accgcctgat ggactacttg catcgggcgg cggccgtgaa ccccgagtac ttcactaatg 13320

ccattctgaa tccccactgg atgccccctc cgggtttcta caacggggac tttgaggtgc 13380

ccgaggtcaa cgacgggttc ctctgggatg acatggatga cagtgtgttc tcacccaacc 13440

cgctgcgcgc cgcgtctctg cgattgaagg agggctctga cagggaagga ccgaggagtc 13500

tggcctcctc cctggctctg ggagcggtgg gcgccacggg cgcggcggcg cggggcagta 13560

gccccttccc cagcctggca gactctctga acagcgggcg ggtgagcagg ccccgcttgc 13620

taggcgagga ggagtatctg aacaactccc tgctgcagcc cgcgagggac aagaacgctc 13680

agcggcagca gtttcccaac aatgggatag agagcctggt ggacaagatg tccagatgga 13740

agacgtatgc gcaggagtac aaggagtggg aggaccgcca gccgcggccc ttgccgcccc 13800

ctaggcagcg ctggcagcgg cgcgcgtcca accgccgctg gaggcagggg cccgaggacg 13860

atgatgactc tgcagatgac agcagcgtgt tggacctggg cgggagcggg aacccctttt 13920

cgcacctgcg cccacgcctg ggcaagatgt tttaaaagaa aaaaaaaata aaactcacca 13980

aggccatggc gacgagcgtt ggtttttttgt tcccttcctt agtatgcggc gcgcggcgat 14040

gttcgaggag gggcctcccc cctcttacga gagcgcgatg gggatttctc ctgcggcgcc 14100

cctgcagcct ccctacgtgc ctcctcggta cctgcaacct acaggggga gaaatagcat 14160

ctgttactct gagctgcagc ccctgtacga taccaccaga ctgtacctgg tggacaacaa 14220

gtccgcggac gtggcctccc tgaactacca gaacgaccac agcgattttt tgaccacggt 14280

gatccaaaac aacgacttca ccccaaccga ggccagcacc cagaccataa acctggataa 14340

caggtcgaac tggggcggcg acctgaagac catcttgcac accaacatgc ccaacgtgaa 14400

cgagttcatg ttcaccaact cttttaaggc gcgggtgatg gtggcgcgcg agcaggggga 14460

ggcgaagtac gagtgggtgg acttcacgct gcccgagggc aactactcag agaccatgac 14520

tctcgacctg atgaacaatg cgatcgtgga acactatctg aaagtgggca ggcagaacgg 14580

ggtgaaggaa agcgatatcg gggtcaagtt tgacaccaga aacttccgtc tgggctggga 14640

ccccgtgacc gggctggtca tgccgggggt ctacaccaac gaggcctttc atcccgacat 14700

agtgcttctg cccggctgtg gggtggactt cacccagagc cggctgagca acctgctggg 14760

cattcgcaag cggcagcctt tccaggaggg tttcaagatc acctatgagg atctgaaggg 14820

gggcaacatt cccgcgctcc ttgatctgga cgcctacgag gagagcttga aacccgagga 14880

gagcgctggc gacagcggcg agagtggcga ggagcaagcc ggcggcggtg gcggcgcgtc 14940

ggtagaaaac gaaagtacgc ccgcagtggc ggcggacgct gcggaggtcg agccggaggc 15000

catgcagcag gacgcagagg agggcgcaca ggagggcgcg cagaaggaca tgaacgatgg 15060

ggagatcagg ggagacacat tcgccacccg gggcgaagaa aaagaggcag aggcggcggc 15120

ggcggcgacg gcggaggccg aaaccgaggt tgaggcagag gcagagcccg agaccgaagt 15180

tatggaagac atgaatgatg gagaacgtag gggcgacacg ttcgccaccc ggggcgaaga 15240

gaaggcggcg gaggcagaag ccgcggctga ggaggcggct gcggctgcgg ccaagactga 15300

ggctgcggct aaggctgagg tcgaagccaa tgttgcggtt gaggctcagg ctgaggagga 15360

ggcggcggct gaagcagtta aggaaaaggc ccaggcagag caggaagaga aaaaacctgt 15420

cattcaacct ctaaaagaag atagcaaaaa gcgcagttac aacgtcatcg agggcagcac 15480

ctttacccag taccgcagct ggtacctggc gtacaactac ggcgacccgg tcaagggggt 15540

gcgctcgtgg accctgctct gcacgccgga cgtcacctgc ggctccgagc agatgtactg 15600

gtcgctgccg aacatgatgc aagacccggt gaccttccgc tccacgcggc aggttagcaa 15660

cttcccggtg gtgggcgccg aactgctgcc cgtgcactcc aagagttttt acaacgagca 15720

ggccgtctac tcccagctga tccgccaggc cacctctctg acccacgtgt tcaatcgctt 15780

tcccgagaac cagattttgg cgcgcccgcc ggcccccacc atcaccaccg tgagtgaaaa 15840

cgttcctgcc ctcacagatc acgggacgct accgctgcgc aacagcatct caggagtcca 15900

gcgagtgacc attactgacg ccagacgccg gacctgcccc tacgtttaca aggccttggg 15960

catagtctcg ccgcgcgtcc tctccagtcg cacttttaa aacacatcta cccacacgtt 16020

ccaaaatcat gtccgtactc atctcaccca gcaacaacac cggctggggg ctgcgcgcgc 16080

ccagcaagat gtttggaggg gcgaggaagc gctccgacca gcaccctgtg cgcgtgcgcg 16140

gccactaccg cgcgccctgg ggagcgcaca agcgcgggcg cacagggcgc accactgtgg 16200

acgacgtcat tgactccgta gtggagcaag cgcgccacta cacacccggc gcgccgaccg 16260

cccccgccgt gtccaccgtg gaccaggcga tcgaaagcgt ggtacagggc gcgcggcact 16320

atgccaacct taaaagtcgc cgccgccgcg tggcccgccg ccatcgccgg agaccccggg 16380

ccaccgccgc cgcgcgcctt actaaggctc tgctcaggcg cgccaggcga actggccacc 16440

gggccgccat gagggccgca cggcgggctg ccgctgccgc aagcgtcgtg gccccgcggg 16500

cacgaaggcg cgcggccgct gccgccgccg ccgccatttc cagcttggcc tcgacgcggc 16560

gcggtaacat atactgggtg cgcgactcgg taaccggcac gcgggtaccc gtgcgctttc 16620

gccccccgcg gaattagcac aagacaacat acacactgag tctcctgctg ttgtgtatcc 16680

cagcggcgac cgtcagcagc ggcgacatgt ccaagcgcaa aattaaagaa gagatgctcc 16740

aggtcatcgc gccggagatc tatgggcccc cgaagaagga ggaggatgat tacaagcccc 16800

gcaagctaaa gcgggtcaaa aagaaaaaga aagatgatga tgacgaggcg gtggagtttg 16860

tccgccgcat ggcacccagg cgccccgtgc agtggaaggg ccggcgcgtg cagcgcgttt 16920

tgcgccccgg caccgcggtg gtcttcacgc ccggcgagcg ctccacgcgc actttcaagc 16980

gggtgtacga tgaggtgtac ggcgacgagg acctgttgga gcaggccaac cagcgctttg 17040

gggagtttgc atatgggaaa cggccccgcg agagtctaaa agaggacctg ctggcgctac 17100

cgctggacga gggcaatccc accccgagtc tgaagccggt aaccctgcaa caggtgctgc 17160

ctttgagcgc gcccagcgag cataagcgag ggttgaagcg cgaaggcggg gacctggcgc 17220

ccaccgtgca gttgatggtg cccaagcggc agaagctgga ggacgtgctg gagaaaatga 17280

aagtagagcc cgggatccag cccgagatca aggtccgccc catcaagcag gtggcgcccg 17340

gcgtgggagt ccagaccgtg gacgttagga ttcccacgga ggagatggaa acccaaaccg 17400

ccactccctc ttcggcggcc agcgccacca ccggcaccgc ttcggtagag gtgcagacgg 17460

acccctggct acccgccacc gctgttgccg ccgccgcccc ccgttcgcgc gggcgcaaga 17520

gaaattatcc agcggccagc gcgctcatgc cccagtacgc actgcatcca tccatcgtgc 17580

ccacccccgg ctaccgcggg tactcgtacc gcccgcgcag atcagccggc actcgcggcc 17640

gccgccgccg tgcgaccaca accagccgcc gccgtcgccg ccgccgccag ccagtgctga 17700

cccccgtgtc tgtaaggaag gtggctcgct cggggagcac gctggtggtg cccagagcgc 17760

gctaccaccc cagcatcgtt taaagccggt ctctgtatgg ttcttgcaga tatggccctc 17820

acttgtcgcc tccgcttccc ggtgccggga taccgaggaa gaactcaccg ccgcagaggc 17880

atggcgggca gcggtctccg cggcggccgt cgccatcgcc ggcgcgcaaa aagcaggcgc 17940

atgcgcggcg gtgtgctgcc tctgctaatc ccgctaatcg ccgcggcgat cggtgccgta 18000

cccgggatcg cctccgtggc cctgcaggcg tcccagaaac gttgactctt gcaaccttgc 18060

aagcttgcat tttttggagg aaaaataaaa aaaagtctag actctcacgc tcgcttggtc 18120

ctgtgactat tttgtagaaa aaaagatgga agacatcaac tttgcgtcgc tggccccgcg 18180

tcacggctcg cgcccgttca tgggagactg gacagatatc ggcaccagca atatgagcgg 18240

tggcgccttc agctggggca gtctgtggag cggccttaaa aattttggtt ccaccattaa 18300

gaactatggc aacaaagcgt ggaacagcag cacgggccag atgctgagag acaagttgaa 18360

agagcagaac ttccaggaga aggtggcgca gggcctggcc tctggcatca gcggggtggt 18420

ggacatagct aaccaggccg tgcagaaaaa gataaacagt catctggacc cccgtcctca 18480

ggtggaggaa atgcctccag cgatggagac ggtgtctccc gagggcaaag gcgaaaagcg 18540

cccgcggccc gacagagaag agaccctggt gtcacacacc gaggagccgc cctcttacga 18600

ggaggcagtc aaggccggcc tgcccaccac tcgccccata gcccccatgg ccaccggtgt 18660

ggtgggccac aggcaacaca ctcccgcaac actagatctg cccccgccgt ccgagccgcc 18720

gcgccagcca aaggcggcga cggtgcccgc tccctccact tccgccgcca acagagtgcc 18780

cctgcgccgc gccgcgagcg gcccccgggc ctcgcgagtt agcggcaact ggcagagcac 18840

actgaacagc atcgtgggcc tgggagtgag gagtgtgaag cgccgccgtt gctactgaat 18900

gagcaagcta gctaacgtgt tgtatgtgtg tatgcgtcct atgtcgccgc cagaggagct 18960

gttgagccgc cggcgccgtc tgcactccag cgaatttcaa gatggcgacc ccatcgatga 19020

tgcctcagtg gtcgtacatg cacatctcgg gccaggacgc ttcggagtac ctgagccccg 19080

ggctggtgca gttcgcccgc gccacagaca cctacttcaa catgagtaac aagttcagga 19140

accccactgt ggcgcccacc cacgatgtga ccacggaccg gtcgcagcgc ctgacgctgc 19200

ggttcatccc cgtggatcgg gaggacaccg cctactctta caaggcgcgg ttcacgctgg 19260

ccgtgggcga caaccgcgtg ctggacatgg cctccactta ctttgacatc agggggggtgc 19320

tggacagggg ccccaccttc aagccctact cgggtactgc ctacaactcc ctggccccca 19380

agggcgctcc caattcttgc gagtgggaac aagatgaacc agctcaggca gcaatagctg 19440

aagatgaaga agaacttgaa gaagaacaag ctcaggacga acaggcgccc actaagaaaa 19500

cccatgtata cgcccaggca cctctttctg gtgaaaaaat tactaaggat ggtttgcaaa 19560

taggtgtgga tgccacacag gcgggagata accctatata tgctgataaa acattccaac 19620

ccgaacctca gataggtgag tctcagtgga acgaggctga tgccacagta gcaggaggca 19680

gagtcttaaa aaagaccacc cctatgagac cttgctatgg atcctatgcc aaacctacta 19740

atgccaatgg cggtcaaggg atcatggtgg ccaatgatca gggagcgctt gaatctaaag 19800

ttgagatgca atttttctcc accacaacgt ctcttaatgt aagggaaggt gaaaacaatc 19860

ttcagccaaa agtagtgcta tacagcgaag atgttaactt ggaatcccct gacactcatt 19920

tgtcttacaa acctaaaaag gatgacacca actctaaaat catgttgggt cagcaagcca 19980

tgcccaacag acccaacctc attgctttta gggacaactt tattggactt atgtactaca 20040

acagcacagg caacatggga gtgctggcag gacaggcctc ccagctaaac gctgtggtag 20100

acttgcaaga cagaaacaca gagctgtcat accaactgat gcttgattcc attggagaca 20160

gatcaagata cttttccatg tggaaccagg cagtggacag ctatgaccca gatgtcagaa 20220

tcattgaaaa ccatggggtt gaagatgagc tgcccaacta ttgctttccc ctgggcggta 20280

ttggaattac agacacatac cagtgcataa aaccaaccgc agctgctaat aacactacat 20340

ggtctaagga tgaagaattt agtgatcgca atgaaatagg ggtgggaaac aacttcgcca 20400

tggagatcaa catccaggcc aacctctgga ggaacttcct ctatgcgaac gtggggctct 20460

acctgccaga caagctcaag tacaacccca ccaacgtgga catctctgac aaccccaaca 20520

cctatgacta catgaacaag cgtgtggtgg ctcccggcct ggtggactgc tttgtcaatg 20580

tgggagccag gtggtccctg gactacatgg acaacgtcaa ccccttcaac caccaccgca 20640

atgcgggtct gcgctaccgc tccatgatcc tgggcaacgg gcgctacgtg cccttccaca 20700

ttcaggtgcc ccagaagttc tttgccatca agaacctcct cctcctgccg ggctcctaca 20760

cttacgagtg gaacttcagg aaggatgtca acatggtcct gcagagctct ctgggcaatg 20820

accttagggt ggacggggcc agcatcaagt ttgacagcgt caccctctat gctaccttct 20880

tccccatggc tcacaacacc gcctccacgc tcgaggccat gctgaggaac gacaccaacg 20940

accagtcctt caatgactac ctctctgggg ccaacatgct ctaccccatc cccgccaagg 21000

ccaccaacgt gcccatctcc attccctctc gcaactgggc cgccttcaga ggctgggcct 21060

ttacccgcct taagaccaag gaaaccccct ccctgggctc gggttttgac ccctactttg 21120

tctactcggg atccatcccc tacctggatg gcaccttcta cctcaaccac acttttaaga 21180

agatatccat catgtatgac tcctccgtca gctggccggg caatgaccgc ctgctcaccc 21240

ccaatgagtt cgaggtcaag cgcgccgtgg acggcgaggg ctacaacgtg gcccagtgca 21300

acatgaccaa ggactggttc ctggtgcaga tgctggccaa ctacaacata ggctaccagg 21360

gcttctacat cccagagagc tacaaggaca ggatgtactc cttcttcaga aatttccaac 21420

ccatgagcag gcaggtggtg gacgagacca aatacaagga ctatcaggcc attggcatca 21480

ctcaccagca caacaactcg ggattcgtgg gctacctggc tcccaccatg cgcgaggggc 21540

aggcctaccc cgccaacttc ccctacccgt tgataggcaa aaccgcggtc gacagcgtca 21600

cccagaaaaa gttcctctgc gaccgcaccc tctggcgcat ccccttctct agcaacttca 21660

tgtccatggg tgcgctcacg gacctgggcc agaacctgct ctatgccaac tccgcccatg 21720

cgctggacat gacttttgag gtggacccca tggacgagcc cacccttctc tatattgtgt 21780

ttgaagtgtt cgacgtggtc agagtgcacc agccgcaccg cggtgtcatc gagaccgtgt 21840

acctgcgcac gcccttctcg gccggcaacg ccaccaccta aggagacagc gccgccgcct 21900

gcatgacggg ttccaccgag caagagctca gggccatcgc cagagacctg ggatgcggac 21960

cctatttttt gggcacctat gacaaacgct tcccgggctt catctcccga gacaagctcg 22020

cctgcgccat cgtcaacacg gccgcgcgcg agaccggggg cgtgcactgg ctggcctttg 22080

gctgggaccc gcgctccaaa acctgctacc tcttcgaccc ctttggcttc tccgatcagc 22140

gcctcagaca gatctatgag tttgagtacg aggggctgct gcgccgcagc gcgcttgcct 22200

cctcgcccga ccgctgcatc acccttgaga agtccaccga gaccgtgcag gggccccact 22260

cggccgcctg cggtctcttc tgctgcatgt ttttgcacgc ctttgtgcgc tggccccaga 22320

gtcccatgga tcgcaacccc accatgaact tgctcaaggg agtgcccaac gccatgctcc 22380

agagccccca ggtccagccc accctgcgcc acaaccagga acagctctac cgcttcctgg 22440

agcgccactc cccctacttc cgcagtcaca gcgcgcacat ccgggggggcc acctctttct 22500

gccacttgca agaaaacatg caagacggaa aatgatgtac agctcgcttt ttaataaatg 22560

taaagactgt gcactttatt tatacacggg ctctttctgg ttatttattc aacaccgccg 22620

tcgccatcta gaaatcgaaa gggttctgcc gcgcgtcgcc gtgcgccacg ggcagagaca 22680

cgttgcgata ctggaagcgg ctcgcccact taaactcggg caccaccatg cggggcagtg 22740

gttcctcggg gaagttctcg ccccacaggg tgcgggtcag ctgcagcgcg ctcaggaggt 22800

cgggagccga gatcttgaag tcgcagttgg ggccggaacc ctgcgcgcgc gagttgcggt 22860

acacggggtt gcagcactgg aacaccagca gggccggatt atgcacgctg gccagcaggc 22920

tctcgtcgct gatcatgtcg ctgtccagat cctccgcgtt gctcagggcg aacggggtca 22980

tcttgcagac ctgcctgccc aggaaaggcg gcagcccggg cttgccgttg cagtcgcagc 23040

gcaggggcat cagcaggtgc ccgcggcccg actgcgcctg cgggtacagc gcgcgcatga 23100

aggcttcgat ctgcctgaaa gccacctgcg tcttggctcc ctccgaaaag aacatcccac 23160

aggacttgct ggagaactgg ttcgcgggac agctggcatc gtgcaggcag cagcgcgcgt 23220

cggtgttggc gatctgcacc acgttgcgac cccaccggtt cttcactatc ttggccttgg 23280

aagcctgctc cttcagcgcg cgctggccgt tctcgctggt cacatccatc tctatcacct 23340

gctccttgtt gatcatgttt gtaccgtgca gacacttcag gtcgccctcc gtctgggtgc 23400

agcggtgctc ccacagcgcg caaccggtgg gctcccaatt tttgtgggtc acccccgcgt 23460

aggcctgcag gtaggcctgc aagaagcgcc ccatcatggc cacaaaggtc ttctggctcg 23520

taaaggtcag ctgcaggccg cgatgctctt cgttcagcca ggtcttgcag atggcggcca 23580

gcgcctcggt ctgctcgggc agcatcctaa aatttgtctt caggtcgtta tccacgtggt 23640

acttgtccat catggcgcgc gccgcctcca tgcccttctc ccaggcggac accatgggca 23700

ggcttagggg gtttatcact tccaccggcg aggacaccgt actttcgatt tcttcttcct 23760

ccccctcttc ccggcgcgcg cccacgctgc tgcgcgctct caccgcctgc accaaggggt 23820

cgtcttcagg caagcgccgc accgagcgct tgccgccctt gacctgctta atcagcaccg 23880

gcgggttgct gaagcccacc atggtcagcg ccgcctgctc ttcttcgtct tcgctgtcta 23940

ccactatctc tggggaaggg cttctccgct ctgcggcggc gcgcttcttt tttttcttgg 24000

gagcggccgt gatggagtcc gccacggcga cggaggtcga gggcgtgggg ctgggggtgc 24060

gcggtaccag ggcctcgtcg ccctcggact cttcctctga ctccaggcgg cggcggagtc 24120

gcttctttgg gggcgcgcgc gtcagcggcg gcggagacgg ggacggggac ggggacggga 24180

cgccctccac agggggtggt cttcgcgcag acccgcggcc gcgctcgggg gtcttctcga 24240

gctggtcttg gtcccgactg gccattgtat cctcctcctc ctaggcagag agacataagg 24300

agtctatcat gcaagtcgag aaggaggaga gcttaaccac cccctctgag accgccgatg 24360

cgcccgccgt cgccgtcgcc cccgctgccg ccgacgcgcc cgccacaccg agcgacaccc 24420

ccgcggaccc ccccgccgac gcacccctgt tcgaggaagc ggccgtggag caggacccgg 24480

gctttgtctc ggcagaggag gatttgcgag aggaggagga taaggagaag aagccctcag 24540

tgccaaaaga tgataaagag caagacgagc acgacgcaga tgcacaccag ggtgaagtcg 24600

ggcgggggga cggagggcat gacggcgccg actacctaga cgaagggaac gacgtgctct 24660

tgaagcacct gcatcgtcag tgcgccattg tttgcgacgc tctgcaggag cgcagcgaag 24720

tgcccctcag cgtggcggag gtcagccacg cctacgagct cagcctcttc tccccccggg 24780

tgcccccccg ccgccgcgaa aacggcacat gcgagcccaa cccgcgcctc aacttctacc 24840

ccgcctttgt ggtacccgag gtcctggcca cctatcacat cttctttcaa aattgcaaga 24900

tccccctctc gtgccgcgcc aaccgtagcc gcgccgataa gatgctggcc ctgcgccagg 24960

gcgaccacat acctgatatc gccgctttgg aagatgtacc aaagatcttc gagggtctgg 25020

gtcgcaacga gaagcgggca gcaaactctc tgcaacagga aaacagcgaa aatgagagtc 25080

acaccggggt actggtggag ctcgagggcg acaacgcccg cctggcggtg gtcaagcgca 25140

gcatcgaggt cacccacttt gcctaccccg cgctaaacct gccccccaaa gtcatgaacg 25200

cggccatgga cgggctgatc atgcgccgcg gccggcccct cgctccagat gcaaacttgc 25260

atgaggagac cgaggacggc cagcccgtgg tcagcgacga gcagctggcg cgctggctgg 25320

agaccgcgga ccccgccgaa ctggaggagc ggcgcaagat gatgatggcc gtggtgctgg 25380

tcaccgtaga gctggagtgt ctgcagcgct tcttcggcga ccccgagatg cagagaaagg 25440

tcgaggagac cctgcactac accttccgcc agggctacgt gcgccaggct tgcaagatct 25500

ccaacgtgga gctcagcaac ctggtgtcct acctgggcat cttgcatgag aaccgcctcg 25560

ggcagagcgt gctgcactcc accctgcgcg gggaggcgcg ccgcgactac gtgcgcgact 25620

gcgtttacct cttcctctgc tacacctggc agacggccat gggggtctgg cagcagtgcc 25680

tggaggagcg caacctcaag gagctggaga agctcctgca gcgcgcgctc aaagatctct 25740

ggacgggcta caacgagcgc tcggtggccg ccgcgctggc cgacctcatc ttccccgagc 25800

gcctgctcaa aaccctccag caggggctgc ccgacttcac cagccaaagc atgttgcaaa 25860

acttcaggaa ctttatcctg gagcgttctg gcatcctacc cgccacctgc tgcgccctgc 25920

ccagcgactt tgtccccctc gtgtaccgcg agtgcccccc gccgctgtgg ggtcactgct 25980

acctgttcca actggccaac tacctgtcct accacgcgga cctcatggag gactccagcg 26040

gcgaggggct catggagtgc cactgccgct gcaacctctg cacgccccac cgctccctgg 26100

tctgcaacac ccaactgctc agcgagagtc agattatcgg taccttcgag ctacagggtc 26160

cgtcctcctc agacgagaag tccgcggctc cggggctaaa actcactccg gggctgtgga 26220

cttccgccta cctgcgcaaa tttgtacctg aagactacca cgcccacgag atcaggtttt 26280

acgaagacca atcccgcccg cccaaggcgg agctgaccgc ctgcgtcatc acccagggcg 26340

agatcctagg ccaattgcaa gccatccaaa aagcccgcca agacttttg ctgaagaagg 26400

gtcgggggt gtatctggac ccccagtcgg gtgaggagct caacccggtt cccccgctgc 26460

cgccgccgcg ggaccttgct tcccaggata agcatcgcca tggctcccag aaagaagcag 26520

cagcggccgc cactgccgcc accccacatg ctggaggaag aggaggaata ctgggacagt 26580

caggcagagg aggtttcgga cgaggaggag ccggagacgg agatggaaga gtgggaggag 26640

gacagcttag acgaggaggc ttccgaagcc gaagaggcag acgcaacacc gtcaccctcg 26700

gccgcagccc cctcgcaggc gcccccgaag tccgctccca gcatcagcag caacagcagc 26760

gctataacct ccgctcctcc accgccgcga cccacggccg accgcagacc caaccgtaga 26820

tgggacacca ccggaaccgg ggccggtaag tcctccggga gaggcaagca agcgcagcgc 26880

caaggctacc gctcgtggcg cgctcacaag aacgccatag tcgcttgctt gcaagactgc 26940

ggggggaaca tctccttcgc ccgccgcttc ctgctcttcc accacggtgt ggccttcccc 27000

cgtaacgtcc tgcattacta ccgtcatctc tacagcccct actgcggcgg cagtgagcca 27060

gagacggtcg gcggcggcgg cggcgcccgt ttcggcgcct aggaagaccc agggcaagac 27120

ttcagccaag aaactcgcgg cggccgcggc gaacgcggtc gcgggggccc tgcgcctgac 27180

ggtgaacgaa cccctgtcga cccgcgaact gaggaaccga atcttcccca ctctctatgc 27240

catcttccag cagagcagag ggcaggatca ggaactgaaa gtaaaaaaca ggtctctgcg 27300

ctccctcacc cgcagctgtc tgtatcacaa gagcgaagac cagcttcggc gcacgctgga 27360

ggacgctgag gcactcttca gcaaatactg cgcgctcact cttaaggact agctccgcgc 27420

ccttctcgaa tttaggcggg aacgcctacg tcatcgcagc gccgccgtca tgagcaagga 27480

cattcccacg ccatacatgt ggagctatca gccgcagatg ggactcgcgg cgggcgcctc 27540

ccaagactac tccacccgca tgaactggct cagtgccggc ccacacatga tctcacaggt 27600

taatgatatc cgcacccatc gaaaccaaat attggtggag caggcggcaa ttaccaccac 27660

gccccgcaat aatcccaacc ccagggagtg gcccgcgtcc ctggtgtatc aggaaattcc 27720

cggccccacc accgtactac ttccgcgtga ttcccaggcc gaagtccaaa tgactaactc 27780

aggggcacag ctcgcgggcg gctgtcgtca cagggtgcgg cctcctcgcc agggtataac 27840

tcacctggag atccgaggca gaggtattca gctcaacgac gagtcggtga gctcctcgct 27900

cggtctcaga cctgacggga ccttccagat agccggagcc ggccgatctt ccttcacgcc 27960

ccgccaggcg tacctgactc tgcaaagctc gtcctcggcg ccgcgctcgg gcggcatcgg 28020

gactctccag ttcgtgcagg agtttgtgcc ctcggtctac ttcaacccct tctcgggctc 28080

tcccggtcgc tacccggacc agttcatctc gaactttgac gccgcgaggg actcggtgga 28140

cggctacgac tgaatgtcgg gtggacccgg tgcagagcaa cttcgcctga agcacctcga 28200

ccactgccgc cgccctcagt gctttgcccg ctgtcagacc ggtgagttcc agtacttttc 28260

cctgcccgac tcgcacccgg acggcccggc gcacggggtg cgctttttca tcccgagtca 28320

ggtgcgctct accctaatca gggagtttac cgcccgtccc ctactggcgg agttggaaaa 28380

ggggccttct atcctaacca ttgcctgcat ctgctctaac cctggattgc accaagatct 28440

ttgctgtcat ttgtgtgctg agtataataa aggctgagat cagaatctac tcgggctcct 28500

gtcgccatcc tgtcaacgcc accgtccaag cccggcccga tcagcccgag gtgaacctca 28560

cctgcggtct gcaccggcgc ctgaggaaat acctagcttg gtactacaac agcactccct 28620

ttgtggttta caacagcttt gaccaggacg gggtctcact gagggataac ctctcgaacc 28680

tgagctactc catcaggaag aacagcaccc tcgagctact tcctccttac ctgcccggga 28740

cttaccagtg tgtcaccggt ccctgcaccc acacccacct gttgatcgta aacgactctc 28800

ttccgagaac agacctcaat aactcctctt cgcagttccc cagaacagga ggtgagctca 28860

ggaaaccccg ggtaaagaag ggtggacgag agttaacact tgtggggttt ctggtgtatg 28920

tgacgctggt ggtggctctt ttgattaagg cttttccttc catgtctgaa ctctccctct 28980

tcttttatga acaactcgac tagtgctaac gggaccctac ccaacgaatc gggattgaat 29040

atcggtaacc aggttgcagt ttcacttttg attaccttca tagtcctctt cctgctagtg 29100

ctgtcgcttc tgtgcctgcg gatcgggggc tgctgcatcc acgtttatat ctggtgctgg 29160

ctgtttagaa ggttcggaga ccatcgcagg tagaataaac atgctgctgc ttaccctctt 29220

tgtcctggcg ctggccgcca gctgccaagc cttttccgag gctgacttta tagagcccca 29280

gtgtaatgtg acttttaaag cccatgcaca gcgttgtcat actataatca aatgtgccac 29340

cgaacacgat gaatacctta tccagtataa agataaatca cacaaagtgg cacttgttga 29400

catctggaaa cccgaagacc ctttggaata caatgtgacc gttttccagg gtgacctctt 29460

caaaatttac aattacactt tcccatttga ccagatgtgt gactttgtca tgtacatgga 29520

aaagcagcac aagctgtggc ctccgactcc ccagggctgt gtggaaaatc caggctcttt 29580

ctgcatgatc tctctctgtg taactgtgct ggcactaata ctcacgcttt tgtatatcag 29640

atttaaatca aggcaaagct tcattgatga aaagaaaatg ccttaatcgc tttcacgctt 29700

gattgctaac accgggtttt tatccgcaga atgattggaa tcaccctact aatcacctcc 29760

ctccttgcga ttgcccatgg gttggaacga atcgaagtcc ctgtgggggc caatgttacc 29820

ctggtggggc ctgtcggcaa tgctacatta atgtgggaaa aatatactaa aaatcaatgg 29880

gtctcttact gcactaacaa aaatagccac aagcccagag ccatctgcga tgggcaaaat 29940

ctaaccttga ttgatgttca attgctggat gcgggctact attatgggca gctgggtaca 30000

atgattaatt actggagacc ccacagagat tacatgctcc acgtagtaaa gggtcccctt 30060

agcagcccac ccactaccac ctctactacc cccactacca ccactactcc caccaccagc 30120

actgccgccc agcctcctca tagcagaaca accactttta tcaattccaa gtcccactcc 30180

ccccacattg ccggcgggcc ctccgcctca gactccgaaa ccaccgagat ctgcttctgc 30240

aaatgctctg acgccattgc ccaggatttg gaagatcacg aggaagatga gcatgacttc 30300

gcagatgcat gccaggcatc agagccagaa gcgctgccgg tggccctcaa acagtatgca 30360

gacccccaca ccacccccga ccttcctcca ccttcccaga agccaagttt cctgggggaa 30420

aatgaaactc tgcctctctc catactcgct ctgacatctg ttgctatgtt gaccgctctg 30480

ctggtgcttc tatgctctat atgctacctg atctgctgca gaaagaaaaa atctcacggc 30540

catgctcacc agcccctcat gcacttccct taccctccag agctgggcga ccacaaactt 30600

taagtctgca gtaactatct gcccatccct tgtcagtcga cagcgatgag ccccactaat 30660

ctaacggcct ctggacttac aacatcgtct cttaatgaga ccaccgctcc tcaagacctg 30720

tacgatggtg tctccgcgct ggttaaccag tgggatcacc tgggcatatg gtggctcctc 30780

ataggagcag tgaccctgtg cctaatcctg gtctggatca tctgctgcat caaaagcaga 30840

agacccaggc ggcggcccat ctacaggccc tttgtcatca cacctgaaga tgatgatgac 30900

accacttcca ggctgcagag gctaaagcag ctactcttct cttttacagc atggtaaatt 30960

gaatcatgcc tcgcattttc atctacttgt ctctccttcc actttttctg ggctcttcta 31020

cattggccgc tgtgtcccac atcgaggtag actgcctcac gcccttcaca gtctacctgc 31080

ttttcggctt tgtcatctgc acctttgtct gcagcgttat cactgtagtg atctgcttca 31140

tacagtgcat cgactacgtc tgcgtgcggg tggcttactt tagacaccac ccccagtatc 31200

gcaacaggga catagcggct ctcctaagac ttgtttaaaa tcatggccaa attaactgtg 31260

attggtcttc tgatcatctg ctgcgtccta gccgcgattg ggactcaagc tcctaccacc 31320

accagcgctc ccagaaagag acatgtatcc tgcagcttca agcgtccctg gaatataccc 31380

caatgcttta ctgatgaacc tgaaatctct ttggcttggt acttcagcgt caccgccctt 31440

cttatcttct gcagtacggt tattgccctt gccatctacc cttcccttga cctgggctgg 31500

aatgctgtca actctatgga atatcccacc ttcccagaac cagacctgcc agacctggtt 31560

gttctaaacg cgtttcctcc tcctgctccc gttcaaaatc agtttcgccc tccgtccccc 31620

acgcccactg aggtcagcta ctttaatcta acaggcggag atgactgaaa acctagacct 31680

agaaatggac ggtctctgca gcgagcaacg cacactagag aggcgccggc aaaaagagct 31740

cgagcgtctt aaacaagagc tccaagacgc ggtggccata caccagtgca aaaaaggtgt 31800

cttctgtctg gtaaaacagg ccacgctcac ctatgaaaaa acaggtgaca cccaccgcct 31860

aggatacaag ctgcccacac agcgccaaaa gttcgccctc atgataggcg aacaacccat 31920

caccgtgacc cagcactccg tggagacaga aggctgcata catgctccct gtaggggcgc 31980

tgactgcctc tacaccttga tcaaaaccct ctgcggtctc agagacctta tccctttcaa 32040

ttaatcataa ctgtaatcaa taaaaaatca cttacttgaa atctgatagc aagcctctgt 32100

ccaatttttt cagcaacact tccttcccct cctcccaact ctggtactct aggcgcctcc 32160

tagctgcaaa cttcctccac agtctgaagg gaatgtcaga ttcctcctcc tgtccctccg 32220

cacccacgat cttcatgttg ttgcagatga aacgcgcgag atcgtctgac gagaccttca 32280

accccgtgta cccctacgat accgagatcg ctccgacttc tgtccctttc cttacccctc 32340

cctttgtgtc atccgcagga atgcaagaaa atccagctgg ggtgctgtcc ctgcacttgt 32400

cagagcccct taccacccac aatggggccc tgactctaaa aatgggggggc ggcctgaccc 32460

tggacaagga agggaatctc acttcccaaa acatcaccag tgtcgatccc cctctcaaaa 32520

aaagcaagaa caacatcagc cttcagaccg ccgcacccct cgccgtcagc tccggggccc 32580

taacactttt tgccactccc cccctagcgg tcagtggtga caaccttact gtgcagtctc 32640

aggcccctct cactttggaa gactcaaaac taactctggc caccaaagga cccctaactg 32700

tgtccgaagg caaacttgtc ctagaaac 32728

<210> 24
<211> 32728
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus vector nucleotide sequences

<400> 24
ataatatacc ttattttgga ttgtggccaa tatgataatg aggtgggcgg ggagaggcgg 60

ggcgggtgac gtaggacgcg cgagtagggt tgggaggtgt ggcggaagtg tggcatttgc 120

aagtgggagg agctcacatg caagcttccg tcgcggaaaa tgtgacgttt ttgatgagcg 180

ccgcctacct ccggaagtgc caattttcgc gcgcttttca ccggatatcg tagtaatttt 240

gggcgggacc atgtaagatt tggccatttt cgcgcgaaaa gtgaaacggg gaagtgaaaa 300

ctgaataata gggcgttagt catagcgcgt aatatttacc gagggccgag ggactttgac 360

cgattacgtg gaggactcgc ccaggtgttt tttacgtgaa tttccgcgtt ccgggtcaaa 420

gtctccgttt ttattgtcac cgtcatttga cgcggagggt atttaaaccc gctgcgctcc 480

tcaagaggcc actcttgagt gccagcgaga agagttttct cctctgctcc gcttcggtga 540

tcgaaaaatg agacacatag cctgcactcc gggtcttttg tccggtcggg cggcggccga 600

gcttttggac gctttgatca atgatgtcct aagcgatgat tttccgtcta ctacccactt 660

tagcccacct actcttcacg aactgtacga tctggatgta ctggtggatg tgaacgatcc 720

caacgaggag gcggtttctg cgtttttttcc cgagtctgcg ctgttggccg ctcaggaggg 780

atttgaccta cacactccgc cgcctatttt agagtctccg ctgccggagc ccagtggtat 840

accttatatg cctgaactgc ttcccgaagt ggtagacctg acctgccacg agcctggctt 900

tccgcccagc gacgatgagg gtgagccttt tgttttagac tttgctgaga tacctgggca 960

cggttgcagg tcttgtgcat atcatcagag ggttaccgga gaccccgagg ttaagtgttc 1020

gctgtgctat atgaggatga cctcttcctt tatctacagt aagtttttgt ctaggtgggc 1080

ttttgggtag gtgggttttg tgtcagaaca ggtgtaaacg ttgcttgtgt tttttgtacc 1140

tgtaggtccg gtgtccgagc cagacccgga gcccgaccgc gatcccgagc cggatcccga 1200

gcctcctcgc aggacaagga aactaccttc cattctgtgc aagtctcaga cacctgtaag 1260

gaccagcgag gcagacagca ccgactctgg cacttctacc tctccccctg aaattcaccc 1320

agtggttcct ctgggtatac ataaacctgt tgctgttaaa gtttgcgggc gacgccctgc 1380

agtacagtgc attgaggact tgcttcacga tcccgaggaa cctttggact tgagccttaa 1440

acgccctagg caataaaccc cacctaagta ataaacccca cctaagtaat aaaccctgcc 1500

gcccttggtt attgagatga cgcccaatgt ttgcttttga atgacttcat gtgtgtaata 1560

aaagtgagtg tgatcatagg tctcttgttt gtctgggcgg ggcttaaggg tatataagtc 1620

tcttggggct aaacttggtt acacttgacc ccaatggagg cgtgggggtg cttggaggag 1680

tttgcggacg tgcgccgttt gctggacgag agctctagca atacctatac tatttggagg 1740

tatctgtggg gctctactca ggccaagttg gtttccagaa ttaagcagga ttacaagtgc 1800

gattttgaag agctttttag ttcctgcggt gagcttttgc aatccttgaa tctgggccat 1860

caggctattt tccaggaaaa ggttctctcg actttggatt tttccactcc cgggcgcacc 1920

gccgcttgtg tggcttttgt gtcttttgtg caagataaat ggagcgagga gacccacctg 1980

agtcacggct acgtactgga tttcatggcg atggctcttt ggagggctca caacaaatgg 2040

aagattcaga aggaactgta cggttccgcc ctacgtcgtc cacttctgtc gcgacagggg 2100

ctgaggtttc ccgaccatcg gcagcatcag aatctggaag acgagtcgga ggagcgagcg 2160

gaggagaaga tcagcttgag agccggcctg gaccctcctc aggaggaatg aatctcccgc 2220

aggtggttga cctgtttcca gaactgagac gggtcctgac tatcagggag gatggtcagt 2280

ttgtgaagaa gtttaagagg gatcggggtg agggagatga tgaggcggct agcaatttag 2340

cttttagtct gatgactcgc caccgaccgg aatgtattac ctatcagcag attaaggaga 2400

gttgtgccaa cgagctggat cttttgggtc agaagtatag catagaacag cttaccactt 2460

actggcttca gcctggggat gattgggaag aggcgatcag ggtgtatgca aaggtggccc 2520

tgcggcccga ttgcaagtat aagattacta agttggttaa tattagaaac tgctgctata 2580

tttctgggaa cggggccgaa gtggagatag atactcagga cagggtggct tttaggtgtt 2640

gcatgataaa catgtggccc gggatactgg ggatggatgg ggtggtattc atgaatgtga 2700

ggtttacggg ccccaacttt aatggcacgg tgttcatggg caacaccaac ttgctcctgc 2760

atggtgcgag tttctatggg tttaataaca cctgtataga ggcctggacc gatgtaaagg 2820

ttcgaggttg ttccttttat agctgttgga aggcggtggt gtgtcgccct aaaagcaggg 2880

gttctgtgaa aaaatgcttg tttgaaaggt gcaccttagg catcctctct gagggcaact 2940

ccagggtgcg ccataatgtg gcttcgaact gcggttgctt catgcaagtg aaggggggtga 3000

gcgttatcaa gcataactcg gtgtgtggaa actgcgagga tcgcgcctcc cagatgctga 3060

cctgctttga tggcaactgt cacctgttga agaccattca tataagcagc caccccagaa 3120

aggcctggcc cgtgtttgag cataacatct tgacccgctg ctccttgcat ctgggggtca 3180

ggaggggtat gttcctgcct taccagtgta actttagcca cactaaaatc ctgctggaac 3240

ccgagtgcat gaccaaggtc agcctgaatg gtgtgtttga tgtgactctg aaaatctgga 3300

aggtgctgag gtatgatgag accaggacca ggtgccgacc ctgcgagtgc ggcggcaagc 3360

acatgagaaa tcagcctgtg atgttggatg tgaccgagga gcttaggcct gaccatctgg 3420

tgctggcctg caccagggcc gagtttgggt ctagcgatga ggataccgat tgaggtgggt 3480

aaggtgggcg tggctagaag ggtggggcgt gtataaattg ggggtctaag ggtctctctg 3540

ttttgtcttg caacagccgc cgccatgagc gacaccggca acagctttga tggaagcatc 3600

tttagcccct atctgacagt gcgcatgcct cactgggctg gagtgcgtca gaatgtgatg 3660

ggttccaacg tggatggacg ccccgttctg ccttcaaatt cgtctacaat ggcctacgcg 3720

accgtgggag gaactccgct ggacgccgcg acctccgccg ccgcctccgc cgccgccgcg 3780

accgcgcgca gcatggctac ggacctttac agctctttgg tggcgagcgg cgcggcctct 3840

cgcgcgtctg ctcgggatga gaaactgacc gctctgctgc ttaaactgga agacttgacc 3900

cgggagctgg gtcaactgac ccagcaggtc tccagcttgc gtgagagcag ccttgcctcc 3960

ccctaatggc ccataatata aataaaagcc agtctgtttg gattaagcaa gtgtatgttc 4020

tttatttaac tctccgcgcg cggtaagccc gggaccagcg gtctcggtcg tttagggtgc 4080

ggtggattct ttccaacacg tggtacaggt ggctctggat gtttagatac atgggcatga 4140

gtccatccct ggggtggagg tagcaccact gcagagcttc gtgctcgggg gtggtgttgt 4200

atatgatcca gtcgtagcag gagcgctggg cgtggtgctg aaaaatgtcc ttaagcaaga 4260

ggcttatagc taggggggagg cccttggtgt aagtgtttac aaatctgctc agttgggagg 4320

ggtgcatccg gggggatata atgtgcatct tggactggat ttttaggttg gctatgttcc 4380

cacccagatc ccttctggga ttcatgttgt gcaggaccac cagcacggta tatccagtgc 4440

acttgggaaa tttatcgtgg agcttagacg ggaatgcatg gaagaacttg gagacgccct 4500

tgtggcctcc cagattttcc atacattcgt ccatgatgat ggcaatgggc ccgtgggaag 4560

ctgcctgagc aaaaatgttt ctgggatcgc tcacatcgta gttatgttcc agggtgaggt 4620

catcatagga catctttacg aatcgggggc ggagggtccc ggactggggg atgatggtac 4680

cctcgggccc cggggcgtag ttcccctcac agatctgcat ctcccaggct ttcatttcag 4740

agggagggat catatccacc tgcggagcga tgaaaaacac agtttctggc gcaggggaga 4800

ttaactggga tgagagcagg tttctgagca gctgtgactt tccacagccg gtgggcccat 4860

atatcacgcc tatcaccggc tgcagctggt agttaagaga gctgcagctg ccgtcctccc 4920

ggagcagggg ggccacctcg ttcagcatat ccctgacgtg gatgttctcc ctgaccaatt 4980

ccgccagaag gcgctcgccg cccagcgaaa gcagctcttg caaggaagca aaatttttca 5040

gcggttttag gccgtcggcc gtgggcatgt ttttcagcgt ctgggtcagc agttccagcc 5100

tgtcccacag ctcggtgatg tgctctacgg catctcgatc cagcagatct cctcgtttcg 5160

cgggttgggg cggctttcgc tgtagggcac cagccgatgg gcgtccagcg gggccagagt 5220

catgtccttc catgggcgca gggtcctcgt cagggtggtc tgggtcacgg tgaaggggtg 5280

cgctccgggt tgggcgctgg ccagggtgcg cttgaggctg gttctgctgg tgctgaatcg 5340

ctgccgctct tcgccctgcg cgtcggccag gtagcatttg accatggtct cgtagtcgag 5400

accctcggcg gcgtgcccct tggcgcggag ctttcccttg gaggtggcgc cgcacgaggg 5460

gcactgcagg ctcttcaggg cgtagagctt gggagcgaga aacacggact ctggggagta 5520

ggcgtccgcg ccgcaggaag cgcagaccgt ctcgcattcc accagccaag tgagctccgg 5580

gcggtcaggg tcaaaaacca ggttgccccc atgctttttg atgcgtttct tacctcggct 5640

ctccatgagg cggtgtccct tctcggtgac gaagaggctg tccgtgtccc cgtagaccga 5700

cttcaggggc ctgtcttcca gcggagtgcc tctgtcctcc tcgtagagaa actctgacca 5760

ctctgagacg aaggcccgcg tccaggccag gacgaaggag gccacgtggg aggggtagcg 5820

gtcgttgtcc actagcgggt ccaccttctc cagggtgtgc aggcacatgt ccccctcctc 5880

cgcgtccaga aaagtgattg gcttgtaggt gtaggacacg tgaccggggg ttcccgacgg 5940

gggggtataa aaggggggtgg gcgccctttc atcttcactc tcttccgcat cgctgtctgc 6000

gagggccagc tgctggggta agtattccct ctcgaaggcg ggcatgacct cagcgctcag 6060

gttgtcagtt tctaaaaatg aggaggattt gatgttcacc tgtccggagg tgataccttt 6120

gagggtacct gggtccatct ggtcagaaaa cactattttt ttgttgtcaa gcttggtggc 6180

gaacgacccg tagagggcgt tggagagcag cttggcgatg gagcgcaggg tctggttttt 6240

gtcgcggtcg gctcgctcct tggccgcgat gttgagttgc acgtactcgc gggccacgca 6300

cttccactcg gggaagacgg tggtgcgctc gtctgggatt aggcgcaccc tccagcctcg 6360

gttgtgcagg gtgaccatgt cgacgctggt ggcgacctcg ccgcgcaggc gctcgttggt 6420

ccagcagagg cggccgccct tgcgcgagca gaaggggggt agggggtcca gctggtcctc 6480

gtttgggggg tccgcgtcga tggtgaagac cccggggagc aagcgcgggt caaagtagtc 6540

gatcttgcaa gcttgcatgt ccagagcccg ctgccattcg cgggcggcga gcgcgcgctc 6600

gtaggggttg aggggcgggc cccagggcat ggggtgggtg agcgcggagg cgtacatgcc 6660

gcagatgtca tacacgtaca ggggttccct gaggatgccg aggtaggtgg ggtagcagcg 6720

ccccccgcgg atgctggcgc gcacgtagtc atagagctcg tgggaggggg ccagcatgtt 6780

gggcccgagg ttggtgcgct gggggcgctc ggcgcggaag gcgatctgcc tgaagatggc 6840

atgggagttg gaggagatgg tgggccgctg gaagacgttg aagcttgctt cttgcaagcc 6900

caccgagtcc ctgacgaagg aggcgtagga ctcgcgcagc ttgtgcacca gctcggcggt 6960

gacctggacg tcgagcgcgc agtagtcgag ggtctcgcgg atgatgtcat acttatcctc 7020

ccccttcttt ttccacagct cgcggttgag gacgaactct tcgcggtctt tccagtactc 7080

ttggagggga aacccgtccg tgtccgaacg gtaagagcct agcatgtaga actggttgac 7140

ggcctggtag gggcaacagc ccttctccac gggcagcgcg taggcctgcg ccgccttgcg 7200

gagggaggtg tgggtgaggg cgaaagtgtc cctgaccatg actttgaggt attgatgttt 7260

gaagtctgtg tcatcgcagc cgccctgttc ccacagggtg tagtccgtgc gctttttgga 7320

gcgcgggttg ggcagggaga aggtgaggtc attgaagagg atcttccccg ctcgaggcat 7380

gaagtttctg gtgatgcgaa agggccctgg gaccgaggag cggttgttga tgacctgggc 7440

ggccaggacg atctcgtcaa agccgtttat gttgtggccc acgatgtaga gctccaaaaa 7500

gcggggctgg cccttgatgg aggggagctt tttgagttcc tcgtaggtga gctcctcggg 7560

cgattccagg ccgtgctcct ccagggccca gtcttgcaag tgagggttgg ccgccaggaa 7620

ggatcgccag aggtcgcggg ccatgagggt ctgcaggcgg tcgcggaagg ttctgaactg 7680

tcgccccacg gccatctttt cgggggtgat gcagtagaag gtgaggggggt ctttctccca 7740

ggggtcccat ctgagctctc gggcgaggtc gcgcgcggcg gcgaccagag cctcgtcgcc 7800

ccccagtttc atgaccagca tgaagggcac gagctgcttg ccaaaggctc ccatccaagt 7860

gtaggtctct acatcgtagg tgacaaagag gcgctccgtg cgaggatgag agccgatcgg 7920

gaagaactgg atctcccgcc accagttgga ggattggctg ttgatgtggt gaaagtagaa 7980

gtcccgtctg cgggccgagc actcgtgctg gcttttgtaa aagcgaccgc agtactggca 8040

gcgctgcacg ggttgtatat cttgcacgag gtgaacctgg cgacctctga cgaggaagcg 8100

cagcgggaat ctaagtcccc cgcctggggt cccgtgtggc tggtggtctt ctactttggt 8160

tgtctggccg ccagcatctg tctcctggag ggcgatggtg gagcagacca ccacgccgcg 8220

agagccgcag gtccagatct cggcgctcgg cggggcggagt ttgatgacga catcgcgcac 8280

attggagctg tccatggtct ccagctcccg cggcggcagg tcagctggga gttcctggag 8340

gttcacctcg cagagacggg tcaaggcgcg ggcagtgttg agatggtatc tgatttcaag 8400

gggcgtgttg gcggcggagt cgatggcttg caggaggccg cagccccggg gggccacgat 8460

ggttccccgc ggggcgcgag gggaggcgga agctgggggt gtgttcagaa gcggtgacgc 8520

gggcgggccc ccggaggtag gggggttcc ggccccacag gcatgggcgg caggggcacg 8580

tcttcgccgc gcgcgggcag gggctggtgc tggctccgaa gagcgcttgc gtgcgcgacg 8640

acgcgacggt tggtgtcctg tatctgacgc ctctgagtga agaccacggg tcccgtgacc 8700

ttgaacctga aagagagttc gacagaatca atctcggcat cgttgacagc ggcctggcgc 8760

aggatctcct gcacgtcgcc cgagttgtcc tggtaggcga tctctgccat gaactgctcg 8820

atctcttctt cctggagatc tcctcgtccg gcgcgctcca cggtggccgc caggtcgttg 8880

gagatgcgac ccatgagctg tgagaaggcg ttgagcccgc cctcgttcca gacccggctg 8940

tagaccacgc ccccctcggc gtcgcgagcg cgcatgacca cctgggccag gttgagctcc 9000

acgtgtcgcg tgaagacggc gtagttgcgc aggcgctgga aaaggtagtt cagggtggtg 9060

gcggtgtgct cggcgacgaa gaagtacatg acccagcgcc gcaacgtgga ttcattgatg 9120

tcccccaagg cctccaggcg ctccatggcc tcgtagaagt ccacggcgaa gttgaaaaac 9180

tgggagttgc gagcggacac ggtcaactcc tcctccagaa gacggatgag ctcggcgaca 9240

gtgttgcgca cctcgcgctc gaaggccacg gggggcgctt cttcctcttc cacctcttct 9300

tccatgatcg cttcttcttc ttcctcagcc gggacgggag ggggcggcgg cggcgggggа 9360

ggggcgcggc ggcggcggcg gcgcaccggg aggcggtcga tgaagcgctc gatcatctcc 9420

ccccgcatgc ggcgcatggt ctcggtgacg gcgcggccgt tctcccgggg gcgcagctcg 9480

aagacgccgc ctctcatctc gccgcggggc gagcggccgt gaggtagcga gacggcgctg 9540

actatgcatc ttaacaattg ctgtgtaggt acaccgccga gggacctgat tgagtccaga 9600

tccaccggat ccgaaaacct ttggaggaaa gcgtctatcc agtcgcagtc gcaaggtagg 9660

ctgagcaccg tggcgggcgg gggcgggtct ggagagttcc tggcggagat gctgctgatg 9720

atgtaattaa agtaggcggt cttgagaagg cggatggtgg acaggagcac catgtctttg 9780

ggtccggcct gttggatgcg gaggcggtcg gccatgcccc aggcctcgtt ctgacaccgg 9840

cgcaggtctt tgtagtagtc ttgcatgagt ctttccaccg gcacctcttc tccttcctct 9900

tctccatctc gccggtggtt tctcgcgccg cccatgcgcg tgaccccaaa gcccctgagc 9960

ggctgcagca gggccaggtc ggcgaccacg cgctcggcca agatggcctg ctgcacctga 10020

gtgagggtcc tctcgaagtc atccatgtcc acgaagcggt ggtaggcgcc cgtgttgatg 10080

gtgtaggtgc agttggccat gacggaccag ttgacggtct ggtgtcccgg ctgcgagagc 10140

tccgtgtacc gcaggcgcga gaaggcgcgg gaatcgaaca cgtagtcgtt gcaagtccgc 10200

accagatact ggtagcccac caggaagtgc ggcggaggtt ggcgatagag gggccagcgc 10260

tgggtggcgg gggcgccggg cgccaggtct tccagcatga ggcggtggta tccgtagatg 10320

tacctggaca tccaggtgat gccggcggcg gtggtggtgg cgcgcgcgta gtcgcggacc 10380

cggttccaga tgtttcgcag gggcgagaag tgttccatgg tcggcacgct ctggccggtg 10440

aggcgcgcgc agtcgttgac gctctataca cacacaaaaa cgaaagcgtt tacagggctt 10500

tcgttctgta gcctggagga aagtaaatgg gttgggttgc ggtgtgcccc ggttcgagac 10560

caagctgagc tcggccggct gaagccgcag ctaacgtggt attggcagtc ccgtctcgac 10620

ccaggccctg tatcctccag gatacggtcg agagcccttt tgctttcttg gccaagcgcc 10680

cgtggcgcga tctgggatag atggtcgcga tgagaggaca aaagcggctc gcttccgtag 10740

tctggagaaa caatcgccag ggttgcgttg cggcgtaccc cggttcgagc ccctatggcg 10800

gcttgaatcg gccggaaccg cggctaacga gggccgtggc agccccgtcc tcaggacccc 10860

gccagccgac ttctccagtt acgggagcga gccccttttg ttttttattt tttagatgca 10920

tcccgtgctg cggcagatgc gcccctcgcc ccggcccgat cagcagcagc aacagcaggc 10980

atgcagaccc ccctctcccc tttccgcccc ggtcaccacg gccgcggcgg ccgtgtcggg 11040

cgcgggggggc gcgctggagt cagatgagcc accgcggcgg cgacctaggc agtatctgga 11100

cttggaagag ggcgagggac tggcgcggct gggggcgaac tctccagagc gccacccgcg 11160

ggtgcagttg aaaagggacg cgcgcgaggc gtacctgccg cggcagaacc tgtttcgcga 11220

ccgcgggggc gaggagcccg aggagatgcg agactgcagg ttccaagcgg ggcgcgagct 11280

gcggcgcggg ctggacagac agcgcctgct gcgcgaggag gactttgagc ccgacacgca 11340

gacgggcatc agccccgcgc gcgcgcacgt agccgcggcc gacctggtga ccgcctacga 11400

gcagacggta aaccaggagc gcaacttcca aaagagcttc aacaaccacg tgcgcacgct 11460

ggtggcgcgc gaggaggtga ccctgggtct catgcatctg tgggacctgg tggaggcgat 11520

cgtgcagaac cccagcagca agcccctgac cgcgcagctg ttcctggtgg tgcagcacag 11580

cagggacaac gaggccttca gggaggcgct gctgaacatc accgagccgg aggggcgctg 11640

gctcctggac ctgataaaca tcctgcagag catagtggtg caggagcgca gcctgagcct 11700

ggccgagaag gtggcggcca tcaactactc tatgctgagc ctgggcaagt tctacgcccg 11760

caagatctac aagacccccт acgtgcccat agacaaggag gtgaagatag acagcttcta 11820

catgcgcatg gcgctgaagg tgctgaccct gagcgacgac ctgggagtgt accgcaacga 11880

gcgcatccac aaggccgtga gcgccagccg gcggcgcgag ctgagcgacc gcgagctgat 11940

gcacagtctg cagcgcgcgc tgaccggcgc gggcgagggc gacagggagg tcgagtccta 12000

cttcgacatg ggggccgacc tgcactggca gccgagccgc cgcgccctgg aggcggcggg 12060

ggcgtacggc ggccccctgg cggccgatga ccaggaagag gaggactatg agctagagga 12120

gggcgagtac ctggaggact gacctggctg gtggtgtttt ggtatagatg caagatccga 12180

acgtggcgga cccggcggtc cgggcggcgc tgcaaagcca gccgtccggc attaactcct 12240

ctgacgactg ggccgcggcc atgggtcgca tcatggccct gaccgcgcgc aaccccgagg 12300

ctttcaggca gcagcctcag gccaaccggc tggcggccat cttggaagcg gtagtgcccg 12360

cgcgctccaa ccccacccac gagaaggtgc tggccatagt caacgcgctg gcggagagca 12420

gggccatccg cgcggacgag gccggactgg tgtacgatgc gctgctgcag cgggtggcgc 12480

ggtacaacag cggcaacgtg cagaccaacc tggaccgcct ggtgacggac gtgcgcgagg 12540

ccgtggcgca gcgcgagcgc ttgcatcagg acggtaacct gggctcgctg gtggcgctaa 12600

acgccttcct cagcacccag ccggccaacg taccgcgggg gcaggaggac tacaccaact 12660

ttttgagcgc gctgcggctg atggtgaccg aggtccctca gagcgaggtg taccagtcgg 12720

ggcccgacta cttcttccag accagcagac agggcttgca aaccgtgaac ctgagccagg 12780

ctttcaagaa cctgcggggg ctgtggggag tgaaggcgcc caccggcgac cgggctacgg 12840

tgtccagcct gctaaccccc aactcgcgcc tgctgctgct gctgatcgcg cccttcacgg 12900

acagcgggag cgtctcgcgg gagacctatc tgggccacct gctgacgctg taccgcgagg 12960

ccatcgggca ggcgcaggtg gacgagcaca ccttccaaga gatcaccagc gtgagccacg 13020

cgctggggca ggaggacacg ggcagcctgc aggcgaccct gaactacctg ctgaccaaca 13080

ggcggcagaa gattcccacg ctgcacagcc tgacccagga ggaggagcgc atcttgcgct 13140

acgtgcagca gagcgtgagc ctgaacctga tgcgcgacgg cgtgacgccc agcgtggcgc 13200

tggacatgac cgcgcgcaac atggaaccgg gcatgtacgc ctcccaccgg ccgtttatca 13260

accgcctgat ggactacttg catcgggcgg cggccgtgaa ccccgagtac ttcactaatg 13320

ccattctgaa tccccactgg atgccccctc cgggtttcta caacggggac tttgaggtgc 13380

ccgaggtcaa cgacgggttc ctctgggatg acatggatga cagtgtgttc tcacccaacc 13440

cgctgcgcgc cgcgtctctg cgattgaagg agggctctga cagggaagga ccgaggagtc 13500

tggcctcctc cctggctctg ggagcggtgg gcgccacggg cgcggcggcg cggggcagta 13560

gccccttccc cagcctggca gactctctga acagcgggcg ggtgagcagg ccccgcttgc 13620

taggcgagga ggagtatctg aacaactccc tgctgcagcc cgcgagggac aagaacgctc 13680

agcggcagca gtttcccaac aatgggatag agagcctggt ggacaagatg tccagatgga 13740

agacgtatgc gcaggagtac aaggagtggg aggaccgcca gccgcggccc ttgccgcccc 13800

ctaggcagcg ctggcagcgg cgcgcgtcca accgccgctg gaggcagggg cccgaggacg 13860

atgatgactc tgcagatgac agcagcgtgt tggacctggg cgggagcggg aacccctttt 13920

cgcacctgcg cccacgcctg ggcaagatgt tttaaaagaa aaaaaaaaat aaaactcacc 13980

aaggccatgg cgacgagcgt tggtttttg ttcccttcct tagtatgcgg cgcgcggcga 14040

tgttcgagga ggggcctccc ccctcttacg agagcgcgat ggggatttct cctgcggcgc 14100

ccctgcagcc tccctacgtg cctcctcggt acctgcaacc tacaggggg agaaatagca 14160

tctgttactc tgagctgcag cccctgtacg ataccaccag actgtacctg gtggacaaca 14220

agtccgcgga cgtggcctcc ctgaactacc agaacgacca cagcgatttt ttgaccacgg 14280

tgatccaaaa caacgacttc accccaaccg aggccagcac ccagaccata aacctggata 14340

acaggtcgaa ctggggcggc gacctgaaga ccatcttgca caccaacatg cccaacgtga 14400

acgagttcat gttcaccaac tcttttaagg cgcgggtgat ggtggcgcgc gagcaggggg 14460

aggcgaagta cgagtgggtg gacttcacgc tgcccgaggg caactactca gagaccatga 14520

ctctcgacct gatgaacaat gcgatcgtgg aacactatct gaaagtgggc aggcagaacg 14580

gggtgaagga aagcgatatc ggggtcaagt ttgacaccag aaacttccgt ctgggctggg 14640

accccgtgac cgggctggtc atgccggggg tctacaccaa cgaggccttt catcccgaca 14700

tagtgcttct gcccggctgt ggggtggact tcacccagag ccggctgagc aacctgctgg 14760

gcattcgcaa gcggcagcct ttccaggagg gtttcaagat cacctatgag gatctgaagg 14820

ggggcaacat tcccgcgctc cttgatctgg acgcctacga ggagagcttg aaacccgagg 14880

agagcgctgg cgacagcggc gagagtggcg aggagcaagc cggcggcggt ggcggcgcgt 14940

cggtagaaaa cgaaagtacg cccgcagtgg cggcggacgc tgcggaggtc gagccggagg 15000

ccatgcagca ggacgcagag gagggcgcac aggagggcgc gcagaaggac atgaacgatg 15060

gggagatcag gggagacaca ttcgccaccc ggggcgaaga aaaagaggca gaggcggcgg 15120

cggcggcgac ggcggaggcc gaaaccgagg ttgaggcaga ggcagagccc gagaccgaag 15180

ttatggaaga catgaatgat ggagaacgta ggggcgacac gttcgccacc cggggcgaag 15240

agaaggcggc ggaggcagaa gccgcggctg aggaggcggc tgcggctgcg gccaagactg 15300

aggctgcggc taaggctgag gtcgaagcca atgttgcggt tgaggctcag gctgaggagg 15360

aggcggcggc tgaagcagtt aaggaaaagg cccaggcaga gcaggaagag aaaaaacctg 15420

tcattcaacc tctaaaagaa gatagcaaaa agcgcagtta caacgtcatc gagggcagca 15480

cctttaccca gtaccgcagc tggtacctgg cgtacaacta cggcgacccg gtcaaggggg 15540

tgcgctcgtg gaccctgctc tgcacgccgg acgtcacctg cggctccgag cagatgtact 15600

ggtcgctgcc gaacatgatg caagacccgg tgaccttccg ctccacgcgg caggttagca 15660

acttcccggt ggtgggcgcc gaactgctgc ccgtgcactc caagagtttt tacaacgagc 15720

aggccgtcta ctcccagctg atccgccagg ccacctctct gacccacgtg ttcaatcgct 15780

ttcccgagaa ccagattttg gcgcgcccgc cggcccccac catcaccacc gtgagtgaaa 15840

acgttcctgc cctcacagat cacgggacgc taccgctgcg caacagcatc tcaggagtcc 15900

agcgagtgac cattactgac gccagacgcc ggacctgccc ctacgtttac aaggccttgg 15960

gcatagtctc gccgcgcgtc ctctccagtc gcacttttta aaacacatct acccacacgt 16020

tccaaaatca tgtccgtact catctcaccc agcaacaaca ccggctgggg gctgcgcgcg 16080

cccagcaaga tgtttggagg ggcgaggaag cgctccgacc agcaccctgt gcgcgtgcgc 16140

ggccactacc gcgcgccctg gggagcgcac aagcgcgggc gcacagggcg caccactgtg 16200

gacgacgtca ttgactccgt agtggagcaa gcgcgccact acacacccgg cgcgccgacc 16260

gcccccgccg tgtccaccgt ggaccaggcg atcgaaagcg tggtacaggg cgcgcggcac 16320

tatgccaacc ttaaaagtcg ccgccgccgc gtggcccgcc gccatcgccg gagaccccgg 16380

gccaccgccg ccgcgcgcct tactaaggct ctgctcaggc gcgccaggcg aactggccac 16440

cgggccgcca tgagggccgc acggcgggct gccgctgccg caagcgtcgt ggccccgcgg 16500

gcacgaaggc gcgcggccgc tgccgccgcc gccgccattt ccagcttggc ctcgacgcgg 16560

cgcggtaaca tatactgggt gcgcgactcg gtaaccggca cgcgggtacc cgtgcgcttt 16620

cgcccccgc ggaattagca caagacaaca tacacactga gtctcctgct gttgtgtatc 16680

ccagcggcga ccgtcagcag cggcgacatg tccaagcgca aaattaaaga agagatgctc 16740

caggtcatcg cgccggagat ctatgggccc ccgaagaagg aggaggatga ttacaagccc 16800

cgcaagctaa agcgggtcaa aaagaaaaag aaagatgatg atgacgaggc ggtggagttt 16860

gtccgccgca tggcacccag gcgccccgtg cagtggaagg gccggcgcgt gcagcgcgtt 16920

ttgcgccccg gcaccgcggt ggtcttcacg cccggcgagc gctccacgcg cactttcaag 16980

cgggtgtacg atgaggtgta cggcgacgag gacctgttgg agcaggccaa ccagcgcttt 17040

ggggagtttg catatgggaa acggccccgc gagagtctaa aagaggacct gctggcgcta 17100

ccgctggacg agggcaatcc caccccgagt ctgaagccgg taaccctgca acaggtgctg 17160

cctttgagcg cgcccagcga gcataagcga gggttgaagc gcgaaggcgg ggacctggcg 17220

cccaccgtgc agttgatggt gcccaagcgg cagaagctgg aggacgtgct ggagaaaatg 17280

aaagtagagc ccgggatcca gcccgagatc aaggtccgcc ccatcaagca ggtggcgccc 17340

ggcgtgggag tccagaccgt ggacgttagg attcccacgg aggagatgga aacccaaacc 17400

gccactccct cttcggcggc cagcgccacc accggcaccg cttcggtaga ggtgcagacg 17460

gacccctggc tacccgccac cgctgttgcc gccgccgccc cccgttcgcg cgggcgcaag 17520

agaaattatc cagcggccag cgcgctcatg ccccagtacg cactgcatcc atccatcgtg 17580

cccacccccg gctaccgcgg gtactcgtac cgcccgcgca gatcagccgg cactcgcggc 17640

cgccgccgcc gtgcgaccac aaccagccgc cgccgtcgcc gccgccgcca gccagtgctg 17700

acccccgtgt ctgtaaggaa ggtggctcgc tcggggagca cgctggtggt gcccagagcg 17760

cgctaccacc ccagcatcgt ttaaagccgg tctctgtatg gttcttgcag atatggccct 17820

cacttgtcgc ctccgcttcc cggtgccggg ataccgagga agaactcacc gccgcagagg 17880

catggcgggc agcggtctcc gcggcggccg tcgccatcgc cggcgcgcaa aaagcaggcg 17940

catgcgcggc ggtgtgctgc ctctgctaat cccgctaatc gccgcggcga tcggtgccgt 18000

acccgggatc gcctccgtgg ccctgcaggc gtcccagaaa cgttgactct tgcaaccttg 18060

caagcttgca ttttttggag gaaaaaataa aaaaaaagtc tagactctca cgctcgcttg 18120

gtcctgtgac tattttgtag aaaaaaagat ggaagacatc aactttgcgt cgctggcccc 18180

gcgtcacggc tcgcgcccgt tcatgggaga ctggacagat atcggcacca gcaatatgag 18240

cggtggcgcc ttcagctggg gcagtctgtg gagcggcctt aaaaattttg gttccaccat 18300

taagaactat ggcaacaaag cgtggaacag cagcacgggc cagatgctga gagacaagtt 18360

gaaagagcag aacttccagg agaaggtggc gcagggcctg gcctctggca tcagcggggt 18420

ggtggacata gctaaccagg ccgtgcagaa aaagataaac agtcatctgg acccccgtcc 18480

tcaggtggag gaaatgcctc cagcgatgga gacggtgtct cccgagggca aaggcgaaaa 18540

gcgcccgcgg cccgacagag aagagaccct ggtgtcacac accgaggagc cgccctctta 18600

cgaggaggca gtcaaggccg gcctgcccac cactcgcccc atagccccca tggccaccgg 18660

tgtggtgggc cacaggcaac acactcccgc aacactagat ctgcccccgc cgtccgagcc 18720

gccgcgccag ccaaaggcgg cgacggtgcc cgctccctcc acttccgccg ccaacagagt 18780

gcccctgcgc cgcgccgcga gcggcccccg ggcctcgcga gttagcggca actggcagag 18840

cacactgaac agcatcgtgg gcctgggagt gaggagtgtg aagcgccgcc gttgctactg 18900

aatgagcaag ctagctaacg tgttgtatgt gtgtatgcgt cctatgtcgc cgccagagga 18960

gctgttgagc cgccggcgcc gtctgcactc cagcgaattt caagatggcg accccatcga 19020

tgatgcctca gtggtcgtac atgcacatct cgggccagga cgcttcggag tacctgagcc 19080

ccgggctggt gcagttcgcc cgcgccacag acacctactt caacatgagt aacaagttca 19140

ggaaccccac tgtggcgccc acccacgatg tgaccacgga ccggtcgcag cgcctgacgc 19200

tgcggttcat ccccgtggat cgggaggaca ccgcctactc ttacaaggcg cggttcacgc 19260

tggccgtggg cgacaaccgc gtgctggaca tggcctccac ttactttgac atcaggggg 19320

tgctggacag gggccccacc ttcaagccct actcgggtac tgcctacaac tccctggccc 19380

ccaagggcgc tcccaattct tgcgagtggg aacaagatga accagctcag gcagcaatag 19440

ctgaagatga agaagaactt gaagaagaac aagctcagga cgaacaggcg cccactaaga 19500

aaacccatgt atacgcccag gcacctcttt ctggtgaaaa aattactaag gatggtttgc 19560

aaataggtgt ggatgccaca caggcgggag ataaccctat atatgctgat aaaacattcc 19620

aacccgaacc tcagataggt gagtctcagt ggaacgaggc tgatgccaca gtagcaggag 19680

gcagagtctt aaaaaagacc acccctatga gaccttgcta tggatcctat gccaaaccta 19740

ctaatgccaa tggcggtcaa gggatcatgg tggccaatga tcagggagcg cttgaatcta 19800

aagttgagat gcaatttttc tccaccacaa cgtctcttaa tgtaagggaa ggtgaaaaca 19860

atcttcagcc aaaagtagtg ctatacagcg aagatgttaa cttggaatcc cctgacactc 19920

atttgtctta caaacctaaa aaggatgaca ccaactctaa aatcatgttg ggtcagcaag 19980

ccatgcccaa cagacccaac ctcattgctt ttagggacaa ctttattgga cttatgtact 20040

acaacagcac aggcaacatg ggagtgctgg caggacaggc ctcccagcta aacgctgtgg 20100

tagacttgca agacagaaac acagagctgt cataccaact gatgcttgat tccattggag 20160

acagatcaag atacttttcc atgtggaacc aggcagtgga cagctatgac ccagatgtca 20220

gaatcattga aaaccatggg gttgaagatg agctgcccaa ctattgcttt cccctgggcg 20280

gtattggaat tacagacaca taccagtgca taaaaccaac cgcagctgct aataacacta 20340

catggtctaa ggatgaagaa tttagtgatc gcaatgaaat aggggtggga aacaacttcg 20400

ccatggagat caacatccag gccaacctct ggaggaactt cctctatgcg aacgtggggc 20460

tctacctgcc agacaagctc aagtacaacc ccaccaacgt ggacatctct gacaacccca 20520

acacctatga ctacatgaac aagcgtgtgg tggctcccgg cctggtggac tgctttgtca 20580

atgtgggagc caggtggtcc ctggactaca tggacaacgt caaccccttc aaccaccacc 20640

gcaatgcggg tctgcgctac cgctccatga tcctgggcaa cgggcgctac gtgcccttcc 20700

acattcaggt gccccagaag ttctttgcca tcaagaacct cctcctcctg ccgggctcct 20760

acacttacga gtggaacttc aggaaggatg tcaacatggt cctgcagagc tctctgggca 20820

atgaccttag ggtggacggg gccagcatca agtttgacag cgtcaccctc tatgctacct 20880

tcttccccat ggctcacaac accgcctcca cgctcgaggc catgctgagg aacgacacca 20940

acgaccagtc cttcaatgac tacctctctg gggccaacat gctctacccc atccccgcca 21000

aggccaccaa cgtgcccatc tccattccct ctcgcaactg ggccgccttc agaggctggg 21060

cctttacccg ccttaagacc aaggaaaccc cctccctggg ctcgggtttt gacccctact 21120

ttgtctactc gggatccatc ccctacctgg atggcacctt ctacctcaac cacactttta 21180

agaagatatc catcatgtat gactcctccg tcagctggcc gggcaatgac cgcctgctca 21240

cccccaatga gttcgaggtc aagcgcgccg tggacggcga gggctacaac gtggcccagt 21300

gcaacatgac caaggactgg ttcctggtgc agatgctggc caactacaac ataggctacc 21360

agggcttcta catcccagag agctacaagg acaggatgta ctccttcttc agaaatttcc 21420

aacccatgag caggcaggtg gtggacgaga ccaaatacaa ggactatcag gccattggca 21480

tcactcacca gcacaacaac tcgggattcg tgggctacct ggctcccacc atgcgcgagg 21540

ggcaggccta ccccgccaac ttcccctacc cgttgatagg caaaaccgcg gtcgacagcg 21600

tcacccagaa aaagttcctc tgcgaccgca ccctctggcg catccccttc tctagcaact 21660

tcatgtccat gggtgcgctc acggacctgg gccagaacct gctctatgcc aactccgccc 21720

atgcgctgga catgactttt gaggtggacc ccatggacga gcccaccctt ctctatattg 21780

tgtttgaagt gttcgacgtg gtcagagtgc accagccgca ccgcggtgtc atcgagaccg 21840

tgtacctgcg cacgcccttc tcggccggca acgccaccac ctaaggagac agcgccgccg 21900

cctgcatgac gggttccacc gagcaagagc tcagggccat cgccagagac ctgggatgcg 21960

gaccctattt tttgggcacc tatgacaaac gcttcccggg cttcatctcc cgagacaagc 22020

tcgcctgcgc catcgtcaac acggccgcgc gcgagaccgg gggcgtgcac tggctggcct 22080

ttggctggga cccgcgctcc aaaacctgct acctcttcga ccccttttggc ttctccgatc 22140

agcgcctcag acagatctat gagtttgagt acgaggggct gctgcgccgc agcgcgcttg 22200

cctcctcgcc cgaccgctgc atcacccttg agaagtccac cgagaccgtg caggggcccc 22260

actcggccgc ctgcggtctc ttctgctgca tgtttttgca cgcctttgtg cgctggcccc 22320

agagtcccat ggatcgcaac cccaccatga acttgctcaa gggagtgccc aacgccatgc 22380

tccagagccc ccaggtccag cccaccctgc gccacaacca ggaacagctc taccgcttcc 22440

tggagcgcca ctccccctac ttccgcagtc acagcgcgca catccggggg gccacctctt 22500

tctgccactt gcaagaaaac atgcaagacg gaaaatgatg tacagctcgc tttttaataa 22560

atgtaaagac tgtgcacttt atttatacac gggctctttc tggttattta ttcaacaccg 22620

ccgtcgccat ctagaaatcg aaagggttct gccgcgcgtc gccgtgcgcc acgggcagag 22680

acacgttgcg atactggaag cggctcgccc acttaaactc gggcaccacc atgcggggca 22740

gtggttcctc ggggaagttc tcgccccaca gggtgcgggt cagctgcagc gcgctcagga 22800

ggtcgggagc cgagatcttg aagtcgcagt tggggccgga accctgcgcg cgcgagttgc 22860

ggtacacggg gttgcagcac tggaacacca gcagggccgg attatgcacg ctggccagca 22920

ggctctcgtc gctgatcatg tcgctgtcca gatcctccgc gttgctcagg gcgaacgggg 22980

tcatcttgca gacctgcctg cccaggaaag gcggcagccc gggcttgccg ttgcagtcgc 23040

agcgcagggg catcagcagg tgcccgcggc ccgactgcgc ctgcgggtac agcgcgcgca 23100

tgaaggcttc gatctgcctg aaagccacct gcgtcttggc tccctccgaa aagaacatcc 23160

cacaggactt gctggagaac tggttcgcgg gacagctggc atcgtgcagg cagcagcgcg 23220

cgtcggtgtt ggcgatctgc accacgttgc gaccccaccg gttcttcact atcttggcct 23280

tggaagcctg ctccttcagc gcgcgctggc cgttctcgct ggtcacatcc atctctatca 23340

cctgctcctt gttgatcatg tttgtaccgt gcagacactt caggtcgccc tccgtctggg 23400

tgcagcggtg ctcccacagc gcgcaaccgg tgggctccca atttttgtgg gtcacccccg 23460

cgtaggcctg caggtaggcc tgcaagaagc gccccatcat ggccacaaag gtcttctggc 23520

tcgtaaaggt cagctgcagg ccgcgatgct cttcgttcag ccaggtcttg cagatggcgg 23580

ccagcgcctc ggtctgctcg ggcagcatcc taaaatttgt cttcaggtcg ttatccacgt 23640

ggtacttgtc catcatggcg cgcgccgcct ccatgccctt ctcccaggcg gacaccatgg 23700

gcaggcttag ggggtttatc acttccaccg gcgaggacac cgtactttcg atttcttctt 23760

cctccccctc ttcccggcgc gcgcccacgc tgctgcgcgc tctcaccgcc tgcaccaagg 23820

ggtcgtcttc aggcaagcgc cgcaccgagc gcttgccgcc cttgacctgc ttaatcagca 23880

ccggcgggtt gctgaagccc accatggtca gcgccgcctg ctcttcttcg tcttcgctgt 23940

ctaccactat ctctggggaa gggcttctcc gctctgcggc ggcgcgcttc ttttttttct 24000

tgggagcggc cgtgatggag tccgccacgg cgacggaggt cgagggcgtg gggctggggg 24060

tgcgcggtac cagggcctcg tcgccctcgg actcttcctc tgactccagg cggcggcgga 24120

gtcgcttctt tgggggcgcg cgcgtcagcg gcggcggaga cggggacggg gacggggacg 24180

ggacgccctc cacagggggt ggtcttcgcg cagacccgcg gccgcgctcg ggggtcttct 24240

cgagctggtc ttggtcccga ctggccattg tatcctcctc ctcctaggca gagagacata 24300

aggagtctat catgcaagtc gagaaggagg agagcttaac cacccctct gagaccgccg 24360

atgcgcccgc cgtcgccgtc gcccccgctg ccgccgacgc gcccgccaca ccgagcgaca 24420

cccccgcgga ccccccccgcc gacgcacccc tgttcgagga agcggccgtg gagcaggacc 24480

cgggctttgt ctcggcagag gaggatttgc gagaggagga ggataaggag aagaagccct 24540

cagtgccaaa agatgataaa gagcaagacg agcacgacgc agatgcacac cagggtgaag 24600

tcgggcgggg ggacggaggg catgacggcg ccgactacct agacgaaggg aacgacgtgc 24660

tcttgaagca cctgcatcgt cagtgcgcca ttgtttgcga cgctctgcag gagcgcagcg 24720

aagtgcccct cagcgtggcg gaggtcagcc acgcctacga gctcagcctc ttctcccccc 24780

gggtgccccc ccgccgccgc gaaaacggca catgcgagcc caacccgcgc ctcaacttct 24840

accccgcctt tgtggtaccc gaggtcctgg ccacctatca catcttcttt caaaattgca 24900

agatccccct ctcgtgccgc gccaaccgta gccgcgccga taagatgctg gccctgcgcc 24960

agggcgacca catacctgat atcgccgctt tggaagatgt accaaagatc ttcgagggtc 25020

tgggtcgcaa cgagaagcgg gcagcaaact ctctgcaaca ggaaaacagc gaaaatgaga 25080

gtcacaccgg ggtactggtg gagctcgagg gcgacaacgc ccgcctggcg gtggtcaagc 25140

gcagcatcga ggtcacccac tttgcctacc ccgcgctaaa cctgcccccc aaagtcatga 25200

acgcggccat ggacgggctg atcatgcgcc gcggccggcc cctcgctcca gatgcaaact 25260

tgcatgagga gaccgaggac ggccagcccg tggtcagcga cgagcagctg gcgcgctggc 25320

tggagaccgc ggaccccgcc gaactggagg agcggcgcaa gatgatgatg gccgtggtgc 25380

tggtcaccgt agagctggag tgtctgcagc gcttcttcgg cgaccccgag atgcagagaa 25440

aggtcgagga gaccctgcac tacaccttcc gccagggcta cgtgcgccag gcttgcaaga 25500

tctccaacgt ggagctcagc aacctggtgt cctacctggg catcttgcat gagaaccgcc 25560

tcgggcagag cgtgctgcac tccaccctgc gcggggaggc gcgccgcgac tacgtgcgcg 25620

actgcgttta cctcttcctc tgctacacct ggcagacggc catgggggtc tggcagcagt 25680

gcctggagga gcgcaacctc aaggagctgg agaagctcct gcagcgcgcg ctcaaagatc 25740

tctggacggg ctacaacgag cgctcggtgg ccgccgcgct ggccgacctc atcttccccg 25800

agcgcctgct caaaaccctc cagcaggggc tgcccgactt caccagccaa agcatgttgc 25860

aaaacttcag gaactttatc ctggagcgtt ctggcatcct acccgccacc tgctgcgccc 25920

tgcccagcga ctttgtcccc ctcgtgtacc gcgagtgccc cccgccgctg tggggtcact 25980

gctacctgtt ccaactggcc aactacctgt cctaccacgc ggacctcatg gaggactcca 26040

gcggcgaggg gctcatggag tgccactgcc gctgcaacct ctgcacgccc caccgctccc 26100

tggtctgcaa cacccaactg ctcagcgaga gtcagattat cggtaccttc gagctacagg 26160

gtccgtcctc ctcagacgag aagtccgcgg ctccggggct aaaactcact ccggggctgt 26220

ggacttccgc ctacctgcgc aaatttgtac ctgaagacta ccacgcccac gagatcaggt 26280

tttacgaaga ccaatcccgc ccgcccaagg cggagctgac cgcctgcgtc atcacccagg 26340

gcgagatcct aggccaattg caagccatcc aaaaagcccg ccaagacttt ttgctgaaga 26400

agggtcgggg ggtgtatctg gacccccagt cgggtgagga gctcaacccg gttcccccgc 26460

tgccgccgcc gcgggacctt gcttcccagg ataagcatcg ccatggctcc cagaaagaag 26520

cagcagcggc cgccactgcc gccaccccac atgctggagg aagaggagga atactgggac 26580

agtcaggcag aggaggtttc ggacgaggag gagccggaga cggagatgga agagtgggag 26640

gaggacagct tagacgagga ggcttccgaa gccgaagagg cagacgcaac accgtcaccc 26700

tcggccgcag ccccctcgca ggcgcccccg aagtccgctc ccagcatcag cagcaacagc 26760

agcgctataa cctccgctcc tccaccgccg cgacccacgg ccgaccgcag acccaaccgt 26820

agatgggaca ccaccggaac cggggccggt aagtcctccg ggagaggcaa gcaagcgcag 26880

cgccaaggct accgctcgtg gcgcgctcac aagaacgcca tagtcgcttg cttgcaagac 26940

tgcgggggga acatctcctt cgcccgccgc ttcctgctct tccaccacgg tgtggccttc 27000

ccccgtaacg tcctgcatta ctaccgtcat ctctacagcc cctactgcgg cggcagtgag 27060

ccagagacgg tcggcggcgg cggcggcgcc cgtttcggcg cctaggaaga cccagggcaa 27120

gacttcagcc aagaaactcg cggcggccgc ggcgaacgcg gtcgcggggg ccctgcgcct 27180

gacggtgaac gaacccctgt cgacccgcga actgaggaac cgaatcttcc ccactctcta 27240

tgccatcttc cagcagagca gagggcagga tcaggaactg aaagtaaaaa acaggtctct 27300

gcgctccctc acccgcagct gtctgtatca caagagcgaa gaccagcttc ggcgcacgct 27360

ggaggacgct gaggcactct tcagcaaata ctgcgcgctc actcttaagg actagctccg 27420

cgcccttctc gaatttaggc gggaacgcct acgtcatcgc agcgccgccg tcatgagcaa 27480

ggacattccc acgccataca tgtggagcta tcagccgcag atgggactcg cggcgggcgc 27540

ctcccaagac tactccaccc gcatgaactg gctcagtgcc ggcccacaca tgatctcaca 27600

ggttaatgat atccgcaccc atcgaaacca aatattggtg gagcaggcgg caattaccac 27660

cacgccccgc aataatccca accccaggga gtggcccgcg tccctggtgt atcaggaaat 27720

tcccggcccc accaccgtac tacttccgcg tgattcccag gccgaagtcc aaatgactaa 27780

ctcaggggca cagctcgcgg gcggctgtcg tcacagggtg cggcctcctc gccagggtat 27840

aactcacctg gagatccgag gcagaggtat tcagctcaac gacgagtcgg tgagctcctc 27900

gctcggtctc agacctgacg ggaccttcca gatagccgga gccggccgat cttccttcac 27960

gccccgccag gcgtacctga ctctgcaaag ctcgtcctcg gcgccgcgct cgggcggcat 28020

cgggactctc cagttcgtgc aggagtttgt gccctcggtc tacttcaacc ccttctcggg 28080

ctctcccggt cgctacccgg accagttcat ctcgaacttt gacgccgcga gggactcggt 28140

ggacggctac gactgaatgt cgggtggacc cggtgcagag caacttcgcc tgaagcacct 28200

cgaccactgc cgccgccctc agtgctttgc ccgctgtcag accggtgagt tccagtactt 28260

ttccctgccc gactcgcacc cggacggccc ggcgcacggg gtgcgctttt tcatcccgag 28320

tcaggtgcgc tctaccctaa tcagggagtt taccgcccgt cccctactgg cggagttgga 28380

aaaggggcct tctatcctaa ccattgcctg catctgctct aaccctggat tgcaccaaga 28440

tctttgctgt catttgtgtg ctgagtataa taaaggctga gatcagaatc tactcgggct 28500

cctgtcgcca tcctgtcaac gccaccgtcc aagcccggcc cgatcagccc gaggtgaacc 28560

tcacctgcgg tctgcaccgg cgcctgagga aatacctagc ttggtactac aacagcactc 28620

cctttgtggt ttacaacagc tttgaccagg acggggtctc actgagggat aacctctcga 28680

acctgagcta ctccatcagg aagaacagca ccctcgagct acttcctcct tacctgcccg 28740

ggacttacca gtgtgtcacc ggtccctgca cccacaccca cctgttgatc gtaaacgact 28800

ctcttccgag aacagacctc aataactcct cttcgcagtt ccccagaaca ggaggtgagc 28860

tcaggaaacc ccgggtaaag aagggtggac gagagttaac acttgtgggg tttctggtgt 28920

atgtgacgct ggtggtggct cttttgatta aggcttttcc ttccatgtct gaactctccc 28980

tcttctttta tgaacaactc gactagtgct aacgggaccc tacccaacga atcgggattg 29040

aatatcggta accaggttgc agtttcactt ttgattacct tcatagtcct cttcctgcta 29100

gtgctgtcgc ttctgtgcct gcggatcggg ggctgctgca tccacgttta tatctggtgc 29160

tggctgttta gaaggttcgg agaccatcgc aggtagaata aacatgctgc tgcttaccct 29220

ctttgtcctg gcgctggccg ccagctgcca agcctttcc gaggctgact ttatagagcc 29280

ccagtgtaat gtgactttta aagcccatgc acagcgttgt catactataa tcaaatgtgc 29340

caccgaacac gatgaatacc ttatccagta taaagataaa tcacacaaag tggcacttgt 29400

tgacatctgg aaacccgaag acccttgga atacaatgtg accgttttcc agggtgacct 29460

cttcaaaatt tacaattaca ctttcccatt tgaccagatg tgtgactttg tcatgtacat 29520

ggaaaagcag cacaagctgt ggcctccgac tccccagggc tgtgtggaaa atccaggctc 29580

tttctgcatg atctctctct gtgtaactgt gctggcacta atactcacgc ttttgtatat 29640

cagatttaaa tcaaggcaaa gcttcattga tgaaaagaaa atgccttaat cgctttcacg 29700

cttgattgct aacaccgggt ttttatccgc agaatgattg gaatcaccct actaatcacc 29760

tccctccttg cgattgccca tgggttggaa cgaatcgaag tccctgtggg ggccaatgtt 29820

accctggtgg ggcctgtcgg caatgctaca ttaatgtggg aaaaatatac taaaaatcaa 29880

tgggtctctt actgcactaa caaaaatagc cacaagccca gagccatctg cgatgggcaa 29940

aatctaacct tgattgatgt tcaattgctg gatgcgggct actattatgg gcagctgggt 30000

acaatgatta attactggag accccacaga gattacatgc tccacgtagt aaagggtccc 30060

cttagcagcc cacccactac cacctctact acccccacta ccaccactac tcccaccacc 30120

agcactgccg cccagcctcc tcatagcaga acaaccactt ttatcaattc caagtcccac 30180

tccccccaca ttgccggcgg gccctccgcc tcagactccg aaaccaccga gatctgcttc 30240

tgcaaatgct ctgacgccat tgcccaggat ttggaagatc acgaggaaga tgagcatgac 30300

ttcgcagatg catgccaggc atcagagcca gaagcgctgc cggtggccct caaacagtat 30360

gcagaccccc acaccacccc cgaccttcct ccaccttccc agaagccaag tttcctgggg 30420

gaaaatgaaa ctctgcctct ctccatactc gctctgacat ctgttgctat gttgaccgct 30480

ctgctggtgc ttctatgctc tatatgctac ctgatctgct gcagaaagaa aaaatctcac 30540

ggccatgctc accagcccct catgcacttc ccttaccctc cagagctggg cgaccacaaa 30600

ctttaagtct gcagtaacta tctgcccatc ccttgtcagt cgacagcgat gagccccact 30660

aatctaacgg cctctggact tacaacatcg tctcttaatg agaccaccgc tcctcaagac 30720

ctgtacgatg gtgtctccgc gctggttaac cagtgggatc acctgggcat atggtggctc 30780

ctcataggag cagtgaccct gtgcctaatc ctggtctgga tcatctgctg catcaaaagc 30840

agaagaccca ggcggcggcc catctacagg ccctttgtca tcacacctga agatgatgat 30900

gacaccactt ccaggctgca gaggctaaag cagctactct tctcttttac agcatggtaa 30960

attgaatcat gcctcgcatt ttcatctact tgtctctcct tccacttttt ctgggctctt 31020

ctacattggc cgctgtgtcc cacatcgagg tagactgcct cacgcccttc acagtctacc 31080

tgcttttcgg ctttgtcatc tgcacctttg tctgcagcgt tatcactgta gtgatctgct 31140

tcatacagtg catcgactac gtctgcgtgc gggtggctta ctttagacac cacccccagt 31200

atcgcaacag ggacatagcg gctctcctaa gacttgttta aaatcatggc caaattaact 31260

gtgattggtc ttctgatcat ctgctgcgtc ctagccgcga ttgggactca agctcctacc 31320

accaccagcg ctcccagaaa gagacatgta tcctgcagct tcaagcgtcc ctggaatata 31380

ccccaatgct ttactgatga acctgaaatc tctttggctt ggtacttcag cgtcaccgcc 31440

cttcttatct tctgcagtac ggttattgcc cttgccatct acccttccct tgacctgggc 31500

tggaatgctg tcaactctat ggaatatccc accttcccag aaccagacct gccagacctg 31560

gttgttctaa acgcgtttcc tcctcctgct cccgttcaaa atcagtttcg ccctccgtcc 31620

cccacgccca ctgaggtcag ctactttaat ctaacaggcg gagatgactg aaaacctaga 31680

cctagaaatg gacggtctct gcagcgagca acgcacacta gagaggcgcc ggcaaaaaga 31740

gctcgagcgt cttaaacaag agctccaaga cgcggtggcc atacaccagt gcaaaaaagg 31800

tgtcttctgt ctggtaaaac aggccacgct cacctatgaa aaaacaggtg acacccaccg 31860

cctaggatac aagctgccca cacagcgcca aaagttcgcc ctcatgatag gcgaacaacc 31920

catcaccgtg acccagcact ccgtggagac agaaggctgc atacatgctc cctgtagggg 31980

cgctgactgc ctctacacct tgatcaaaac cctctgcggt ctcagagacc ttatcccttt 32040

caattaatca taactgtaat caataaaaaa tcacttactt gaaatctgat agcaagcctc 32100

tgtccaattt tttcagcaac acttccttcc cctcctccca actctggtac tctaggcgcc 32160

tcctagctgc aaacttcctc cacagtctga agggaatgtc agattcctcc tcctgtccct 32220

ccgcacccac gatcttcatg ttgttgcaga tgaaacgcgc gagatcgtct gacgagacct 32280

tcaaccccgt gtacccctac gataccgaga tcgctccgac ttctgtccct ttccttaccc 32340

ctccctttgt gtcatccgca ggaatgcaag aaaatccagc tggggtgctg tccctgcact 32400

tgtcagagcc ccttaccacc cacaatgggg ccctgactct aaaaatgggg ggcggcctga 32460

ccctggacaa ggaagggaat ctcacttccc aaaacatcac cagtgtcgat ccccctctca 32520

aaaaaagcaa gaacaacatc agccttcaga ccgccgcacc cctcgccgtc agctccgggg 32580

ccctaacact ttttgccact ccccccctag cggtcagtgg tgacaacctt actgtgcagt 32640

ctcaggcccc tctcactttg gaagactcaa aactaactct ggccaccaaa ggacccctaa 32700

ctgtgtccga aggcaaactt gtcctaga 32728

<210> 25
<211> 32728
<212> DNA
<213> Artificial sequence

<220>
<223> Adenovirus vector nucleotide sequences

<400> 25
catcatcaat aatatacctt attttggatt gtggccaata tgataatgag gtgggcgggg 60

agaggcgggg cgggtgacgt aggacgcgcg agtagggttg ggaggtgtgg cggaagtgtg 120

gcatttgcaa gtgggaggag ctcacatgca agcttccgtc gcggaaaatg tgacgttttt 180

gatgagcgcc gcctacctcc ggaagtgcca attttcgcgc gcttttcacc ggatatcgta 240

gtaattttgg gcgggaccat gtaagatttg gccattttcg cgcgaaaagt gaaacgggga 300

agtgaaaact gaataatagg gcgttagtca tagtgcgtaa tatttaccga gggccgaggg 360

actttgaccg attacgtgga ggactcgccc aggtgttttt tacgtgaatt tccgcgttcc 420

gggtcaaagt ctccgtttta ttgtcaccgt catttgacgc ttaggcctga ccatctggtg 480

ctggcctgca ccagggccga gtttgggtct agcgatgagg ataccgattg aggtgggtaa 540

ggtgggcgtg gctagaaggg tggggcgtgt ataaattggg ggtctaaggg tctctctgtt 600

ttgtcttgca acagccgccg ccatgagcga caccggcaac agctttgatg gaagcatctt 660

tagcccctat ctgacagtgc gcatgcctca ctgggctgga gtgcgtcaga atgtgatggg 720

ttccaacgtg gatggacgcc ccgttctgcc ttcaaattcg tctacaatgg cctacgcgac 780

cgtgggagga actccgctgg acgccgcgac ctccgccgcc gcctccgccg ccgccgcgac 840

cgcgcgcagc atggctacgg acctttacag ctctttggtg gcgagcggcg cggcctctcg 900

cgcgtctgct cgggatgaga aactgaccgc tctgctgctt aaactggaag acttgacccg 960

ggagctgggt caactgaccc agcaggtctc cagcttgcgt gagagcagcc ttgcctcccc 1020

ctaatggccc ataatataaa taaaagccag tctgtttgga ttaagcaagt gtatgttctt 1080

tatttaactc tccgcgcgcg gtaagcccgg gaccagcggt ctcggtcgtt tagggtgcgg 1140

tggattcttt ccaacacgtg gtacaggtgg ctctggatgt ttagatacat gggcatgagt 1200

ccatccctgg ggtggaggta gcaccactgc agagcttcgt gctcgggggt ggtgttgtat 1260

atgatccagt cgtagcagga gcgctgggcg tggtgctgaa aaatgtcctt aagcaagagg 1320

cttatagcta gggggaggcc cttggtgtaa gtgtttacaa atctgctcag ttgggagggg 1380

tgcatccggg gggatataat gtgcatcttg gactggattt ttaggttggc tatgttccca 1440

cccagatccc ttctgggatt catgttgtgc aggaccacca gcacggtata tccagtgcac 1500

ttgggaaatt tatcgtggag cttagacggg aatgcatgga agaacttgga gacgcccttg 1560

tggcctccca gattttccat acattcgtcc atgatgatgg caatgggccc gtgggaagct 1620

gcctgagcaa aaatgtttct gggatcgctc acatcgtagt tatgttccag ggtgaggtca 1680

tcataggaca tctttacgaa tcgggggcgg agggtcccgg actgggggat gatggtaccc 1740

tcgggccccg gggcgtagtt cccctcacag atctgcatct cccaggcttt catttcagag 1800

ggagggatca tatccacctg cggagcgatg aaaaacacag tttctggcgc aggggagatt 1860

aactgggatg agagcaggtt tctgagcagc tgtgactttc cacagccggt gggcccatat 1920

atcacgccta tcaccggctg cagctggtag ttaagagagc tgcagctgcc gtcctcccgg 1980

agcaggggggg ccacctcgtt cagcatatcc ctgacgtgga tgttctccct gaccaattcc 2040

gccagaaggc gctcgccgcc cagcgaaagc agctcttgca aggaagcaaa atttttcagc 2100

ggttttaggc cgtcggccgt gggcatgttt ttcagcgtct gggtcagcag ttccagcctg 2160

tcccacagct cggtgatgtg ctctacggca tctcgatcca gcagatctcc tcgtttcgcg 2220

ggttggggcg gctttcgctg tagggcacca gccgatgggc gtccagcggg gccagagtca 2280

tgtccttcca tgggcgcagg gtcctcgtca gggtggtctg ggtcacggtg aaggggtgcg 2340

ctccgggttg ggcgctggcc agggtgcgct tgaggctggt tctgctggtg ctgaatcgct 2400

gccgctcttc gccctgcgcg tcggccaggt agcatttgac catggtctcg tagtcgagac 2460

cctcggcggc gtgccccttg gcgcggagct ttcccttgga ggtggcgccg cacgaggggc 2520

actgcaggct cttcagggcg tagagcttgg gagcgagaaa cacggactct ggggagtagg 2580

cgtccgcgcc gcaggaagcg cagaccgtct cgcattccac cagccaagtg agctccgggc 2640

ggtcagggtc aaaaaccagg ttgcccccat gctttttgat gcgtttctta cctcggctct 2700

ccatgaggcg gtgtcccttc tcggtgacga agaggctgtc cgtgtccccg tagaccgact 2760

tcaggggcct gtcttccagc ggagtgcctc tgtcctcctc gtagagaaac tctgaccact 2820

ctgagacgaa ggcccgcgtc caggccagga cgaaggaggc cacgtgggag gggtagcggt 2880

cgttgtccac tagcgggtcc accttctcca gggtgtgcag gcacatgtcc ccctcctccg 2940

cgtccagaaa agtgattggc ttgtaggtgt aggacacgtg accgggggtt cccgacgggg 3000

gggtataaaa gggggtgggc gccctttcat cttcactctc ttccgcatcg ctgtctgcga 3060

gggccagctg ctggggtaag tattccctct cgaaggcggg catgacctca gcgctcaggt 3120

tgtcagtttc taaaaatgag gaggatttga tgttcacctg tccggaggtg atacctttga 3180

gggtacctgg gtccatctgg tcagaaaaca ctatttttt gttgtcaagc ttggtggcga 3240

acgacccgta gagggcgttg gagagcagct tggcgatgga gcgcagggtc tggtttttgt 3300

cgcggtcggc tcgctccttg gccgcgatgt tgagttgcac gtactcgcgg gccacgcact 3360

tccactcggg gaagacggtg gtgcgctcgt ctgggattag gcgcaccctc cagcctcggt 3420

tgtgcagggt gaccatgtcg acgctggtgg cgacctcgcc gcgcaggcgc tcgttggtcc 3480

agcagaggcg gccgcccttg cgcgagcaga agggggggtag ggggtccagc tggtcctcgt 3540

ttgggggggtc cgcgtcgatg gtgaagaccc cggggagcaa gcgcgggtca aagtagtcga 3600

tcttgcaagc ttgcatgtcc agagcccgct gccattcgcg ggcggcgagc gcgcgctcgt 3660

aggggttgag gggcgggccc cagggcatgg ggtgggtgag cgcggaggcg tacatgccgc 3720

agatgtcata cacgtacagg ggttccctga ggatgccgag gtaggtgggg tagcagcgcc 3780

ccccgcggat gctggcgcgc acgtagtcat agagctcgtg ggaggggggcc agcatgttgg 3840

gcccgaggtt ggtgcgctgg gggcgctcgg cgcggaaggc gatctgcctg aagatggcat 3900

gggagttgga ggagatggtg ggccgctgga agacgttgaa gcttgcttct tgcaagccca 3960

ccgagtccct gacgaaggag gcgtaggact cgcgcagctt gtgcaccagc tcggcggtga 4020

cctggacgtc gagcgcgcag tagtcgaggg tctcgcggat gatgtcatac ttatcctccc 4080

ccttcttttt ccacagctcg cggttgagga cgaactcttc gcggtctttc cagtactctt 4140

ggaggggaaa cccgtccgtg tccgaacggt aagagcctag catgtagaac tggttgacgg 4200

cctggtaggg gcaacagccc ttctccacgg gcagcgcgta ggcctgcgcc gccttgcgga 4260

gggaggtgtg ggtgagggcg aaagtgtccc tgaccatgac tttgaggtat tgatgtttga 4320

agtctgtgtc atcgcagccg ccctgttccc acagggtgta gtccgtgcgc tttttggagc 4380

gcgggttggg cagggagaag gtgaggtcat tgaagaggat cttccccgct cgaggcatga 4440

agtttctggt gatgcgaaag ggccctggga ccgaggagcg gttgttgatg acctgggcgg 4500

ccaggacgat ctcgtcaaag ccgtttatgt tgtggcccac gatgtagagc tccaaaaagc 4560

ggggctggcc cttgatggag gggagctttt tgagttcctc gtaggtgagc tcctcgggcg 4620

attccaggcc gtgctcctcc agggcccagt cttgcaagtg agggttggcc gccaggaagg 4680

atcgccagag gtcgcgggcc atgagggtct gcaggcggtc gcggaaggtt ctgaactgtc 4740

gccccacggc catcttttcg ggggtgatgc agtagaaggt gagggggtct ttctcccagg 4800

ggtcccatct gagctctcgg gcgaggtcgc gcgcggcggc gaccagagcc tcgtcgcccc 4860

ccagtttcat gaccagcatg aagggcacga gctgcttgcc aaaggctccc atccaagtgt 4920

aggtctctac atcgtaggtg acaaagaggc gctccgtgcg aggatgagag ccgatcggga 4980

agaactggat ctcccgccac cagttggagg attggctgtt gatgtggtga aagtagaagt 5040

cccgtctgcg ggccgagcac tcgtgctggc ttttgtaaaa gcgaccgcag tactggcagc 5100

gctgcacggg ttgtatatct tgcacgaggt gaacctggcg acctctgacg aggaagcgca 5160

gcgggaatct aagtcccccg cctggggtcc cgtgtggctg gtggtcttct actttggttg 5220

tctggccgcc agcatctgtc tcctggaggg cgatggtgga gcagaccacc acgccgcgag 5280

agccgcaggt ccagatctcg gcgctcggcg ggcggagttt gatgacgaca tcgcgcacat 5340

tggagctgtc catggtctcc agctcccgcg gcggcaggtc agctgggagt tcctggaggt 5400

tcacctcgca gagacgggtc aaggcgcggg cagtgttgag atggtatctg atttcaaggg 5460

gcgtgttggc ggcggagtcg atggcttgca ggaggccgca gccccggggg gccacgatgg 5520

ttccccgcgg ggcgcgaggg gaggcggaag ctgggggtgt gttcagaagc ggtgacgcgg 5580

gcgggccccc ggaggtaggg ggggttccgg ccccacaggc atgggcggca ggggcacgtc 5640

ttcgccgcgc gcgggcaggg gctggtgctg gctccgaaga gcgcttgcgt gcgcgacgac 5700

gcgacggttg gtgtcctgta tctgacgcct ctgagtgaag accacgggtc ccgtgacctt 5760

gaacctgaaa gagagttcga cagaatcaat ctcggcatcg ttgacagcgg cctggcgcag 5820

gatctcctgc acgtcgcccg agttgtcctg gtaggcgatc tctgccatga actgctcgat 5880

ctcttcttcc tggagatctc ctcgtccggc gcgctccacg gtggccgcca ggtcgttgga 5940

gatgcgaccc atgagctgtg agaaggcgtt gagcccgccc tcgttccaga cccggctgta 6000

gaccacgccc ccctcggcgt cgcgagcgcg catgaccacc tgggccaggt tgagctccac 6060

gtgtcgcgtg aagacggcgt agttgcgcag gcgctggaaa aggtagttca gggtggtggc 6120

ggtgtgctcg gcgacgaaga agtacatgac ccagcgccgc aacgtggatt cattgatgtc 6180

ccccaaggcc tccaggcgct ccatggcctc gtagaagtcc acggcgaagt tgaaaaactg 6240

ggagttgcga gcggacacgg tcaactcctc ctccagaaga cggatgagct cggcgacagt 6300

gttgcgcacc tcgcgctcga aggccacggg gggcgcttct tcctcttcca cctcttcttc 6360

catgatcgct tcttcttctt cctcagccgg gacgggaggg ggcggcggcg gcgggggagg 6420

ggcgcggcgg cggcggcggc gcaccgggag gcggtcgatg aagcgctcga tcatctcccc 6480

ccgcatgcgg cgcatggtct cggtgacggc gcggccgttc tcccgggggc gcagctcgaa 6540

gacgccgcct ctcatctcgc cgcggggcga gcggccgtga ggtagcgaga cggcgctgac 6600

tatgcatctt aacaattgct gtgtaggtac accgccgagg gacctgattg agtccagatc 6660

caccggatcc gaaaaccttt ggaggaaagc gtctatccag tcgcagtcgc aaggtaggct 6720

gagcaccgtg gcgggcgggg gcgggtctgg agagttcctg gcggagatgc tgctgatgat 6780

gtaattaaag taggcggtct tgagaaggcg gatggtggac aggagcacca tgtctttggg 6840

tccggcctgt tggatgcgga ggcggtcggc catgccccag gcctcgttct gacaccggcg 6900

caggtctttg tagtagtctt gcatgagtct ttccaccggc acctcttctc cttcctcttc 6960

tccatctcgc cggtggtttc tcgcgccgcc catgcgcgtg accccaaagc ccctgagcgg 7020

ctgcagcagg gccaggtcgg cgaccacgcg ctcggccaag atggcctgct gcacctgagt 7080

gagggtcctc tcgaagtcat ccatgtccac gaagcggtgg taggcgcccg tgttgatggt 7140

gtaggtgcag ttggccatga cggaccagtt gacggtctgg tgtcccggct gcgagagctc 7200

cgtgtaccgc aggcgcgaga aggcgcggga atcgaacacg tagtcgttgc aagtccgcac 7260

cagatactgg tagcccacca ggaagtgcgg cggaggttgg cgatagaggg gccagcgctg 7320

ggtggcgggg gcgccgggcg ccaggtcttc cagcatgagg cggtggtatc cgtagatgta 7380

cctggacatc caggtgatgc cggcggcggt ggtggtggcg cgcgcgtagt cgcggacccg 7440

gttccagatg tttcgcaggg gcgagaagtg ttccatggtc ggcacgctct ggccggtgag 7500

gcgcgcgcag tcgttgacgc tctatacaca cacaaaaacg aaagcgttta cagggctttc 7560

gttctgtagc ctggaggaaa gtaaatgggt tgggttgcgg tgtgccccgg ttcgagacca 7620

agctgagctc ggccggctga agccgcagct aacgtggtat tggcagtccc gtctcgaccc 7680

aggccctgta tcctccagga tacggtcgag agccctttg ctttcttggc caagcgcccg 7740

tggcgcgatc tgggatagat ggtcgcgatg agaggacaaa agcggctcgc ttccgtagtc 7800

tggagaaaca atcgccaggg ttgcgttgcg gcgtaccccg gttcgagccc ctatggcggc 7860

ttgaatcggc cggaaccgcg gctaacgagg gccgtggcag ccccgtcctc aggaccccgc 7920

cagccgactt ctccagttac gggagcgagc ccctttgtt ttttatttt tagatgcatc 7980

ccgtgctgcg gcagatgcgc ccctcgcccc ggcccgatca gcagcagcaa cagcaggcat 8040

gcagaccccc ctctcccctt tccgccccgg tcaccacggc cgcggcggcc gtgtcgggcg 8100

cgggggcgc gctggagtca gatgagccac cgcggcggcg acctaggcag tatctggact 8160

tggaagaggg cgagggactg gcgcggctgg gggcgaactc tccagagcgc cacccgcggg 8220

tgcagttgaa aagggacgcg cgcgaggcgt acctgccgcg gcagaacctg tttcgcgacc 8280

gcgggggcga ggagcccgag gagatgcgag actgcaggtt ccaagcgggg cgcgagctgc 8340

ggcgcgggct ggacagacag cgcctgctgc gcgaggagga ctttgagccc gacacgcaga 8400

cgggcatcag ccccgcgcgc gcgcacgtag ccgcggccga cctggtgacc gcctacgagc 8460

agacggtaaa ccaggagcgc aacttccaaa agagcttcaa caaccacgtg cgcacgctgg 8520

tggcgcgcga ggaggtgacc ctgggtctca tgcatctgtg ggacctggtg gaggcgatcg 8580

tgcagaaccc cagcagcaag cccctgaccg cgcagctgtt cctggtggtg cagcacagca 8640

gggacaacga ggccttcagg gaggcgctgc tgaacatcac cgagccggag gggcgctggc 8700

tcctggacct gataaacatc ctgcagagca tagtggtgca ggagcgcagc ctgagcctgg 8760

ccgagaaggt ggcggccatc aactactcta tgctgagcct gggcaagttc tacgcccgca 8820

agatctacaa gacccctac gtgcccatag acaaggaggt gaagatagac agcttctaca 8880

tgcgcatggc gctgaaggtg ctgaccctga gcgacgacct gggagtgtac cgcaacgagc 8940

gcatccacaa ggccgtgagc gccagccggc ggcgcgagct gagcgaccgc gagctgatgc 9000

acagtctgca gcgcgcgctg accggcgcgg gcgagggcga cagggaggtc gagtcctact 9060

tcgacatggg ggccgacctg cactggcagc cgagccgccg cgccctggag gcggcggggg 9120

cgtacggcgg ccccctggcg gccgatgacc aggaagagga ggactatgag ctagaggagg 9180

gcgagtacct ggaggactga cctggctggt ggtgttttgg tatagatgca agatccgaac 9240

gtggcggacc cggcggtccg ggcggcgctg caaagccagc cgtccggcat taactcctct 9300

gacgactggg ccgcggccat gggtcgcatc atggccctga ccgcgcgcaa ccccgaggct 9360

ttcaggcagc agcctcaggc caaccggctg gcggccatct tggaagcggt agtgcccgcg 9420

cgctccaacc ccacccacga gaaggtgctg gccatagtca acgcgctggc ggagagcagg 9480

gccatccgcg cggacgaggc cggactggtg tacgatgcgc tgctgcagcg ggtggcgcgg 9540

tacaacagcg gcaacgtgca gaccaacctg gaccgcctgg tgacggacgt gcgcgaggcc 9600

gtggcgcagc gcgagcgctt gcatcaggac ggtaacctgg gctcgctggt ggcgctaaac 9660

gccttcctca gcacccagcc ggccaacgta ccgcgggggc aggaggacta caccaacttt 9720

ttgagcgcgc tgcggctgat ggtgaccgag gtccctcaga gcgaggtgta ccagtcgggg 9780

cccgactact tcttccagac cagcagacag ggcttgcaaa ccgtgaacct gagccaggct 9840

ttcaagaacc tgcgggggct gtggggagtg aaggcgccca ccggcgaccg ggctacggtg 9900

tccagcctgc taacccccaa ctcgcgcctg ctgctgctgc tgatcgcgcc cttcacggac 9960

agcgggagcg tctcgcggga gacctatctg ggccacctgc tgacgctgta ccgcgaggcc 10020

atcgggcagg cgcaggtgga cgagcacacc ttccaagaga tcaccagcgt gagccacgcg 10080

ctggggcagg aggacacggg cagcctgcag gcgaccctga actacctgct gaccaacagg 10140

cggcagaaga ttcccacgct gcacagcctg acccaggagg aggagcgcat cttgcgctac 10200

gtgcagcaga gcgtgagcct gaacctgatg cgcgacggcg tgacgcccag cgtggcgctg 10260

gacatgaccg cgcgcaacat ggaaccgggc atgtacgcct cccaccggcc gtttatcaac 10320

cgcctgatgg actacttgca tcgggcggcg gccgtgaacc ccgagtactt cactaatgcc 10380

attctgaatc cccactggat gccccctccg ggtttctaca acggggactt tgaggtgccc 10440

gaggtcaacg acgggttcct ctgggatgac atggatgaca gtgtgttctc acccaacccg 10500

ctgcgcgccg cgtctctgcg attgaaggag ggctctgaca gggaaggacc gaggagtctg 10560

gcctcctccc tggctctggg agcggtgggc gccacgggcg cggcggcgcg gggcagtagc 10620

cccttcccca gcctggcaga ctctctgaac agcgggcggg tgagcaggcc ccgcttgcta 10680

ggcgaggagg agtatctgaa caactccctg ctgcagcccg cgagggacaa gaacgctcag 10740

cggcagcagt ttcccaacaa tgggatagag agcctggtgg acaagatgtc cagatggaag 10800

acgtatgcgc aggagtacaa ggagtgggag gaccgccagc cgcggccctt gccgcccccc 10860

aggcagcgct ggcagcggcg cgcgtccaac cgccgctgga ggcaggggcc cgaggacgat 10920

gatgactctg cagatgacag cagcgtgttg gacctgggcg ggagcgggaa ccccttttcg 10980

cacctgcgcc cacgcctggg caagatgttt taaaagaaaa aaaaaataaa actcaccaag 11040

gccatggcga cgagcgttgg ttttttgttc ccttccttag tatgcggcgc gcggcgatgt 11100

tcgaggaggg gcctcccccc tcttacgaga gcgcgatggg gatttctcct gcggcgcccc 11160

tgcagcctcc ctacgtgcct cctcggtacc tgcaacctac agggggggaga aatagcatct 11220

gttactctga gctgcagccc ctgtacgata ccaccagact gtacctggtg gacaacaagt 11280

ccgcggacgt ggcctccctg aactaccaga acgaccacag cgatttttg accacggtga 11340

tccaaaacaa cgacttcacc ccaaccgagg ccagcaccca gaccataaac ctggataaca 11400

ggtcgaactg gggcggcgac ctgaagacca tcttgcacac caacatgccc aacgtgaacg 11460

agttcatgtt caccaactct tttaaggcgc gggtgatggt ggcgcgcgag caggggggagg 11520

cgaagtacga gtgggtggac ttcacgctgc ccgagggcaa ctactcagag accatgactc 11580

tcgacctgat gaacaatgcg atcgtggaac actatctgaa agtgggcagg cagaacgggg 11640

tgaaggaaag cgatatcggg gtcaagtttg acaccagaaa cttccgtctg ggctgggacc 11700

ccgtgaccgg gctggtcatg ccgggggtct acaccaacga ggcctttcat cccgacatag 11760

tgcttctgcc cggctgtggg gtggacttca cccagagccg gctgagcaac ctgctgggca 11820

ttcgcaagcg gcagcctttc caggagggtt tcaagatcac ctatgaggat ctgaaggggg 11880

gcaacattcc cgcgctcctt gatctggacg cctacgagga gagcttgaaa cccgaggaga 11940

gcgctggcga cagcggcgag agtggcgagg agcaagccgg cggcggtggc ggcgcgtcgg 12000

tagaaaacga aagtacgccc gcagtggcgg cggacgctgc ggaggtcgag ccggaggcca 12060

tgcagcagga cgcagaggag ggcgcacagg agggcgcgca gaaggacatg aacgatgggg 12120

agatcagggg agacacattc gccacccggg gcgaagaaaa agaggcagag gcggcggcgg 12180

cggcgacggc ggaggccgaa accgaggttg aggcagaggc agagcccgag accgaagtta 12240

tggaagacat gaatgatgga gaacgtaggg gcgacacgtt cgccacccgg ggcgaagaga 12300

aggcggcgga ggcagaagcc gcggctgagg aggcggctgc ggctgcggcc aagactgagg 12360

ctgcggctaa ggctgaggtc gaagccaatg ttgcggttga ggctcaggct gaggaggagg 12420

cggcggctga agcagttaag gaaaaggccc aggcagagca ggaagagaaa aaacctgtca 12480

ttcaacctct aaaagaagat agcaaaaagc gcagttacaa cgtcatcgag ggcagcacct 12540

ttacccagta ccgcagctgg tacctggcgt acaactacgg cgacccggtc aaggggggtgc 12600

gctcgtggac cctgctctgc acgccggacg tcacctgcgg ctccgagcag atgtactggt 12660

cgctgccgaa catgatgcaa gacccggtga ccttccgctc cacgcggcag gttagcaact 12720

tcccggtggt gggcgccgaa ctgctgcccg tgcactccaa gagtttttac aacgagcagg 12780

ccgtctactc ccagctgatc cgccaggcca cctctctgac ccacgtgttc aatcgctttc 12840

ccgagaacca gattttggcg cgcccgccgg cccccaccat caccaccgtg agtgaaaacg 12900

ttcctgccct cacagatcac gggacgctac cgctgcgcaa cagcatctca ggagtccagc 12960

gagtgaccat tactgacgcc agacgccgga cctgccccta cgtttacaag gccttgggca 13020

tagtctcgcc gcgcgtcctc tccagtcgca ctttttaaaa cacatctacc cacacgttcc 13080

aaaatcatgt ccgtactcat ctcacccagc aacaacaccg gctgggggct gcgcgcgccc 13140

agcaagatgt ttggaggggc gaggaagcgc tccgaccagc accctgtgcg cgtgcgcggc 13200

cactaccgcg cgccctgggg agcgcacaag cgcgggcgca cagggcgcac cactgtggac 13260

gacgtcattg actccgtagt ggagcaagcg cgccactaca cacccggcgc gccgaccgcc 13320

cccgccgtgt ccaccgtgga ccaggcgatc gaaagcgtgg tacagggcgc gcggcactat 13380

gccaacctta aaagtcgccg ccgccgcgtg gcccgccgcc atcgccggag accccgggcc 13440

accgccgccg cgcgccttac taaggctctg ctcaggcgcg ccaggcgaac tggccaccgg 13500

gccgccatga gggccgcacg gcgggctgcc gctgccgcaa gcgtcgtggc cccgcgggca 13560

cgaaggcgcg cggccgctgc cgccgccgcc gccatttcca gcttggcctc gacgcggcgc 13620

ggtaacatat actgggtgcg cgactcggta accggcacgc gggtacccgt gcgctttcgc 13680

cccccgcgga attagcacaa gacaacatac acactgagtc tcctgctgtt gtgtatccca 13740

gcggcgaccg tcagcagcgg cgacatgtcc aagcgcaaaa ttaaagaaga gatgctccag 13800

gtcatcgcgc cggagatcta tgggcccccg aagaaggagg aggatgatta caagccccgc 13860

aagctaaagc gggtcaaaaa gaaaaagaaa gatgatgatg acgaggcggt ggagtttgtc 13920

cgccgcatgg cacccaggcg ccccgtgcag tggaagggcc ggcgcgtgca gcgcgttttg 13980

cgccccggca ccgcggtggt cttcacgccc ggcgagcgct ccacgcgcac tttcaagcgg 14040

gtgtacgatg aggtgtacgg cgacgaggac ctgttggagc aggccaacca gcgctttggg 14100

gagtttgcat atgggaaacg gccccgcgag agtctaaaag aggacctgct ggcgctaccg 14160

ctggacgagg gcaatcccac cccgagtctg aagccggtaa ccctgcaaca ggtgctgcct 14220

ttgagcgcgc ccagcgagca taagcgaggg ttgaagcgcg aaggcgggga cctggcgccc 14280

accgtgcagt tgatggtgcc caagcggcag aagctggagg acgtgctgga gaaaatgaaa 14340

gtagagcccg ggatccagcc cgagatcaag gtccgcccca tcaagcaggt ggcgcccggc 14400

gtgggagtcc agaccgtgga cgttaggatt cccacggagg agatggaaac ccaaaccgcc 14460

actccctctt cggcggccag cgccaccacc ggcaccgctt cggtagaggt gcagacggac 14520

ccctggctac ccgccaccgc tgttgccgcc gccgcccccc gttcgcgcgg gcgcaagaga 14580

aattatccag cggccagcgc gctcatgccc cagtacgcac tgcatccatc catcgtgccc 14640

acccccggct accgcgggta ctcgtaccgc ccgcgcagat cagccggcac tcgcggccgc 14700

cgccgccgtg cgaccacaac cagccgccgc cgtcgccgcc gccgccagcc agtgctgacc 14760

cccgtgtctg taaggaaggt ggctcgctcg gggagcacgc tggtggtgcc cagagcgcgc 14820

taccacccca gcatcgttta aagccggtct ctgtatggtt cttgcagata tggccctcac 14880

ttgtcgcctc cgcttcccgg tgccgggata ccgaggaaga actcaccgcc gcagaggcat 14940

ggcgggcagc ggtctccgcg gcggccgtcg ccatcgccgg cgcgcaaaaa gcaggcgcat 15000

gcgcggcggt gtgctgcctc tgctaatccc gctaatcgcc gcggcgatcg gtgccgtacc 15060

cgggatcgcc tccgtggccc tgcaggcgtc ccagaaacgt tgactcttgc aaccttgcaa 15120

gcttgcattt tttggaggaa aaataaaaaa aagtctagac tctcacgctc gcttggtcct 15180

gtgactattt tgtagaaaaa aagatggaag acatcaactt tgcgtcgctg gccccgcgtc 15240

acggctcgcg cccgttcatg ggagactgga cagatatcgg caccagcaat atgagcggtg 15300

gcgccttcag ctggggcagt ctgtggagcg gccttaaaaa ttttggttcc accattaaga 15360

actatggcaa caaagcgtgg aacagcagca cgggccagat gctgagagac aagttgaaag 15420

agcagaactt ccaggagaag gtggcgcagg gcctggcctc tggcatcagc ggggtggtgg 15480

acatagctaa ccaggccgtg cagaaaaaga taaacagtca tctggacccc cgtcctcagg 15540

tggaggaaat gcctccagcg atggagacgg tgtctcccga gggcaaaggc gaaaagcgcc 15600

cgcggcccga cagagaagag accctggtgt cacacaccga ggagccgccc tcttacgagg 15660

aggcagtcaa ggccggcctg cccaccactc gccccatagc ccccatggcc accggtgtgg 15720

tgggccacag gcaacacact cccgcaacac tagatctgcc cccgccgtcc gagccgccgc 15780

gccagccaaa ggcggcgacg gtgcccgctc cctccacttc cgccgccaac agagtgcccc 15840

tgcgccgcgc cgcgagcggc ccccgggcct cgcgagttag cggcaactgg cagagcacac 15900

tgaacagcat cgtgggcctg ggagtgagga gtgtgaagcg ccgccgttgc tactgaatga 15960

gcaagctagc taacgtgttg tatgtgtgta tgcgtcctat gtcgccgcca gaggagctgt 16020

tgagccgccg gcgccgtctg cactccagcg aatttcaaga tggcgacccc atcgatgatg 16080

cctcagtggt cgtacatgca catctcgggc caggacgctt cggagtacct gagccccggg 16140

ctggtgcagt tcgcccgcgc cacagacacc tacttcaaca tgagtaacaa gttcaggaac 16200

cccactgtgg cgcccaccca cgatgtgacc acggaccggt cgcagcgcct gacgctgcgg 16260

ttcatccccg tggatcggga ggacaccgcc tactcttaca aggcgcggtt cacgctggcc 16320

gtgggcgaca accgcgtgct ggacatggcc tccacttact ttgacatcag gggggtgctg 16380

gacaggggcc ccaccttcaa gccctactcg ggtactgcct acaactccct ggcccccaag 16440

ggcgctccca attcttgcga gtgggaacaa gatgaaccag ctcaggcagc aatagctgaa 16500

gatgaagaag aacttgaaga agaacaagct caggacgaac aggcgcccac taagaaaacc 16560

catgtatacg cccaggcacc tctttctggt gaaaaaatta ctaaggatgg tttgcaaata 16620

ggtgtggatg ccacacaggc gggagataac cctatatatg ctgataaaac attccaaccc 16680

gaacctcaga taggtgagtc tcagtggaac gaggctgatg ccacagtagc aggaggcaga 16740

gtcttaaaaa agaccacccc tatgagacct tgctatggat cctatgccaa acctactaat 16800

gccaatggcg gtcaagggat catggtggcc aatgatcagg gagcgcttga atctaaagtt 16860

gagatgcaat ttttctccac cacaacgtct cttaatgtaa gggaaggtga aaacaatctt 16920

cagccaaaag tagtgctata cagcgaagat gttaacttgg aatcccctga cactcatttg 16980

tcttacaaac ctaaaaagga tgacaccaac tctaaaatca tgttgggtca gcaagccatg 17040

cccaacagac ccaacctcat tgcttttagg gacaacttta ttggacttat gtactacaac 17100

agcacaggca acatgggagt gctggcagga caggcctccc agctaaacgc tgtggtagac 17160

ttgcaagaca gaaacacaga gctgtcatac caactgatgc ttgattccat tggagacaga 17220

tcaagatact tttccatgtg gaaccaggca gtggacagct atgacccaga tgtcagaatc 17280

attgaaaacc atggggttga agatgagctg cccaactatt gctttcccct gggcggtatt 17340

ggaattacag acacatacca gtgcataaaa ccaaccgcag ctgctaataa cactacatgg 17400

tctaaggatg aagaatttag tgatcgcaat gaaatagggg tgggaaacaa cttcgccatg 17460

gagatcaaca tccaggccaa cctctggagg aacttcctct atgcgaacgt ggggctctac 17520

ctgccagaca agctcaagta caaccccacc aacgtggaca tctctgacaa ccccaacacc 17580

tatgactaca tgaacaagcg tgtggtggct cccggcctgg tggactgctt tgtcaatgtg 17640

ggagccaggt ggtccctgga ctacatggac aacgtcaacc ccttcaacca ccaccgcaat 17700

gcgggtctgc gctaccgctc catgatcctg ggcaacgggc gctacgtgcc cttccacatt 17760

caggtgcccc agaagttctt tgccatcaag aacctcctcc tcctgccggg ctcctacact 17820

tacgagtgga acttcaggaa ggatgtcaac atggtcctgc agagctctct gggcaatgac 17880

cttagggtgg acggggccag catcaagttt gacagcgtca ccctctatgc taccttcttc 17940

cccatggctc acaacaccgc ctccacgctc gaggccatgc tgaggaacga caccaacgac 18000

cagtccttca atgactacct ctctggggcc aacatgctct accccatccc cgccaaggcc 18060

accaacgtgc ccatctccat tccctctcgc aactgggccg ccttcagagg ctgggccttt 18120

acccgcctta agaccaagga aacccccctcc ctgggctcgg gttttgaccc ctactttgtc 18180

tactcgggat ccatccccta cctggatggc accttctacc tcaaccacac ttttaagaag 18240

atatccatca tgtatgactc ctccgtcagc tggccgggca atgaccgcct gctcaccccc 18300

aatgagttcg aggtcaagcg cgccgtggac ggcgagggct acaacgtggc ccagtgcaac 18360

atgaccaagg actggttcct ggtgcagatg ctggccaact acaacatagg ctaccagggc 18420

ttctacatcc cagagagcta caaggacagg atgtactcct tcttcagaaa tttccaaccc 18480

atgagcaggc aggtggtgga cgagaccaaa tacaaggact atcaggccat tggcatcact 18540

caccagcaca acaactcggg attcgtgggc tacctggctc ccaccatgcg cgaggggcag 18600

gcctaccccg ccaacttccc ctacccgttg ataggcaaaa ccgcggtcga cagcgtcacc 18660

cagaaaaagt tcctctgcga ccgcaccctc tggcgcatcc ccttctctag caacttcatg 18720

tccatgggtg cgctcacgga cctgggccag aacctgctct atgccaactc cgcccatgcg 18780

ctggacatga cttttgaggt ggaccccatg gacgagccca cccttctcta tattgtgttt 18840

gaagtgttcg acgtggtcag agtgcaccag ccgcaccgcg gtgtcatcga gaccgtgtac 18900

ctgcgcacgc ccttctcggc cggcaacgcc accacctaag gagacagcgc cgccgcctgc 18960

atgacgggtt ccaccgagca agagctcagg gccatcgcca gagacctggg atgcggaccc 19020

tatttttgg gcacctatga caaacgcttc ccgggcttca tctcccgaga caagctcgcc 19080

tgcgccatcg tcaacacggc cgcgcgcgag accgggggcg tgcactggct ggcctttggc 19140

tgggacccgc gctccaaaac ctgctacctc ttcgacccct ttggcttctc cgatcagcgc 19200

ctcagacaga tctatgagtt tgagtacgag gggctgctgc gccgcagcgc gcttgcctcc 19260

tcgcccgacc gctgcatcac ccttgagaag tccaccgaga ccgtgcaggg gccccactcg 19320

gccgcctgcg gtctcttctg ctgcatgttt ttgcacgcct ttgtgcgctg gccccagagt 19380

cccatggatc gcaaccccac catgaacttg ctcaagggag tgcccaacgc catgctccag 19440

agcccccagg tccagcccac cctgcgccac aaccaggaac agctctaccg cttcctggag 19500

cgccactccc cctacttccg cagtcacagc gcgcacatcc ggggggccac ctctttctgc 19560

cacttgcaag aaaacatgca agacggaaaa tgatgtacag ctcgcttttt aataaatgta 19620

aagactgtgc actttattta tacacgggct ctttctggtt atttattcaa caccgccgtc 19680

gccatctaga aatcgaaagg gttctgccgc gcgtcgccgt gcgccacggg cagagacacg 19740

ttgcgatact ggaagcggct cgcccactta aactcgggca ccaccatgcg gggcagtggt 19800

tcctcgggga agttctcgcc ccacagggtg cgggtcagct gcagcgcgct caggaggtcg 19860

ggagccgaga tcttgaagtc gcagttgggg ccggaaccct gcgcgcgcga gttgcggtac 19920

acggggttgc agcactggaa caccagcagg gccggattat gcacgctggc cagcaggctc 19980

tcgtcgctga tcatgtcgct gtccagatcc tccgcgttgc tcagggcgaa cggggtcatc 20040

ttgcagacct gcctgcccag gaaaggcggc agcccgggct tgccgttgca gtcgcagcgc 20100

aggggcatca gcaggtgccc gcggcccgac tgcgcctgcg ggtacagcgc gcgcatgaag 20160

gcttcgatct gcctgaaagc cacctgcgtc ttggctccct ccgaaaagaa catcccacag 20220

gacttgctgg agaactggtt cgcgggacag ctggcatcgt gcaggcagca gcgcgcgtcg 20280

gtgttggcga tctgcaccac gttgcgaccc caccggttct tcactatctt ggccttggaa 20340

gcctgctcct tcagcgcgcg ctggccgttc tcgctggtca catccatctc tatcacctgc 20400

tccttgttga tcatgtttgt accgtgcaga cacttcaggt cgccctccgt ctgggtgcag 20460

cggtgctccc acagcgcgca accggtgggc tcccaatttt tgtgggtcac ccccgcgtag 20520

gcctgcaggt aggcctgcaa gaagcgcccc atcatggcca caaaggtctt ctggctcgta 20580

aaggtcagct gcaggccgcg atgctcttcg ttcagccagg tcttgcagat ggcggccagc 20640

gcctcggtct gctcgggcag catcctaaaa tttgtcttca ggtcgttatc cacgtggtac 20700

ttgtccatca tggcgcgcgc cgcctccatg cccttctccc aggcggacac catgggcagg 20760

cttaggggggt ttatcacttc caccggcgag gacaccgtac tttcgatttc ttcttcctcc 20820

ccctcttccc ggcgcgcgcc cacgctgctg cgcgctctca ccgcctgcac caaggggtcg 20880

tcttcaggca agcgccgcac cgagcgcttg ccgcccttga cctgcttaat cagcaccggc 20940

gggttgctga agcccaccat ggtcagcgcc gcctgctctt cttcgtcttc gctgtctacc 21000

actatctctg gggaagggct tctccgctct gcggcggcgc gcttcttttt tttcttggga 21060

gcggccgtga tggagtccgc cacggcgacg gaggtcgagg gcgtggggct gggggtgcgc 21120

ggtaccaggg cctcgtcgcc ctcggactct tcctctgact ccaggcggcg gcggagtcgc 21180

ttctttgggg gcgcgcgcgt cagcggcggc ggagacgggg acggggacgg ggacgggacg 21240

ccctccacag ggggtggtct tcgcgcagac ccgcggccgc gctcgggggt cttctcgagc 21300

tggtcttggt cccgactggc cattgtatcc tcctcctcct aggcagagag acataaggag 21360

tctatcatgc aagtcgagaa ggaggagagc ttaaccaccc cctctgagac cgccgatgcg 21420

cccgccgtcg ccgtcgcccc cgctgccgcc gacgcgcccg ccacaccgag cgacaccccc 21480

gcggaccccc ccgccgacgc acccctgttc gaggaagcgg ccgtggagca ggacccgggc 21540

tttgtctcgg cagaggagga tttgcgagag gaggaggata aggagaagaa gccctcagtg 21600

ccaaaagatg ataaagagca agacgagcac gacgcagatg cacaccaggg tgaagtcggg 21660

cgggggggacg gagggcatga cggcgccgac tacctagacg aagggaacga cgtgctcttg 21720

aagcacctgc atcgtcagtg cgccattgtt tgcgacgctc tgcaggagcg cagcgaagtg 21780

cccctcagcg tggcggaggt cagccacgcc tacgagctca gcctcttctc cccccgggtg 21840

ccccccccgcc gccgcgaaaa cggcacatgc gagcccaacc cgcgcctcaa cttctacccc 21900

gcctttgtgg tacccgaggt cctggccacc tatcacatct tctttcaaaa ttgcaagatc 21960

cccctctcgt gccgcgccaa ccgtagccgc gccgataaga tgctggccct gcgccagggc 22020

gaccacatac ctgatatcgc cgctttggaa gatgtaccaa agatcttcga gggtctgggt 22080

cgcaacgaga agcgggcagc aaactctctg caacaggaaa acagcgaaaa tgagagtcac 22140

accggggtac tggtggagct cgagggcgac aacgcccgcc tggcggtggt caagcgcagc 22200

atcgaggtca cccactttgc ctaccccgcg ctaaacctgc cccccaaagt catgaacgcg 22260

gccatggacg ggctgatcat gcgccgcggc cggcccctcg ctccagatgc aaacttgcat 22320

gaggagaccg aggacggcca gcccgtggtc agcgacgagc agctggcgcg ctggctggag 22380

accgcggacc ccgccgaact ggaggagcgg cgcaagatga tgatggccgt ggtgctggtc 22440

accgtagagc tggagtgtct gcagcgcttc ttcggcgacc ccgagatgca gagaaaggtc 22500

gaggagaccc tgcactacac cttccgccag ggctacgtgc gccaggcttg caagatctcc 22560

aacgtggagc tcagcaacct ggtgtcctac ctgggcatct tgcatgagaa ccgcctcggg 22620

cagagcgtgc tgcactccac cctgcgcggg gaggcgcgcc gcgactacgt gcgcgactgc 22680

gtttacctct tcctctgcta cacctggcag acggccatgg gggtctggca gcagtgcctg 22740

gaggagcgca acctcaagga gctggagaag ctcctgcagc gcgcgctcaa agatctctgg 22800

acgggctaca acgagcgctc ggtggccgcc gcgctggccg acctcatctt ccccgagcgc 22860

ctgctcaaaa ccctccagca ggggctgccc gacttcacca gccaaagcat gttgcaaaac 22920

ttcaggaact ttatcctgga gcgttctggc atcctacccg ccacctgctg cgccctgccc 22980

agcgactttg tccccctcgt gtaccgcgag tgcccccgc cgctgtgggg tcactgctac 23040

ctgttccaac tggccaacta cctgtcctac cacgcggacc tcatggagga ctccagcggc 23100

gaggggctca tggagtgcca ctgccgctgc aacctctgca cgccccaccg ctccctggtc 23160

tgcaacaccc aactgctcag cgagagtcag attatcggta ccttcgagct acagggtccg 23220

tcctcctcag acgagaagtc cgcggctccg gggctaaaac tcactccggg gctgtggact 23280

tccgcctacc tgcgcaaatt tgtacctgaa gactaccacg cccacgagat caggttttac 23340

gaagaccaat cccgcccgcc caaggcggag ctgaccgcct gcgtcatcac ccagggcgag 23400

atcctaggcc aattgcaagc catccaaaaa gcccgccaag acttttgct gaagaagggt 23460

cgggggggtgt atctggaccc ccagtcgggt gaggagctca acccggttcc cccgctgccg 23520

ccgccgcggg accttgcttc ccaggataag catcgccatg gctcccagaa agaagcagca 23580

gcggccgcca ctgccgccac cccacatgct ggaggaagag gaggaatact gggacagtca 23640

ggcagaggag gtttcggacg aggaggagcc ggagacggag atggaagagt gggaggagga 23700

cagcttagac gaggaggctt ccgaagccga agaggcagac gcaacaccgt caccctcggc 23760

cgcagccccc tcgcaggcgc ccccgaagtc cgctcccagc atcagcagca acagcagcgc 23820

tataacctcc gctcctccac cgccgcgacc cacggccgac cgcagaccca accgtagatg 23880

ggacaccacc ggaaccgggg ccggtaagtc ctccgggaga ggcaagcaag cgcagcgcca 23940

aggctaccgc tcgtggcgcg ctcacaagaa cgccatagtc gcttgcttgc aagactgcgg 24000

ggggaacatc tccttcgccc gccgcttcct gctcttccac cacggtgtgg ccttcccccg 24060

taacgtcctg cattactacc gtcatctcta cagcccctac tgcggcggca gtgagccaga 24120

gacggtcggc ggcggcggcg gcgcccgttt cggcgcctag gaagacccag ggcaagactt 24180

cagccaagaa actcgcggcg gccgcggcga acgcggtcgc gggggccctg cgcctgacgg 24240

tgaacgaacc cctgtcgacc cgcgaactga ggaaccgaat cttccccact ctctatgcca 24300

tcttccagca gagcagaggg caggatcagg aactgaaagt aaaaaacagg tctctgcgct 24360

ccctcacccg cagctgtctg tatcacaaga gcgaagacca gcttcggcgc acgctggagg 24420

acgctgaggc actcttcagc aaatactgcg cgctcactct taaggactag ctccgcgccc 24480

ttctcgaatt taggcgggaa cgcctacgtc atcgcagcgc cgccgtcatg agcaaggaca 24540

ttcccacgcc atacatgtgg agctatcagc cgcagatggg actcgcggcg ggcgcctccc 24600

aagactactc cacccgcatg aactggctca gtgccggccc acacatgatc tcacaggtta 24660

atgatatccg cacccatcga aaccaaatat tggtggagca ggcggcaatt accaccacgc 24720

cccgcaataa tcccaacccc agggagtggc ccgcgtccct ggtgtatcag gaaattcccg 24780

gccccaccac cgtactactt ccgcgtgatt cccaggccga agtccaaatg actaactcag 24840

gggcacagct cgcgggcggc tgtcgtcaca gggtgcggcc tcctcgccag ggtataactc 24900

acctggagat ccgaggcaga ggtattcagc tcaacgacga gtcggtgagc tcctcgctcg 24960

gtctcagacc tgacgggacc ttccagatag ccggagccgg ccgatcttcc ttcacgcccc 25020

gccaggcgta cctgactctg caaagctcgt cctcggcgcc gcgctcgggc ggcatcggga 25080

ctctccagtt cgtgcaggag tttgtgccct cggtctactt caaccccttc tcgggctctc 25140

ccggtcgcta cccggaccag ttcatctcga actttgacgc cgcgagggac tcggtggacg 25200

gctacgactg aatgtcgggt ggacccggtg cagagcaact tcgcctgaag cacctcgacc 25260

actgccgccg ccctcagtgc tttgcccgct gtcagaccgg tgagttccag tacttttccc 25320

tgcccgactc gcacccggac ggcccggcgc acggggtgcg ctttttcatc ccgagtcagg 25380

tgcgctctac cctaatcagg gagtttaccg cccgtcccct actggcggag ttggaaaagg 25440

ggccttctat cctaaccatt gcctgcatct gctctaaccc tggattgcac caagatcttt 25500

gctgtcattt gtgtgctgag tataataaag gctgagatca gaatctactc gggctcctgt 25560

cgccatcctg tcaacgccac cgtccaagcc cggcccgatc agcccgaggt gaacctcacc 25620

tgcggtctgc accggcgcct gaggaaatac ctagcttggt actacaacag cactcccttt 25680

gtggtttaca acagctttga ccaggacggg gtctcactga gggataacct ctcgaacctg 25740

agctactcca tcaggaagaa cagcaccctc gagctacttc ctccttacct gcccgggact 25800

taccagtgtg tcaccggtcc ctgcacccac acccacctgt tgatcgtaaa cgactctctt 25860

ccgagaacag acctcaataa ctcctcttcg cagttcccca gaacaggagg tgagctcagg 25920

aaaccccggg taaagaaggg tggacgagag ttaacacttg tggggtttct ggtgtatgtg 25980

acgctggtgg tggctctttt gattaaggct tttccttcca tgtctgaact ctccctcttc 26040

ttttatgaac aactcgacta gtgctaacgg gaccctaccc aacgaatcgg gattgaatat 26100

cggtaaccag gttgcagttt cacttttgat taccttcata gtcctcttcc tgctagtgct 26160

gtcgcttctg tgcctgcgga tcgggggctg ctgcatccac gtttatatct ggtgctggct 26220

gtttagaagg ttcggagacc atcgcaggta gaataaacat gctgctgctt accctctttg 26280

tcctggcgct ggccgccagc tgccaagcct tttccgaggc tgactttata gagccccagt 26340

gtaatgtgac ttttaaagcc catgcacagc gttgtcatac tataatcaaa tgtgccaccg 26400

aacacgatga ataccttatc cagtataaag ataaatcaca caaagtggca cttgttgaca 26460

tctggaaacc cgaagaccct ttggaataca atgtgaccgt tttccagggt gacctcttca 26520

aaatttacaa ttacactttc ccatttgacc agatgtgtga ctttgtcatg tacatggaaa 26580

agcagcacaa gctgtggcct ccgactcccc agggctgtgt ggaaaatcca ggctctttct 26640

gcatgatctc tctctgtgta actgtgctgg cactaatact cacgcttttg tatatcagat 26700

ttaaatcaag gcaaagcttc attgatgaaa agaaaatgcc ttaatcgctt tcacgcttga 26760

ttgctaacac cgggttttta tccgcagaat gattggaatc accctactaa tcacctccct 26820

ccttgcgatt gcccatgggt tggaacgaat cgaagtccct gtgggggcca atgttaccct 26880

ggtggggcct gtcggcaatg ctacattaat gtgggaaaaa tatactaaaa atcaatgggt 26940

ctcttactgc actaacaaaa atagccacaa gcccagagcc atctgcgatg ggcaaaatct 27000

aaccttgatt gatgttcaat tgctggatgc gggctactat tatgggcagc tgggtacaat 27060

gattaattac tggagacccc acagagatta catgctccac gtagtaaagg gtccccttag 27120

cagcccaccc actaccacct ctactacccc cactaccacc actactccca ccaccagcac 27180

tgccgcccag cctcctcata gcagaacaac cacttttatc aattccaagt cccactcccc 27240

ccacattgcc ggcgggccct ccgcctcaga ctccgaaacc accgagatct gcttctgcaa 27300

atgctctgac gccattgccc aggatttgga agatcacgag gaagatgagc atgacttcgc 27360

agatgcatgc caggcatcag agccagaagc gctgccggtg gccctcaaac agtatgcaga 27420

ccccacacc acccccgacc ttcctccacc ttcccagaag ccaagtttcc tgggggaaaa 27480

tgaaactctg cctctctcca tactcgctct gacatctgtt gctatgttga ccgctctgct 27540

ggtgcttcta tgctctatat gctacctgat ctgctgcaga aagaaaaaat ctcacggcca 27600

tgctcaccag cccctcatgc acttccctta ccctccagag ctgggcgacc acaaacttta 27660

agtctgcagt aactatctgc ccatcccttg tcagtcgaca gcgatgagcc ccactaatct 27720

aacggcctct ggacttacaa catcgtctct taatgagacc accgctcctc aagacctgta 27780

cgatggtgtc tccgcgctgg ttaaccagtg ggatcacctg ggcatatggt ggctcctcat 27840

aggagcagtg accctgtgcc taatcctggt ctggatcatc tgctgcatca aaagcagaag 27900

acccaggcgg cggcccatct acaggccctt tgtcatcaca cctgaagatg atgatgacac 27960

cacttccagg ctgcagaggc taaagcagct actcttctct tttacagcat ggtaaattga 28020

atcatgcctc gcattttcat ctacttgtct ctccttccac tttttctggg ctcttctaca 28080

ttggccgctg tgtcccacat cgaggtagac tgcctcacgc ccttcacagt ctacctgctt 28140

ttcggctttg tcatctgcac ctttgtctgc agcgttatca ctgtagtgat ctgcttcata 28200

cagtgcatcg actacgtctg cgtgcgggtg gcttacttta gacaccaccc ccagtatcgc 28260

aacagggaca tagcggctct cctaagactt gtttaaaatc atggccaaat taactgtgat 28320

tggtcttctg atcatctgct gcgtcctagc cgcgattggg actcaagctc ctaccaccac 28380

cagcgctccc agaaagagac atgtatcctg cagcttcaag cgtccctgga atatacccca 28440

atgctttact gatgaacctg aaatctcttt ggcttggtac ttcagcgtca ccgcccttct 28500

tatcttctgc agtacggtta ttgcccttgc catctaccct tcccttgacc tgggctggaa 28560

tgctgtcaac tctatggaat atcccacctt cccagaacca gacctgccag acctggttgt 28620

tctaaacgcg tttcctcctc ctgctcccgt tcaaaatcag tttcgccctc cgtcccccac 28680

gcccactgag gtcagctact ttaatctaac aggcggagat gactgaaaac ctagacctag 28740

aaatggacgg tctctgcagc gagcaacgca cactagagag gcgccggcaa aaagagctcg 28800

agcgtcttaa acaagagctc caagacgcgg tggccataca ccagtgcaaa aaaggtgtct 28860

tctgtctggt aaaacaggcc acgctcacct atgaaaaaac aggtgacacc caccgcctag 28920

gatacaagct gcccacacag cgccaaaagt tcgccctcat gataggcgaa caacccatca 28980

ccgtgaccca gcactccgtg gagacagaag gctgcataca tgctccctgt aggggcgctg 29040

actgcctcta caccttgatc aaaaccctct gcggtctcag agaccttatc cctttcaatt 29100

aatcataact gtaatcaata aaaaatcact tacttgaaat ctgatagcaa gcctctgtcc 29160

aatttttca gcaacacttc cttcccctcc tcccaactct ggtactctag gcgcctccta 29220

gctgcaaact tcctccacag tctgaaggga atgtcagatt cctcctcctg tccctccgca 29280

cccacgatct tcatgttgtt gcagatgaaa cgcgcgagat cgtctgacga gaccttcaac 29340

cccgtgtacc cctacgatac cgagatcgct ccgacttctg tccctttcct taccctccc 29400

tttgtgtcat ccgcaggaat gcaagaaaat ccagctgggg tgctgtccct gcacttgtca 29460

gagcccctta ccacccacaa tggggccctg actctaaaaa tgggggggcgg cctgaccctg 29520

gacaaggaag ggaatctcac ttcccaaaac atcaccagtg tcgatccccc tctcaaaaaa 29580

agcaagaaca acatcagcct tcagaccgcc gcacccctcg ccgtcagctc cggggcccta 29640

acacttttg ccactccccc cctagcggtc agtggtgaca accttactgt gcagtctcag 29700

gcccctctca ctttggaaga ctcaaaacta actctggcca ccaaaggacc cctaactgtg 29760

tccgaaggca aacttgtcct agaaacagag gctcccctgc atgcaagtga cagcagcagc 29820

ctgggcctta gcgttacggc cccacttagc attaacaatg acagcctagg actagatctg 29880

caggcaccca ttgtctctca aaatggaaaa ctggctctaa atgtagcagg ccccctagct 29940

gtggccaatg gcattaatgc tttgacagta ggcacaggca aaggtattgg tctaaatgaa 30000

accagcactc acttgcaagc aaagttggtc gccccctag gctttgatac caatggcaac 30060

attaagctaa gcgttgcagg aggcatgaga ctaaataatg acacacttat actagatgta 30120

aactacccat ttgaagctca aggccaacta agtctaagag tgggccaggg tccgctgtat 30180

gtagattcta gcagccataa cctgaccatt agatgcctta gaggattata cataacatcg 30240

tctaataacc aaaccggtct agaggccaac ataaaactaa caaaaggcct tgtctatgat 30300

ggaaatgcca tagcagtcaa tgttggtcaa ggattgcaat acagcactac tgccacatcg 30360

gaaggtgtgt atcctataca gtctaagata ggtttgggaa tggaatatga taccaacgga 30420

gccatgatga caaaactagg ctctggacta agctttgaca attcaggagc cattgtagtg 30480

ggaaacaaaa atgatgacag gcttactctg tggactacac cagacccatc tcctaactgt 30540

agaatttatt ctgaaaaaga tactaaacta accttggtgc tgactaagtg tggcagccaa 30600

atcctaggca cagtatctgc ccttgctgtc agaggcagcc ttgcgcccat cactaatgca 30660

tccagcatag tccaaatatt tctaagattt gatgaaaatg gactattgat gagcaactca 30720

tcgctagacg gtgattactg gaattacaga aatggggact ccactaatag cacaccatat 30780

acaaatgcag taggctttat gcctaatcta gcagcctatc ctaaaggtca ggctacagct 30840

gcaaaaagca gtattgtaag ccaggtatac atggatggtg acactactaa acctataaca 30900

ctaaaaataa acttcaatgg cattgatgaa acaacagaaa ataccctgt tagtaaatat 30960

tccatgacat tctcatggag ctggcccacc gcaagctaca taggccacac ttttgcaaca 31020

aactctttta ctttctccta catcgcccaa gaataaagaa agcacagaga tgcttgtttt 31080

gatttcaaaa ttgtgtgctt ttatttattt tcagcttaca gtatttccag tagtcattcg 31140

aataaagctt aatcaaactg catgagaacc cttccacata gcttaaatta gcaccagtgc 31200

aaatggagaa aagcctcgag gtcgttgcgc ggccgggatc ggtgatcacc gatccagaca 31260

tgataagata cattgatgag tttggacaaa ccacaactag aatgcagtga aaaaaatgct 31320

ttatttgtga aatttgtgat gctattgctt tatttgtaac cattataagc tgcaataaac 31380

aagttcccgg atcgcgatcc ggcccgaggc tgtagccgac gatggtgcgc caggagagtt 31440

gttgattcat tgtttgcctc cctgctgcgg tttttcaccg aagttcatgc cagtccagcg 31500

tttttgcagc agaaaagccg ccgacttcgg tttgcggtcg cgagtgaaga tccctttctt 31560

gttaccgcca acgcgcaata tgccttgcga ggtcgcaaaa tcggcgaaat tccatacctg 31620

ttcaccgacg acggcgctga cgcgatcaaa gacgcggtga tacatatcca gccatgcaca 31680

ctgatactct tcactccaca tgtcggtgta cattgagtgc agcccggcta acgtatccac 31740

gccgtattcg gtgatgataa tcggctgatg cagtttctcc tgccaggcca gaagttcttt 31800

ttccagtacc ttctctgccg tttccaaatc gccgctttgg acataccatc cgtaataacg 31860

gttcaggcac agcacatcaa agagatcgct gatggtatcg gtgtgagcgt cgcagaacat 31920

tacattgacg caggtgatcg gacgcgtcgg gtcgagttta cgcgttgctt ccgccagtgg 31980

cgcgaaatat tcccgtgcac cttgcggacg ggtatccggt tcgttggcaa tactccacat 32040

caccacgctt gggtggtttt tgtcacgcgc tatcagctct ttaatcgcct gtaagtgcgc 32100

ttgctgagtt tccccgttga ctgcctcttc gctgtacagt tctttcggct tgttgcccgc 32160

ttcgaaacca atgcctaaag agaggttaaa gccgacagca gcagtttcat caatcaccac 32220

gatgccatgt tcatctgccc agtcgagcat ctcttcagcg taagggtaat gcgaggtacg 32280

gtaggagttg gccccaatcc agtccattaa tgcgtggtcg tgcaccatca gcacgttatc 32340

gaatcctttg ccacgcaagt ccgcatcttc atgacgacca aagccagtaa agtagaacgg 32400

tttgtggtta atcaggaact gttcgccctt cactgccact gaccggatgc cgacgcgaag 32460

cgggtagata tcacactctg tctggctttt ggctgtgacg cacagttcat agagataacc 32520

ttcacccggt tgccagaggt gcggattcac cacttgcaaa gtcccgctag tgccttgtcc 32580

agttgcaacc acctgttgat ccgcatcacg cagttcaacg ctgacatcac cattggccac 32640

cacctgccag tcaacagacg cgtggttaca gtcttgcgcg acatgcgtca ccacggtgat 32700

atcgtccacc caggtgttcg gcgtggtg 32728

<210> 26
<211> 114
<212> DNA
<213> Artificial sequence

<220>
<223> IL-2 core promoter

<400> 26
acattttgac acccccataa tatttttcca gaattaacag tataaattgc atctcttgtt 60

caagagttcc ctatcactct ctttaatcac tactcacagt aacctcaact cctg 114

<210> 27
<211> 55
<212> DNA
<213> Artificial sequence

<220>
<223> IL-2 minimal promoter

<400> 27
tcaagagttc cctatcactc tctttaatca ctactcacag taacctcaac tcctg 55

<210> 28
<211> 380
<212> DNA
<213> Artificial sequence

<220>
<223> IL-2 enhancer and promoter variant

<400> 28
tgatatcttt tctgagttac ttttgtatcc ccacccccct aaagaaagga ggaaaaactg 60

tttcatacag aaggcgttaa ttgcatgaat tagagctatc acctaagtgt gggctaatgt 120

aacaaagagg gatttcacct acatccattc agtcagtctt tgggggttta aagaaattcc 180

aaagagtcat cagaagagga aaaatgaagg taatgttttt tcagactggt aaagtctttg 240

aaaatatgtg taatatgtaa aacattttga cacccccata atatttttcc agaattaaca 300

gtataaattg catctcttgt tcaagagttc cctatcactc tctttaatca ctactcacag 360

taacctcaac tcctgccaca 380

<210> 29
<211> 373
<212> DNA
<213> Artificial sequence

<220>
<223> L-2 enhancer and promoter variant

<400> 29
ttttctgagt tacttttgta tccccacccc cttaaagaaa ggaggaaaaa ctgtttcata 60

cagaaggcgt taattgcatg aattagagct atcacctaag tgtgggctaa tgtaacaaag 120

agggatttca cctacatcca ttcagtcagt ctttgggggt ttaaagaaat tccaaagagt 180

catcagaaga ggaaaaatga aggtaatgtt ttttcagact ggtaaagtct ttgaaaatat 240

gtgtaatatg taaaacattt tgacaccccc ataatatttt tccagaatta acagtataaa 300

ttgcatctct tgttcaagag ttccctatca ctctctttaa tcactactca cagtaacctc 360

aactcctgcc aca 373

<210> 30
<211> 161
<212> DNA
<213> Artificial sequence

<220>
<223> (NF-?B)1-IL2 promoter variant

<400> 30
aattggtccc atcgaagagg gatttcacct acataattgg tcccgggaca ttttgacacc 60

cccataatat ttttccagaa ttaacagtat aaattgcatc tcttgttcaa gagttcccta 120

tcactctctt taatcactac tcacagtaac ctcaactcct g 161

<210> 31
<211> 201
<212> DNA
<213> Artificial sequence

<220>
<223> (NF-?B)3-IL2 promoter variant

<400> 31
aattggtccc atcgaagagg gatttcacct acataagagg gatttcacct acataagagg 60

gatttcacct acataattgg tcccgggaca ttttgacacc cccataatat ttttccagaa 120

ttaacagtat aaattgcatc tcttgttcaa gagttcccta tcactctctt taatcactac 180

tcacagtaac ctcaactcct g 201

<210> 32
<211> 268
<212> DNA
<213> Artificial sequence

<220>
<223> (NF-?B)6-IL2 promoter variant

<400> 32
aattggtccc atcgaagagg gatttcacct acataagagg gatttcacct acataagagg 60

gatttcacct acataattgg taagagggat ttcacctaca taagagggat ttcacctaca 120

taagagggat ttcacctaca taattggtcc cgggacattt tgacaccccc ataatatttt 180

tccagaatta acagtataaa ttgcatctct tgttcaagag ttccctatca ctctctttaa 240

tcactactca cagtaacctc aactcctg 268

<210> 33
<211> 177
<212> DNA
<213> Artificial sequence

<220>
<223> 1X NFAT response elements-IL2 promoter variant

<400> 33
aattggtccc atcgaattag gaggaaaaac tgtttcatac agaaggcgtc aattggtccc 60

gggacatttt gacaccccca taatattttt ccagaattaa cagtataaat tgcatctctt 120

gttcaagagt tccctatcac tctctttaat cactactcac agtaacctca actcctg 177

<210> 34
<211> 256
<212> DNA
<213> Artificial sequence

<220>
<223> 3X NFAT response elements-IL2 promoter variant

<400> 34
tgatatcaat tggtcccatc gaattaggag gaaaaactgt ttcatacaga aggcgtcaat 60

taggaggaaa aactgtttca tacagaaggc gtcaattagg aggaaaaact gtttcataca 120

gaaggcgtca attggtcccg ggacattttg acacccccat aatatttttc cagaattaac 180

agtataaatt gcatctcttg ttcaagagtt ccctatcact ctctttaatc actactcaca 240

gtaacctcaa ctcctg 256

<210> 35
<211> 249
<212> DNA
<213> Artificial sequence

<220>
<223> 3X NFAT response elements-IL2 promoter variant

<400> 35
aattggtccc atcgaattag gaggaaaaac tgtttcatac agaaggcgtc aattaggagg 60

aaaaactgtt tcatacagaa ggcgtcaatt aggaggaaaa actgtttcat acagaaggcg 120

tcaattggtc ccgggacatt ttgacacccc cataatattt ttccagaatt aacagtataa 180

attgcatctc ttgttcaaga gttccctatc actctcttta atcactactc acagtaacct 240

caactcctg 249

<210> 36
<211> 358
<212> DNA
<213> Artificial sequence

<220>
<223> 6X NFAT response elements-IL2 promoter variant

<400> 36
gaattaggag gaaaaactgt ttcatacaga aggcgtcaat taggaggaaa aactgtttca 60

tacagaaggc gtcaattagg aggaaaaact gtttcataca gaaggcgtca attggtccca 120

tcgaattagg aggaaaaact gtttcataca gaaggcgtca attaggagga aaaactgttt 180

catacagaag gcgtcaatta ggaggaaaaa ctgtttcata cagaaggcgt caattggtcc 240

cgggacattt tgacaccccc ataatatttt tccagaatta acagtataaa ttgcatctct 300

tgttcaagag ttccctatca ctctccttaa tcactactca cagtaacctc aactcctg 358

<210> 37
<211> 374
<212> DNA
<213> Artificial sequence

<220>
<223> 6X NFAT response elements-IL2 promoter variant

<400> 37
tgatatcgaa ttaggaggaa aaactgtttc atacagaagg cgtcaattag gaggaaaaac 60

tgtttcatac agaaggcgtc aattaggagg aaaaactgtt tcatacagaa ggcgtcaatt 120

ggtcccatcg aattaggagg aaaaactgtt tcatacagaa ggcgtcaatt aggaggaaaa 180

actgtttcat acagaaggcg tcaattagga ggaaaaactg tttcatacag aaggcgtcaa 240

ttggtcccgg gacattttga cacccccata tatttttcc agaattaaca gtataaattg 300

catctcttgt tcaagagttc cctatcactc tctttaatca ctactcacag taacctcaac 360

tcctgaattc catg 374

<210> 38
<211> 358
<212> DNA
<213> Artificial sequence

<220>
<223> 6X NFAT response elements-IL2 promoter variant

<400> 38
gaattaggag gaaaaactgt ttcatacaga aggcgtcaat taggaggaaa aactgtttca 60

tacagaaggc gtcaattagg aggaaaaact gtttcataca gaaggcgtca attggtccca 120

tcgaattagg aggaaaaact gtttcataca gaaggcgtca attaggagga aaaactgttt 180

catacagaag gcgtcaatta ggaggaaaaa ctgtttcata cagaaggcgt caattggtcc 240

cgggacattt tgacaccccc ataatatttt tccagaatta acagtataaa ttgcatctct 300

tgttcaagag ttccctatca ctctctttaa tcactactca cagtaacctc aactcctg 358

<210> 39
<211> 365
<212> DNA
<213> Artificial sequence

<220>
<223> 6X NFAT response elements-IL2 promoter variant

<400> 39
tgatatcgaa ttaggaggaa aaactgtttc atacagaagg cgtcaattag gaggaaaaac 60

tgtttcatac agaaggcgtc aattaggagg aaaaactgtt tcatacagaa ggcgtcaatt 120

ggtcccatcg aattaggagg aaaaactgtt tcatacagaa ggcgtcaatt aggaggaaaa 180

actgtttcat acagaaggcg tcaattagga ggaaaaactg tttcatacag aaggcgtcaa 240

ttggtcccgg gacattttga cacccccata atatttttcc agaattaaca gtataaattg 300

catctcttgt tcaagagttc cctatcactc tctttaatca ctactcacag taacctcaac 360

tcctg 365

<210> 40
<211> 244
<212> DNA
<213> Artificial sequence

<220>
<223> human EEF1A1 promoter variant

<400> 40
gagcgtgcgt gaggctccgg tgcccgtcag tgggcagagc gcacatcgcc cacagtcccc 60

gagaagttgg ggggaggggg tcggcgattg aaccggtgcc tagagaaggt ggcgcggggt 120

aaactgggaa agtgatgtcg tgtactggct ccgccttttt cccgagggtg ggggagaacc 180

gtatataagt gcagtagtcg ccgtgaacgt tcttttcgc aacgggtttg ccgccagaac 240

acag 244

<210> 41
<211> 236

<212> DNA
<213> Artificial sequence

<220>
<223> human EEF1A1 promoter variant

<400> 41
gcgtgaggct ccggtgcccg tcagtgggca gagcgcacat cgcccacagt ccccgagaag 60

ttgggggggag gggtcggcaa ttgaaccggt gcctagagaa ggtggcgcgg ggtaaactgg 120

gaaagtgatg tcgtgtactg gctccgcctt tttcccgagg gtgggggaga accgtatata 180

agtgcagtag tcgccgtgaa cgttcttttt cgcaacgggt ttgccgccag aacaca 236

<210> 42
<211> 1266
<212> DNA
<213> Artificial sequence

<220>
<223> human EEF1A1 promoter and enhancer

<400> 42
gagctttgca aagatggata aagttttaaa cagagaggaa tctttgcagc taatggacct 60

tctaggtctt gaaaggagtg ggaattggct ccggtgcccg tcagtgggca gagcgcacat 120

cgcccacagt ccccgagaag ttgggggggag gggtcggcaa ttgaaccggt gcctagagaa 180

ggtggcgcgg ggtaaactgg gaaagtgatg tcgtgtactg gctccgcctt tttcccgagg 240

gtgggggaga accgtatata agtgcagtag tcgccgtgaa cgttcttttt cgcaacgggt 300

ttgccgccag aacacaggta agtgccgtgt gtggttcccg cgggcctggc ctctttacgg 360

gttatggccc ttgcgtgcct tgaattactt ccacctggct gcagtacgtg attcttgatc 420

ccgagcttcg ggttggaagt gggtgggaga gttcgaggcc ttgcgcttaa ggagcccctt 480

cgcctcgtgc ttgagttgag gcctggcctg ggcgctgggg ccgccgcgtg cgaatctggt 540

ggcaccttcg cgcctgtctc gctgctttcg ataagtctct agccatttaa aatttttgat 600

gacctgctgc gacgcttttt ttctggcaag atagtcttgt aaatgcgggc caagatctgc 660

acactggtat ttcggttttt ggggccgcgg gcggcgacgg ggcccgtgcg tcccagcgca 720

catgttcggc gaggcggggc ctgcgagcgc ggccaccgag aatcggacgg gggtagtctc 780

aagctggccg gcctgctctg gtgcctggcc tcgcgccgcc gtgtatcgcc ccgccctggg 840

cggcaaggct ggcccggtcg gcaccagttg cgtgagcgga aagatggccg cttcccggcc 900

ctgctgcagg gagctcaaaa tggaggacgc ggcgctcggg agagcgggcg ggtgagtcac 960

ccacacaaag gaaaagggcc tttccgtcct cagccgtcgc ttcatgtgac tccacggagt 1020

accgggcgcc gtccaggcac ctcgattagt tctcgagctt ttggagtacg tcgtctttag 1080

gttgggggga ggggttttat gcgatggagt ttccccacac tgagtgggtg gagactgaag 1140

ttaggccagc ttggcacttg atgtaattct ccttggaatt tgccctttt gagtttggat 1200

cttggttcat tctcaagcct cagacagtgg ttcaaagttt ttttcttcca tttcaggtgt 1260

cgtgag 1266

<210> 43
<211> 571
<212> DNA
<213> Artificial sequence

<220>
<223> human UBC promoter

<400> 43
ggcctccgcg ccgggttttg gcgcctcccg cgggcgcccc cctcctcacg gcgagcgctg 60

ccacgtcaga cgaagggcgc agcgagcgtc ctgatccttc cgcccggacg ctcaggacag 120

cggcccgctg ctcataagac tcggccttag aaccccagta tcagcagaag gacattttag 180

gacgggactt gggtgactct agggcactgg ttttctttcc agagagcgga acaggcgagg 240

aaaagtagtc ccttctcggc gattctgcgg agggatctcc gtggggcggt gaacgccgat 300

gattatataa ggacgcgccg ggtgtggcac agctagttcc gtcgcagccg ggatttgggt 360

cgcggttctt gtttgtggat cgctgtgatc gtcacttggt gagtagcggg ctgctgggct 420

gggtacgtgc gctcggggtt ggcgagtgtg ttttgtgaag ttttttaggc acctttgaa 480

atgtaatcat ttgggtcaat atgtaatttt cagtgttaga ctagtaaatt gtccgctaaa 540

ttctggccgt ttttggcttt tttgttagac g 571

<210> 44
<211> 81
<212> DNA
<213> Artificial sequence

<220>

<223> synthetic minimal promoter 1

<400> 44
aggtctatat aagcagagct cgtttagtga accctcattc tggagacgga tcccgagccg 60

agtgttttga cctccataga a 81

<210> 45
<211> 151
<212> PRT
<213> Artificial sequence

<220>
<223> HPV antigen design 1 HPV16 E6 amino acids

<400> 45

Met Phe Gln Asp Pro Gln Glu Arg Pro Arg Lys Leu Pro Gln Leu Cys
1 5 10 15

Thr Ala Leu Gln Thr Thr Ile His Asp Ile Ile Leu Glu Cys Val Tyr
20 25 30

Cys Lys Gln Gln Leu Leu Arg Arg Glu Val Tyr Asp Phe Ala Phe Arg
35 40 45

Asp Gly Cys Ile Val Tyr Arg Asp Gly Asn Pro Tyr Ala Val Cys Asp
50 55 60

Lys Cys Leu Lys Phe Tyr Ser Lys Ile Ser Glu Tyr Arg His Tyr Cys
65 70 75 80

Tyr Ser Leu Tyr Gly Thr Thr Leu Glu Gln Gln Tyr Asn Lys Pro Leu
85 90 95

Cys Asp Leu Leu Ile Arg Cys Ile Asn Cys Gln Lys Pro Leu Cys Pro
100 105 110

Glu Glu Lys Gln Arg His Leu Asp Lys Lys Gln Arg Phe His Asn Ile
115 120 125

Arg Gly Arg Trp Thr Gly Arg Cys Met Ser Cys Cys Arg Ser Ser Arg
130 135 140

Thr Arg Arg Ala Ala Ala Ala
145 150

<210> 46
<211> 98
<212> PRT
<213> Artificial sequence

<220>
<223> HPV antigen design 1 HPV16 E7 amino acids

<400> 46

Met Pro Gly Asp Thr Pro Thr Leu His Glu Tyr Met Leu Asp Leu Gln
1 5 10 15

Pro Glu Thr Thr Asp Leu Tyr Gly Tyr Glu Gln Leu Asn Asp Ser Ser
20 25 30

Glu Glu Glu Asp Glu Ile Asp Gly Pro Ala Gly Gln Ala Ala Pro Asp
35 40 45

Arg Ala His Tyr Asn Ile Val Thr Phe Cys Cys Lys Cys Asp Ser Thr
50 55 60

Leu Arg Arg Cys Val Gln Ser Thr His Val Asp Ile Arg Thr Leu Glu
65 70 75 80

Asp Leu Leu Met Gly Thr Leu Gly Ile Val Cys Pro Ile Cys Ser Gln
85 90 95

Lys Pro

<210> 47
<211> 58
<212> PRT
<213> Artificial sequence

<220>
<223> HPV antigen design 1 HPV16 E5 amino acids

<400> 47

```
Met Thr Asn Leu Asp Thr Ala Ser Thr Thr Leu Leu Ala Cys Phe Leu
1               5                   10                  15


Leu Cys Phe Cys Val Leu Leu Cys Val Cys Leu Leu Ile Arg Pro Leu
            20                  25                  30


Leu Leu Ser Val Ser Thr Tyr Thr Arg Cys Phe Ile Val Tyr Ile Ile
        35                  40                  45


Phe Val Tyr Ile Pro Leu Phe Leu Ile His
    50                  55


<210>  48
<211>  120
<212>  PRT
<213>  Artificial sequence

<220>
<223>  HPV antigen design 1 HPV18 E6 amino acids

<400>  48

Met Ala Arg Phe Glu Asp Pro Thr Arg Arg Pro Tyr Lys Leu Pro Asp
1               5                   10                  15


Leu Cys Thr Ala Leu Asn Thr Ser Leu Gln Asp Ile Glu Ile Thr Cys
            20                  25                  30


Val Tyr Cys Lys Thr Val Leu Glu Leu Thr Glu Val Phe Glu Phe Ala
        35                  40                  45


Phe Lys Asp Gly Phe Val Val Tyr Arg Asp Ser Ile Pro His Ala Ala
    50                  55                  60


Cys His Lys Cys Ile Asp Phe Tyr Ser Arg Ile Arg Glu Leu Arg His
65                  70                  75                  80


Tyr Ser Asp Ser Val Tyr Gly Asp Thr Leu Glu Lys Leu Thr Asn Thr
                85                  90                  95


Gly Leu Tyr Asn Leu Leu Ile Arg Cys Leu Arg Cys Gln Lys Pro Leu
            100                 105                 110
```

Asn Pro Ala Glu Lys Leu Arg His
        115   120

<210> 49
<211> 66
<212> PRT
<213> Artificial sequence

<220>
<223> HPV antigen design 1 HPV18 E7 amino acids

<400> 49

Glu Ile Asp Gly Val Asn His Gln His Leu Pro Ala Arg Arg Ala Ala
1   5   10   15

Pro Gln Arg His Thr Met Leu Cys Met Cys Cys Lys Cys Glu Ala Arg
            20   25   30

Ile Glu Arg Val Val Glu Ser Ser Ala Asp Asp Leu Arg Ala Phe Gln
        35   40   45

Gln Leu Phe Leu Asn Thr Leu Ser Phe Val Cys Pro Trp Cys Ala Ser
    50   55   60

Gln Gln
65

<210> 50
<211> 53
<212> PRT
<213> Artificial sequence

<220>
<223> HPV antigen design 1 HPV18 E5 amino acids

<400> 50

Met Leu Ser Leu Ile Phe Leu Phe Cys Phe Cys Val Cys Met Tyr Val
1   5   10   15

Cys Cys His Val Pro Leu Leu Pro Ser Val Val Val Ile Thr Ser Pro
            20   25   30

```
Ala Thr Ala Phe Thr Val Tyr Leu Leu Pro Met Leu Leu Leu His Ile
        35                  40                  45


His Ala Ile Leu Ser
    50


<210>  51
<211>  547
<212>  PRT
<213>  Artificial sequence

<220>
<223>  HPV antigen design 1 amino acids

<400>  51

Met Met Phe Gln Asp Pro Gln Glu Arg Pro Arg Lys Leu Pro Gln Leu
1               5                   10                  15


Cys Thr Ala Leu Gln Thr Thr Ile His Asp Ile Ile Leu Glu Cys Val
            20                  25                  30


Tyr Cys Lys Gln Gln Leu Leu Arg Arg Glu Val Tyr Asp Phe Ala Phe
        35                  40                  45


Arg Asp Gly Cys Ile Val Tyr Arg Asp Gly Asn Pro Tyr Ala Val Cys
    50                  55                  60


Asp Lys Cys Leu Lys Phe Tyr Ser Lys Ile Ser Glu Tyr Arg His Tyr
65                  70                  75                  80


Cys Tyr Ser Leu Tyr Gly Thr Thr Leu Glu Gln Gln Tyr Asn Lys Pro
                85                  90                  95


Leu Cys Asp Leu Leu Ile Arg Cys Ile Asn Cys Gln Lys Pro Leu Cys
            100                 105                 110


Pro Glu Glu Lys Gln Arg His Leu Asp Lys Lys Gln Arg Phe His Asn
        115                 120                 125


Ile Arg Gly Arg Trp Thr Gly Arg Cys Met Ser Cys Cys Arg Ser Ser
    130                 135                 140
```

```
Arg Thr Arg Arg Ala Ala Ala Ala Met Pro Gly Asp Thr Pro Thr Leu
145                 150                 155                 160

His Glu Tyr Met Leu Asp Leu Gln Pro Glu Thr Thr Asp Leu Tyr Gly
                165                 170                 175

Tyr Glu Gln Leu Asn Asp Ser Ser Glu Glu Glu Asp Glu Ile Asp Gly
            180                 185                 190

Pro Ala Gly Gln Ala Ala Pro Asp Arg Ala His Tyr Asn Ile Val Thr
        195                 200                 205

Phe Cys Cys Lys Cys Asp Ser Thr Leu Arg Arg Cys Val Gln Ser Thr
    210                 215                 220

His Val Asp Ile Arg Thr Leu Glu Asp Leu Leu Met Gly Thr Leu Gly
225                 230                 235                 240

Ile Val Cys Pro Ile Cys Ser Gln Lys Pro Met Thr Asn Leu Asp Thr
                245                 250                 255

Ala Ser Thr Thr Leu Leu Ala Cys Phe Leu Leu Cys Phe Cys Val Leu
            260                 265                 270

Leu Cys Val Cys Leu Leu Ile Arg Pro Leu Leu Leu Ser Val Ser Thr
        275                 280                 285

Tyr Thr Arg Cys Phe Ile Val Tyr Ile Ile Phe Val Tyr Ile Pro Leu
    290                 295                 300

Phe Leu Ile His Met Ala Arg Phe Glu Asp Pro Thr Arg Arg Pro Tyr
305                 310                 315                 320

Lys Leu Pro Asp Leu Cys Thr Ala Leu Asn Thr Ser Leu Gln Asp Ile
                325                 330                 335

Glu Ile Thr Cys Val Tyr Cys Lys Thr Val Leu Glu Leu Thr Glu Val
            340                 345                 350
```

```
Phe Glu Phe Ala Phe Lys Asp Gly Phe Val Val Tyr Arg Asp Ser Ile
        355                 360                 365

Pro His Ala Ala Cys His Lys Cys Ile Asp Phe Tyr Ser Arg Ile Arg
    370                 375                 380

Glu Leu Arg His Tyr Ser Asp Ser Val Tyr Gly Asp Thr Leu Glu Lys
385                 390                 395                 400

Leu Thr Asn Thr Gly Leu Tyr Asn Leu Leu Ile Arg Cys Leu Arg Cys
                405                 410                 415

Gln Lys Pro Leu Asn Pro Ala Glu Lys Leu Arg His Glu Ile Asp Gly
            420                 425                 430

Val Asn His Gln His Leu Pro Ala Arg Arg Ala Ala Pro Gln Arg His
        435                 440                 445

Thr Met Leu Cys Met Cys Cys Lys Cys Glu Ala Arg Ile Glu Arg Val
    450                 455                 460

Val Glu Ser Ser Ala Asp Asp Leu Arg Ala Phe Gln Gln Leu Phe Leu
465                 470                 475                 480

Asn Thr Leu Ser Phe Val Cys Pro Trp Cys Ala Ser Gln Gln Met Leu
                485                 490                 495

Ser Leu Ile Phe Leu Phe Cys Phe Cys Val Cys Met Tyr Val Cys Cys
            500                 505                 510

His Val Pro Leu Leu Pro Ser Val Val Val Ile Thr Ser Pro Ala Thr
        515                 520                 525

Ala Phe Thr Val Tyr Leu Leu Pro Met Leu Leu Leu His Ile His Ala
    530                 535                 540

Ile Leu Ser
545
```

<210> 52

<211> 563
<212> PRT
<213> Artificial sequence

<220>
<223> HPV antigen design 2 amino acids

<400> 52

Met Gln Thr Asp Arg Thr Gly Glu Thr Ala Leu His Leu Ala Ala Arg
1 5 10 15

Tyr Ser Arg Ser Asp His Leu Asp Lys Lys Gln Arg Phe His Asn Ile
20 25 30

Ala Asp Ala Arg Trp Thr Gly Arg Cys Met Ser Cys Cys Asp Asn Met
35 40 45

Thr Thr Leu Glu Gln Gln Tyr Asn Lys Pro Leu Cys Asp Leu Leu Pro
50 55 60

Leu His Ala Ala Val Ser Ala Asp Ile Ser Glu Tyr Arg His Tyr Cys
65 70 75 80

Tyr Arg Asn Arg Ala Thr Asp Leu Val Tyr Asp Phe Ala Phe Arg Asp
85 90 95

Leu Met His Asp Thr Ile His Asp Ile Ile Leu Glu Cys Val Pro Leu
100 105 110

Ile Leu Ala Ala Arg Leu Ala Val Lys Leu Pro Gln Leu Cys Thr Glu
115 120 125

Leu Ser His Ala Asp Val Phe Ala Phe Arg Asp Leu Cys Ile Val Tyr
130 135 140

Asp Asp Leu Leu Cys Ile Val Tyr Arg Asp Gly Asn Pro Tyr Ala Val
145 150 155 160

Cys Asp Ala Leu His Trp Ala Ala Ala Val Asn Asn Val Leu Cys Val
165 170 175

```
Gln Ser Thr His Val Asp Ile Gly Ala Asn Lys Arg Thr Leu Glu Asp
            180                 185                 190

Leu Leu Met Gly Thr Asn Asn Arg Thr Leu Gly Ile Val Cys Pro Ile
        195                 200                 205

Pro Leu Phe Leu Ala Ala Arg Glu Gly Ser Tyr Glu Leu Leu Met Gly
    210                 215                 220

Thr Leu Gly Ile Val Ala Asn Arg Thr Leu His Glu Tyr Met Leu Asp
225                 230                 235                 240

Leu Asp His Met Ala His Tyr Asn Ile Val Thr Phe Cys Cys Pro Arg
                245                 250                 255

Asp Tyr Met Leu Asp Leu Gln Pro Glu Thr Thr Ile Val Arg Leu Leu
            260                 265                 270

Asp Leu Glu Val Ser Gln Thr Ser Lys Leu Thr Arg Gln Thr Asp Arg
        275                 280                 285

Thr Gly Glu Thr Ala Leu His Leu Ala Ala Arg Tyr Ser Arg Ser Asp
    290                 295                 300

Cys Asp Ser Thr Leu Arg Leu Cys Val Ala Asp Ala Lys Leu Thr Asn
305                 310                 315                 320

Thr Gly Leu Tyr Asn Leu Asp Asn Met Lys Cys Ile Asp Phe Tyr Ser
                325                 330                 335

Arg Ile Pro Leu His Ala Ala Val Ser Ala Asp Phe Ala Phe Lys Asp
            340                 345                 350

Leu Phe Val Val Arg Asn Arg Ala Thr Asp Leu Asn Leu Leu Ile Arg
        355                 360                 365

Cys Leu Arg Cys Met His Asp Lys Leu Pro Asp Leu Cys Thr Glu Leu
    370                 375                 380

Pro Leu Ile Leu Ala Ala Arg Leu Ala Val Glu Leu Thr Glu Val Phe
```

385 390 395 400

Glu Phe Ala Ser His Ala Asp Val Ser Leu Gln Asp Ile Glu Ile Thr
405 410 415

Cys Val Asp Asp Leu Lys Thr Val Leu Glu Leu Thr Glu Val Leu His
420 425 430

Trp Ala Ala Ala Val Asn Asn Val Asp Asp Leu Arg Ala Phe Gln Gln
435 440 445

Leu Phe Leu Asn Thr Leu Ser Gly Ala Asn Lys Phe Gln Gln Leu Phe
450 455 460

Leu Asn Thr Leu Asn Asn Arg Gln Leu Phe Leu Asn Thr Leu Ser Phe
465 470 475 480

Val Pro Leu Phe Leu Ala Ala Arg Glu Gly Ser Tyr Glu Leu Phe Leu
485 490 495

Asn Thr Leu Ser Phe Val Cys Pro Trp Cys Ala Ser Ala Asn Arg Thr
500 505 510

Leu Gln Asp Ile Val Leu His Leu Asp His Met Ser Glu Glu Glu Asn
515 520 525

Asp Glu Ile Asp Gly Val Asn His Gln His Leu Pro Ala Arg Arg Pro
530 535 540

Arg Asp Tyr Ile Ile Phe Val Tyr Ile Pro Leu Ile Val Arg Leu Leu
545 550 555 560

Asp Leu Glu

<210> 53
<211> 605
<212> PRT
<213> Artificial sequence

<220>

<223> HPV antigen design 3 amino acids

<400> 53

```
Met Lys Leu Pro Gln Leu Cys Thr Glu Val Met Phe Gln Asp Pro Gln
1               5                  10                  15


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


Ile His Asp Ile Ile Leu Glu Cys Val Tyr Cys Lys Gln Gln Leu Leu
        35                  40                  45


Arg Arg Glu Val Tyr Asp Phe Ala Phe Arg Asp Gly Cys Ile Val Tyr
    50                  55                  60


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


Ser Lys Ile Ser Glu Tyr Arg His Tyr Cys Tyr Ser Leu Tyr Gly Thr
                85                  90                  95


Thr Leu Glu Gln Gln Tyr Asn Lys Pro Leu Cys Asp Leu Leu Ile Arg
            100                 105                 110


Cys Ile Asn Cys Gln Lys Pro Leu Cys Pro Glu Glu Lys Gln Arg His
        115                 120                 125


Leu Asp Lys Lys Gln Arg Phe His Asn Ile Arg Gly Arg Trp Thr Gly
    130                 135                 140


Arg Cys Met Ser Cys Cys Arg Ser Ser Arg Thr Arg Arg Ala Ala Ala
145                 150                 155                 160


Ala Gln Leu Tyr Asn Lys Pro Leu Cys Asp Val Met Pro Gly Asp Thr
                165                 170                 175


Pro Thr Leu His Glu Tyr Met Leu Asp Leu Gln Pro Glu Thr Thr Asp
            180                 185                 190


Leu Tyr Gly Tyr Glu Gln Leu Asn Asp Ser Ser Glu Glu Glu Asp Glu
```

```
        195                 200                 205

Ile Asp Gly Pro Ala Gly Gln Ala Ala Pro Asp Arg Ala His Tyr Asn
    210                 215                 220

Ile Val Thr Phe Cys Cys Lys Cys Asp Ser Thr Leu Arg Arg Cys Val
225                 230                 235                 240

Gln Ser Thr His Val Asp Ile Arg Thr Leu Glu Asp Leu Leu Met Gly
                245                 250                 255

Thr Leu Gly Ile Val Cys Pro Ile Cys Ser Gln Lys Pro Arg Thr Leu
            260                 265                 270

Glu Asp Leu Leu Met Gly Val Met Thr Asn Leu Asp Thr Ala Ser Thr
        275                 280                 285

Thr Leu Leu Ala Cys Phe Leu Leu Cys Phe Cys Val Leu Leu Cys Val
    290                 295                 300

Cys Leu Leu Ile Arg Pro Leu Leu Leu Ser Val Ser Thr Tyr Thr Arg
305                 310                 315                 320

Cys Phe Ile Val Tyr Ile Ile Phe Val Tyr Ile Pro Leu Phe Leu Ile
                325                 330                 335

His Lys Leu Pro Asp Leu Cys Thr Glu Val Met Ala Arg Phe Glu Asp
            340                 345                 350

Pro Thr Arg Arg Pro Tyr Lys Leu Pro Asp Leu Cys Thr Ala Leu Asn
        355                 360                 365

Thr Ser Leu Gln Asp Ile Glu Ile Thr Cys Val Tyr Cys Lys Thr Val
    370                 375                 380

Leu Glu Leu Thr Glu Val Phe Glu Phe Ala Phe Lys Asp Gly Phe Val
385                 390                 395                 400

Val Tyr Arg Asp Ser Ile Pro His Ala Ala Cys His Lys Cys Ile Asp
                405                 410                 415
```

```
Phe Tyr Ser Arg Ile Arg Glu Leu Arg His Tyr Ser Asp Ser Val Tyr
            420                 425                 430

Gly Asp Thr Leu Glu Lys Leu Thr Asn Thr Gly Leu Tyr Asn Leu Leu
        435                 440                 445

Ile Arg Cys Leu Arg Cys Gln Lys Pro Leu Asn Pro Ala Glu Lys Leu
    450                 455                 460

Arg His Lys Leu Thr Asn Thr Gly Leu Tyr Asn Val Glu Ile Asp Gly
465                 470                 475                 480

Val Asn His Gln His Leu Pro Ala Arg Arg Ala Ala Pro Gln Arg His
                485                 490                 495

Thr Met Leu Cys Met Cys Cys Lys Cys Glu Ala Arg Ile Glu Arg Val
            500                 505                 510

Val Glu Ser Ser Ala Asp Asp Leu Arg Ala Phe Gln Gln Leu Phe Leu
        515                 520                 525

Asn Thr Leu Ser Phe Val Cys Pro Trp Cys Ala Ser Gln Gln Arg Ala
    530                 535                 540

Phe Gln Gln Leu Phe Leu Asn Val Met Leu Ser Leu Ile Phe Leu Phe
545                 550                 555                 560

Cys Phe Cys Val Cys Met Tyr Val Cys Cys His Val Pro Leu Leu Pro
                565                 570                 575

Ser Val Val Val Ile Thr Ser Pro Ala Thr Ala Phe Thr Val Tyr Leu
            580                 585                 590

Leu Pro Met Leu Leu Leu His Ile His Ala Ile Leu Ser
        595                 600                 605
```

<210> 54
<211> 572
<212> PRT

<213> Artificial sequence

<220>
<223> HPV antigen design 4 amino acids

<400> 54

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

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

Ala Lys Leu Pro Gln Leu Cys Thr Glu Val Asp Asn Met Leu Leu Met
35 40 45

Gly Thr Leu Gly Ile Val Pro Leu His Ala Ala Val Ser Ala Asp Thr
50 55 60

Leu His Glu Tyr Met Leu Asp Leu Arg Asn Arg Ala Thr Asp Leu Ser
65 70 75 80

Glu Glu Glu Asn Asp Glu Ile Asp Gly Val Asn His Gln His Leu Pro
85 90 95

Ala Arg Arg Met His Asp Asn Leu Leu Ile Arg Cys Leu Arg Cys Pro
100 105 110

Leu Ile Leu Ala Ala Arg Leu Ala Val Leu Phe Leu Asn Thr Leu Ser
115 120 125

Phe Val Cys Pro Trp Cys Ala Ser Ser His Ala Asp Val Lys Cys Ile
130 135 140

Asp Phe Tyr Ser Arg Ile Asp Asp Leu Lys Leu Pro Asp Leu Cys Thr
145 150 155 160

Glu Leu Ala Leu His Trp Ala Ala Ala Val Asn Asn Val Gln Leu Phe
165 170 175

Leu Asn Thr Leu Ser Phe Val Gly Ala Asn Lys Phe Gln Gln Leu Phe
180 185 190

```
Leu Asn Thr Leu Asn Asn Arg Val Tyr Asp Phe Ala Phe Arg Asp Leu
        195                 200                 205

Pro Leu Phe Leu Ala Ala Arg Glu Gly Ser Tyr Glu Lys Leu Thr Asn
    210                 215                 220

Thr Gly Leu Tyr Asn Leu Ala Asn Arg Leu Cys Ile Val Tyr Arg Asp
225                 230                 235                 240

Gly Asn Pro Tyr Ala Val Cys Asp Asp His Met Tyr Met Leu Asp Leu
                245                 250                 255

Gln Pro Glu Thr Thr Pro Arg Asp Phe Ala Phe Arg Asp Leu Cys Ile
            260                 265                 270

Val Tyr Ile Val Arg Leu Leu Asp Leu Glu Val Ser Gln Thr Ser Lys
        275                 280                 285

Leu Thr Arg Gln Thr Asp Arg Thr Leu Gly Ile Val Cys Pro Ile Ala
    290                 295                 300

Ala Arg Tyr Ser Arg Ser Asp Arg Thr Leu Glu Asp Leu Leu Met Gly
305                 310                 315                 320

Val Ala Asp Ala Thr Ile His Asp Ile Ile Leu Glu Cys Val Asp Asn
                325                 330                 335

Met His Leu Asp Lys Lys Gln Arg Phe His Asn Ile Pro Leu His Ala
            340                 345                 350

Ala Val Ser Ala Asp Thr Thr Leu Glu Gln Gln Tyr Asn Lys Pro Leu
        355                 360                 365

Cys Asp Leu Leu Arg Asn Arg Ala Thr Asp Leu Cys Asp Ser Thr Leu
    370                 375                 380

Arg Leu Cys Val Met His Asp Arg Trp Thr Gly Arg Cys Met Ser Cys
385                 390                 395                 400
```

```
Cys Pro Leu Ile Leu Ala Ala Arg Leu Ala Val Ser Leu Gln Asp Ile
                405                 410                 415

Glu Ile Thr Cys Val Ser His Ala Asp Val Leu Cys Val Gln Ser Thr
            420                 425                 430

His Val Asp Ile Asp Asp Leu Ala His Tyr Asn Ile Val Thr Phe Cys
        435                 440                 445

Cys Leu His Trp Ala Ala Ala Val Asn Asn Val Asp Asp Leu Arg Ala
    450                 455                 460

Phe Gln Gln Leu Phe Leu Asn Thr Leu Ser Gly Ala Asn Lys Ile Ser
465                 470                 475                 480

Glu Tyr Arg His Tyr Cys Tyr Asn Asn Arg Lys Leu Pro Gln Leu Cys
                485                 490                 495

Thr Glu Leu Pro Leu Phe Leu Ala Ala Arg Glu Gly Ser Tyr Glu Lys
            500                 505                 510

Thr Val Leu Glu Leu Thr Glu Val Ala Asn Arg Arg Thr Leu Glu Asp
        515                 520                 525

Leu Leu Met Gly Thr Asp His Met Phe Ala Phe Lys Asp Leu Phe Val
    530                 535                 540

Val Pro Arg Asp Gln Leu Tyr Asn Lys Pro Leu Cys Asp Val Ile Val
545                 550                 555                 560

Arg Thr Leu Gln Asp Ile Val Leu His Leu Leu Glu
                565                 570
```

<210> 55
<211> 436
<212> PRT
<213> Artificial sequence

<220>
<223> HPV antigen design 5 amino acids

<400> 55

Met Lys Lys Glu Leu Thr Glu Val Phe Glu Phe Ala Lys Lys Tyr Ile
1 5 10 15

Ile Phe Val Tyr Ile Pro Leu Lys Lys Lys Leu Pro Gln Leu Cys Thr
20 25 30

Glu Val Lys Lys Leu Leu Met Gly Thr Leu Gly Ile Val Lys Lys Thr
35 40 45

Leu His Glu Tyr Met Leu Asp Leu Lys Lys Ser Glu Glu Glu Asn Asp
50 55 60

Glu Ile Asp Gly Val Asn His Gln His Leu Pro Ala Arg Arg Lys Lys
65 70 75 80

Asn Leu Leu Ile Arg Cys Leu Arg Cys Lys Lys Leu Phe Leu Asn Thr
85 90 95

Leu Ser Phe Val Cys Pro Trp Cys Ala Ser Lys Lys Lys Cys Ile Asp
100 105 110

Phe Tyr Ser Arg Ile Lys Lys Lys Leu Pro Asp Leu Cys Thr Glu Leu
115 120 125

Lys Lys Gln Leu Phe Leu Asn Thr Leu Ser Phe Val Lys Lys Phe Gln
130 135 140

Gln Leu Phe Leu Asn Thr Leu Lys Lys Val Tyr Asp Phe Ala Phe Arg
145 150 155 160

Asp Leu Lys Lys Lys Leu Thr Asn Thr Gly Leu Tyr Asn Leu Lys Lys
165 170 175

Leu Cys Ile Val Tyr Arg Asp Gly Asn Pro Tyr Ala Val Cys Asp Lys
180 185 190

Lys Tyr Met Leu Asp Leu Gln Pro Glu Thr Thr Lys Lys Phe Ala Phe
195 200 205

```
Arg Asp Leu Cys Ile Val Tyr Lys Lys Thr Leu Gly Ile Val Cys Pro
    210                 215                 220

Ile Lys Lys Arg Thr Leu Glu Asp Leu Leu Met Gly Val Lys Lys Thr
225                 230                 235                 240

Ile His Asp Ile Ile Leu Glu Cys Val Lys Lys His Leu Asp Lys Lys
                245                 250                 255

Gln Arg Phe His Asn Ile Lys Lys Thr Thr Leu Glu Gln Gln Tyr Asn
            260                 265                 270

Lys Pro Leu Cys Asp Leu Leu Lys Lys Cys Asp Ser Thr Leu Arg Leu
        275                 280                 285

Cys Val Lys Lys Arg Trp Thr Gly Arg Cys Met Ser Cys Cys Lys Lys
    290                 295                 300

Ser Leu Gln Asp Ile Glu Ile Thr Cys Val Lys Lys Leu Cys Val Gln
305                 310                 315                 320

Ser Thr His Val Asp Ile Lys Lys Ala His Tyr Asn Ile Val Thr Phe
                325                 330                 335

Cys Cys Lys Lys Asp Asp Leu Arg Ala Phe Gln Gln Leu Phe Leu Asn
            340                 345                 350

Thr Leu Ser Lys Lys Ile Ser Glu Tyr Arg His Tyr Cys Tyr Lys Lys
        355                 360                 365

Lys Leu Pro Gln Leu Cys Thr Glu Leu Lys Lys Lys Thr Val Leu Glu
    370                 375                 380

Leu Thr Glu Val Lys Lys Arg Thr Leu Glu Asp Leu Leu Met Gly Thr
385                 390                 395                 400

Lys Lys Phe Ala Phe Lys Asp Leu Phe Val Val Lys Lys Gln Leu Tyr
                405                 410                 415
```

Asn Lys Pro Leu Cys Asp Val Lys Lys Thr Leu Gln Asp Ile Val Leu
420 425 430

His Leu Lys Lys
435

<210> 56
<211> 6380
<212> DNA
<213> Artificial sequence

<220>
<223> HPV antigen design 1 full nucleotide sequences of gorilla adenovirus shuttle plasmid

<400> 56
gacgaaaggg cctcgtgata cgcctatttt tataggttaa tgtcatgata ataatggttt 60

cttagacgtc aggtggcact tttcggggaa atgtgcgcgg aacccctatt tgtttatttt 120

tctaaataca ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat 180

aatattgaaa aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt 240

ttgcggcatt ttgccttcct gtttttgctc acccagaaac gctggtgaaa gtaaaagatg 300

ctgaagatca gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga 360

tccttgagag ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc 420

tatgtggcgc ggtattatcc cgtattgacg ccgggcaaga gcaactcggt cgccgcatac 480

actattctca gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg 540

gcatgacagt aagagaatta tgcagtgctg ccataaccat gagtgataac actgcggcca 600

acttacttct gacaacgatc ggaggaccga aggagctaac cgcttttttg cacaacatgg 660

gggatcatgt aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaacg 720

acgagcgtga caccacgatg cctgtagcaa tggcaacaac gttgcgcaaa ctattaactg 780

gcgaactact tactctagct tcccggcaac aattaataga ctggatggag gcggataaag 840

ttgcaggacc acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg 900

gagccggtga gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct 960

cccgtatcgt agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac 1020

agatcgctga gataggtgcc tcactgatta agcattggta actgtcagac caagtttact 1080

catatatact ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga 1140

tccttttga taatctcatg accaaaatcc cttaacgtga gttttcgttc cactgagcgt 1200

cagaccccgt agaaaagatc aaaggatctt cttgagatcc ttttttttctg cgcgtaatct 1260

gctgcttgca aacaaaaaaa ccaccgctac cagcggtggt ttgtttgccg gatcaagagc 1320

taccaactct ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgttc 1380

ttctagtgta gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc 1440

tcgctctgct aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg 1500

ggttggactc aagacgatag ttaccggata aggcgcagcg gtcgggctga acgggggggtt 1560

cgtgcacaca gcccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg 1620

agctatgaga aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg 1680

gcagggtcgg aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggtatcttt 1740

atagtcctgt cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag 1800

gggggcggag cctatggaaa aacgccagca acgcggcctt tttacggttc ctggccttttt 1860

gctggccttt tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta 1920

ttaccgcctt tgagtgagct gataccgctc gccgcagccg aacgaccgag cgcagcgagt 1980

cagtgagcga ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc gcgcgttggc 2040

cgattcatta atgcagctgg cacgacaggt ttcccgactg gaaagcgggc agtgagcgca 2100

acgcaattaa tgtgagttag ctcactcatt aggcacccca ggctttacac tttatgcttc 2160

cggctcgtat gttgtgtgga attgtgagcg gataacaatt tcacacagga aacagctatg 2220

accatgatta cgccaagctg ggtcaagtct tccagtttaa gcagcagagc ggtcagtttc 2280

tcatcccgag cagacgcgcg agaggccgcg ccgctcgcca ccaaagagct gtaaaggtcc 2340

gtagccatgc tgcgcgcggt cgcggcggcg gcggaggcgg cggcggaggt cgcggcgtcc 2400

agcggagttc ctcccacggt cgcgtaggcc attgtagacg aatttgaagg cagaacgggg 2460

cgtccatcca cgttggaacc catcacattc tgacgcactc cagcccagtg aggcatgcgc 2520

actgtcagat aggggctaaa gatgcttcca tcaaagctgt tgccggtgtc gctcatggcg 2580

gcggctgttg caagacaaaa cagagagacc cttagacccc caatttatac acgccccacc 2640

cttctagcca cgcccacctt acccacctca atcggtatcc tcatcgctag acccaaactc 2700

ggccctggtg caggccagca ccagatggtc aggcctctag ttattaatag taatcaatta 2760

cggggtcatt agttcatagc ccatatatgg agttccgcgt tacataactt acggtaaatg 2820

gcccgcctgg ctgaccgccc aacgaccccc gcccattgac gtcaataatg acgtatgttc 2880

ccatagtaac gccaataggg actttccatt gacgtcaatg ggtggagtat ttacggtaaa 2940

ctgcccactt ggcagtacat caagtgtatc atatgccaag tacgcccccc attgacgtca 3000

atgacggtaa atggcccgcc tggcattatg cccagtacat gaccttatgg gactttccta 3060

cttggcagta catctacgta ttagtcatcg ctattaccat ggtgatgcgg ttttggcagt 3120

acatcaatgg gcgtggatag cggtttgact cacggggatt tccaagtctc caccccattg 3180

acgtcaatgg gagtttgttt tggcaccaaa atcaacggga ctttccaaaa tgtcgtaaca 3240

actccgcccc attgacgcaa atgggcggta ggcgtgtacg gtgggaggtc tatataagca 3300

gagctctccc tatcagtgat agagatctcc ctatcagtga tagagatcgt cgacgagctc 3360

gtttagtgaa ccgtcagatc gcctggagac gccatccacg ctgttttgac ctccatagaa 3420

gacaccggga ccgatccagc ctccgcggcc gggaacggtg cattggaacg cggattcccc 3480

gtgccaagag tgacgtaagt accgcctata gagtctatag gcccaccccc ttggcttcac 3540

ttgaggtgtg gcaggcttga gatctggcca tacacttgag tgacaatgac atccactttg 3600

cctttctctc cacaggtgtc cactcccagg tccaactgca gccggatccg gtaccgccac 3660

catgatgttc caggatcctc aagaacggcc tcggaaacta cctcagctgt gtacagcctt 3720

acagacaaca atacatgata taatcctgga gtgcgtctac tgtaaacagc aactgttgcg 3780

tcgcgaggtc tatgatttcg ccttcaggga tggttgtatt gtatacagag acggcaatcc 3840

gtatgcagtg tgtgataagt gtctcaagtt ctatagcaaa atcagtgaat accggcacta 3900

ttgctatagc ctgtatggaa ctacactaga gcagcagtat aacaagccac tctgtgacct 3960

gctaattaga tgtatcaact gccagaagcc tctgtgcccc gaagagaagc agcggcacct 4020

tgacaagaag cagcggtttc ataatatcag agggaggtgg accgggcggt gtatgtcctg 4080

ctgccgcagc agcaggaccc gtcgggccgc ggcggcaatg ccaggggaca cgcccacact 4140

ccacgagtac atgctcgacc ttcagccgga aaccaccgat ctctacggct atgaacagtt 4200

gaacgacagc tccgaagagg aagatgagat cgacggccca gcaggacagg cggcccctga 4260

cagagcacac tacaatattg ttaccttctg ctgcaagtgc gacagcacgc tgcgccgatg 4320

cgtacaatct acgcatgtgg acattaggac ccttgaggat ctgcttatgg ggacactcgg 4380

aattgtttgt cccatatgca gtcagaaacc tatgaccaac ctagacaccg cgagcacgac 4440

tcttctggct tgcttcctgc tatgtttttg cgtgctgctt tgtgtttgcc tactcattcg 4500

gcccctgctg ctgtctgtga gcacgtacac gaggtgcttc attgtctata ttatcttcgt 4560

ttacataccg ctgttcctga ttcacatggc aagatttgaa gatcccacgc ggcggccata 4620

caaactccct gatctctgca cggcactgaa cacttcgttg caggacatag aaatcacttg 4680

cgtgtactgc aagactgtgc tagagctgac cgaggtgttt gagtttgcct tcaaggacgg 4740

ttttgtggtg tatcgggata gcatccccca tgccgcctgc cataaatgta ttgatttcta 4800

ttcgagaatt agagaactca ggcattattc cgactccgta tacggcgaca ccctagaaaa 4860

actgaccaac accggcttgt ataacctcct catccgctgc ctccgatgcc agaagccact 4920

taacccagcc gagaaattac gccacgagat cgacggggtc aaccatcagc acctgccggc 4980

cagacgagcc gcccctcagc gccataccat gctgtgcatg tgttgcaagt gcgaagccag 5040

gatcgaaagg gtggtggaat ctagcgctga cgacttaagg gcattccaac aactctttct 5100

taacaccctg agcttcgtgt gtccttggtg tgcttcccaa cagatgctta gtctgatttt 5160

tctgttttgc ttttgcgtgt gtatgtatgt ctgctgccac gtgcctctcc taccatctgt 5220

agtggtgatt acatcccccg cgactgcctt caccgtgtac ctgttgccaa tgctcctcct 5280

tcacatacac gccatcctga gctaagcggc cgctctcgag tctagctagt ctagactagc 5340

tagaaagatc cgggaacttg tttattgcag cttataatgg ttacaaataa agcaatagca 5400

tcacaaattt cacaaataaa gcatttttt cactgcattc tagttgtggt ttgtccaaac 5460

tcatcaatgt atcttatcat gtctggatcg gtgatcaccg atcccgatct gtcaaatgac 5520

ggtgacaata aaacggagac tttgacccgg aacgcggaaa ttcacgtaaa aaacacctgg 5580

gcgagtcctc cacgtaatcg gtcaaagtcc ctcggccctc ggtaaatatt acgcactatg 5640

actaacgccc tattattcag ttttcacttc cccgtttcac ttttcgcgcg aaaatggcca 5700

aatcttacat ggtcccgccc aaaattacta cgatatccgg tgaaaagcgc gcgaaaattg 5760

gcacttccgg aggtaggcgg cgctcatcaa aaacgtcaca ttttccgcga cggaagcttg 5820

catgtgagct cctcccactt gcaaatgcca cacttccgcc acacctccca accctactcg 5880

cgcgtcctac gtcacccgcc ccgcctctcc ccgcccacct cattatcata ttggccacaa 5940

tccaaaataa ggtatattat tgatgatggt ttaaacgccc aattcactgg ccgtcgtttt 6000

acaacgtcgt gactgggaaa accctggcgt tacccaactt aatcgccttg cagcacatcc 6060

ccctttcgcc agctggcgta atagcgaaga ggcccgcacc gatcgccctt cccaacagtt 6120

gcgcagcctg aatggcgaat ggcgcctgat gcggtatttt ctccttacgc atctgtgcgg 6180

tatttcacac cgcatatggt gcactctcag tacaatctgc tctgatgccg catagttaag 6240

ccagccccga cacccgccaa cacccgctga cgcgccctga cgggcttgtc tgctcccggc 6300

atccgcttac agacaagctg tgaccgtctc cgggagctgc atgtgtcaga ggttttcacc 6360

gtcatcaccg aaacgcgcga 6380

<210> 57
<211> 6428
<212> DNA
<213> Artificial sequence

<220>
<223> HPV antigen design 2 full nucleotide sequences of gorilla adenovirus shuttle plasmid

<400> 57
gacgaaaggg cctcgtgata cgcctatttt tataggttaa tgtcatgata ataatggttt 60

cttagacgtc aggtggcact tttcggggaa atgtgcgcgg aacccctatt tgtttatttt 120

tctaaataca ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat 180

aatattgaaa aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt 240

ttgcggcatt ttgccttcct gtttttgctc acccagaaac gctggtgaaa gtaaaagatg 300

ctgaagatca gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga 360

tccttgagag ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc 420

tatgtggcgc ggtattatcc cgtattgacg ccgggcaaga gcaactcggt cgccgcatac 480

actattctca gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg 540

gcatgacagt aagagaatta tgcagtgctg ccataaccat gagtgataac actgcggcca 600

acttacttct gacaacgatc ggaggaccga aggagctaac cgcttttttg cacaacatgg 660

gggatcatgt aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaacg 720

acgagcgtga caccacgatg cctgtagcaa tggcaacaac gttgcgcaaa ctattaactg 780

gcgaactact tactctagct tcccggcaac aattaataga ctggatggag gcggataaag 840

ttgcaggacc acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg 900

gagccggtga gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct 960

cccgtatcgt agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac 1020

agatcgctga gataggtgcc tcactgatta agcattggta actgtcagac caagtttact 1080

catatatact ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga 1140

tccttttga taatctcatg accaaaatcc cttaacgtga gttttcgttc cactgagcgt 1200

cagaccccgt agaaaagatc aaaggatctt cttgagatcc ttttttttctg cgcgtaatct 1260

gctgcttgca aacaaaaaaa ccaccgctac cagcggtggt ttgtttgccg gatcaagagc 1320

taccaactct ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgttc 1380

ttctagtgta gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc 1440

tcgctctgct aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg 1500

ggttggactc aagacgatag ttaccggata aggcgcagcg gtcgggctga acgggggggtt 1560

cgtgcacaca gcccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg 1620

agctatgaga aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg 1680

gcagggtcgg aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggtatcttt 1740

atagtcctgt cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag 1800

gggggcggag cctatggaaa aacgccagca acgcggcctt tttacggttc ctggcctttt 1860

gctggccttt tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta 1920

ttaccgcctt tgagtgagct gataccgctc gccgcagccg aacgaccgag cgcagcgagt 1980

cagtgagcga ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc gcgcgttggc 2040

cgattcatta atgcagctgg cacgacaggt ttcccgactg gaaagcgggc agtgagcgca 2100

acgcaattaa tgtgagttag ctcactcatt aggcacccca ggctttacac tttatgcttc 2160

cggctcgtat gttgtgtgga attgtgagcg gataacaatt tcacacagga aacagctatg 2220

accatgatta cgccaagctg ggtcaagtct tccagtttaa gcagcagagc ggtcagtttc 2280

tcatcccgag cagacgcgcg agaggccgcg ccgctcgcca ccaaagagct gtaaaggtcc 2340

gtagccatgc tgcgcgcggt cgcggcggcg gcggaggcgg cggcggaggt cgcggcgtcc 2400

agcggagttc ctcccacggt cgcgtaggcc attgtagacg aatttgaagg cagaacgggg 2460

cgtccatcca cgttggaacc catcacattc tgacgcactc cagcccagtg aggcatgcgc 2520

actgtcagat aggggctaaa gatgcttcca tcaaagctgt tgccggtgtc gctcatggcg 2580

gcggctgttg caagacaaaa cagagagacc cttagacccc caatttatac acgccccacc 2640

cttctagcca cgcccacctt acccacctca atcggtatcc tcatcgctag acccaaactc 2700

ggccctggtg caggccagca ccagatggtc aggcctctag ttattaatag taatcaatta 2760

cggggtcatt agttcatagc ccatatatgg agttccgcgt tacataactt acggtaaatg 2820

gcccgcctgg ctgaccgccc aacgaccccc gcccattgac gtcaataatg acgtatgttc 2880

ccatagtaac gccaataggg actttccatt gacgtcaatg ggtggagtat ttacggtaaa 2940

ctgcccactt ggcagtacat caagtgtatc atatgccaag tacgcccccc attgacgtca 3000

atgacggtaa atggcccgcc tggcattatg cccagtacat gaccttatgg gactttccta 3060

cttggcagta catctacgta ttagtcatcg ctattaccat ggtgatgcgg ttttggcagt 3120

acatcaatgg gcgtggatag cggtttgact cacggggatt tccaagtctc caccccattg 3180

acgtcaatgg gagtttgttt tggcaccaaa atcaacggga ctttccaaaa tgtcgtaaca 3240

actccgcccc attgacgcaa atgggcggta ggcgtgtacg gtgggaggtc tatataagca 3300

gagctctccc tatcagtgat agagatctcc ctatcagtga tagagatcgt cgacgagctc 3360

gtttagtgaa ccgtcagatc gcctggagac gccatccacg ctgttttgac ctccatagaa 3420

gacaccggga ccgatccagc ctccgcggcc gggaacggtg cattggaacg cggattcccc 3480

gtgccaagag tgacgtaagt accgcctata gagtctatag gcccaccccc ttggcttcac 3540

ttgaggtgtg gcaggcttga gatctggcca tacacttgag tgacaatgac atccactttg 3600

cctttctctc cacaggtgtc cactcccagg tccaactgca gccggatccg gtaccgccac 3660

catgcagact gatagaaccg gcgaaaccgc tctacacctt gccgcccgtt atagtcgaag 3720

cgaccacctc gataagaaac agcgattcca caacatcgca gacgcaagat ggaccgggcg 3780

gtgtatgtcc tgctgtgaca atatgacaac actggaacag cagtataaca agcccctgtg 3840

tgacctgttg cccctgcacg ccgccgtgtc agccgacata tccgagtatc ggcattactg 3900

ctaccggaac cgtgccaccg acctcgtgta cgactttgca tttagagacc tgatgcacga 3960

taccatccat gacatcatcc tggaatgtgt cccactgatc ctggctgctc ggcttgcagt 4020

gaagctaccc cagctatgca ctgagctatc acacgcagac gtgttcgcct tcagggatct 4080

gtgcattgtt tacgatgacc tgttgtgtat tgtgtacaga gatggcaacc cttatgcagt 4140

gtgtgacgcc ctgcattggg ctgccgccgt gaataatgtc ctttgtgtcc agagcaccca 4200

cgtcgatata ggcgctaata agcggacact ggaggacctg ttgatgggga ctaataatag 4260

aaccctggga atcgtgtgcc ccattccatt attcctggcc gcccgcgagg gatcttatga 4320

actcctgatg ggcacactag gcatcgtggc caataggaca ttgcacgagt atatgctaga 4380

cttagaccac atggctcact ataacattgt cacattttgt tgcccccgcg attacatgct 4440

tgatttacag cccgaaacaa ccatcgtgag actgctcgat ctggaggtat ctcagacaag 4500

taagctcaca agacaaacag acagaaccgg cgagactgct ttgcatctgg ctgcacgata 4560

ttccaggtcc gactgtgata gcaccctgcg gttatgtgtg gcagacgcaa aacttaccaa 4620

taccggccta tataacctcg acaacatgaa gtgcatcgac ttctacagca gaatcccccc 4680

ccatgccgcc gtgagcgccg attttgcctt caaggacctg ttcgtggtga gaaaccgagc 4740

caccgacctg aacctgttga ttcggtgttt acgctgtatg cacgacaagc tgcccgattt 4800

gtgtactgag ctgcctctca ttctggccgc acggctcgca gttgaactaa ccgaagtgtt 4860

cgagttcgcc tcccacgccg acgtgtccct acaggacatc gagatcacat gcgtagacga 4920

tctgaaaacc gttctcgaac tcacagaagt gcttcattgg gccgccgcag tcaacaacgt 4980

ggacgatctc cgggcattcc agcaactgtt cctgaataca ctgtctggcg ctaacaagtt 5040

tcagcagtta tttttgaaca cacttaataa ccgccagcta ttcttgaata ccctgtcatt 5100

cgtgccgctg ttcttggctg cgcgcgaggg gtcctacgag ctgtttctga atacgctctc 5160

cttcgtgtgt ccctggtgcg cctccgctaa taggaccctg caagacatcg tacttcacct 5220

ggatcacatg tcagaggagg agaacgatga gatcgacggt gtcaaccacc agcacctccc 5280

cgcccggagg ccccgagatt acatcatttt tgtatatatt cccttaatcg taagattact 5340

cgacctggag taagcggccg ctctcgagtc tagctagtct agactagcta gaaagatccg 5400

ggaacttgtt tattgcagct tataatggtt acaaataaag caatagcatc acaaatttca 5460

caaataaagc attttttca ctgcattcta gttgtggttt gtccaaactc atcaatgtat 5520

cttatcatgt ctggatcggt gatcaccgat cccgatctgt caaatgacgg tgacaataaa 5580

acggagactt tgacccggaa cgcggaaatt cacgtaaaaa acacctgggc gagtcctcca 5640

cgtaatcggt caaagtccct cggccctcgg taaatattac gcactatgac taacgcccta 5700

ttattcagtt ttcacttccc cgtttcactt ttcgcgcgaa aatggccaaa tcttacatgg 5760

tcccgcccaa aattactacg atatccggtg aaaagcgcgc gaaaattggc acttccggag 5820

gtaggcggcg ctcatcaaaa acgtcacatt ttccgcgacg gaagcttgca tgtgagctcc 5880

tcccacttgc aaatgccaca cttccgccac acctcccaac cctactcgcg cgtcctacgt 5940

cacccgcccc gcctctcccc gcccacctca ttatcatatt ggccacaatc caaaataagg 6000

tatattattg atgatggttt aaacgcccaa ttcactggcc gtcgttttac aacgtcgtga 6060

ctgggaaaac cctggcgtta cccaacttaa tcgccttgca gcacatcccc ctttcgccag 6120

ctggcgtaat agcgaagagg cccgcaccga tcgcccttcc caacagttgc gcagcctgaa 6180

tggcgaatgg cgcctgatgc ggtattttct ccttacgcat ctgtgcggta tttcacaccg 6240

catatggtgc actctcagta caatctgctc tgatgccgca tagttaagcc agccccgaca 6300

cccgccaaca cccgctgacg cgccctgacg ggcttgtctg ctcccggcat ccgcttacag 6360

acaagctgtg accgtctccg ggagctgcat gtgtcagagg ttttcaccgt catcaccgaa 6420

acgcgcga 6428

<210> 58
<211> 6554
<212> DNA
<213> Artificial sequence

<220>
<223> HPV antigen design 3 full nucleotide sequences of gorilla adenovirus shuttle plasmid

<400> 58
gacgaaaggg cctcgtgata cgcctatttt tataggttaa tgtcatgata ataatggttt 60

cttagacgtc aggtggcact tttcggggaa atgtgcgcgg aacccctatt tgtttatttt 120

tctaaataca ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat 180

aatattgaaa aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt 240

ttgcggcatt ttgccttcct gtttttgctc acccagaaac gctggtgaaa gtaaaagatg 300

ctgaagatca gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga 360

tccttgagag ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc 420

tatgtggcgc ggtattatcc cgtattgacg ccgggcaaga gcaactcggt cgccgcatac 480

actattctca gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg 540

gcatgacagt aagagaatta tgcagtgctg ccataaccat gagtgataac actgcggcca 600

acttacttct gacaacgatc ggaggaccga aggagctaac cgcttttttg cacaacatgg 660

gggatcatgt aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaacg 720

acgagcgtga caccacgatg cctgtagcaa tggcaacaac gttgcgcaaa ctattaactg 780

gcgaactact tactctagct tcccggcaac aattaataga ctggatggag gcggataaag 840

ttgcaggacc acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg 900

gagccggtga gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct 960

cccgtatcgt agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac 1020

agatcgctga gataggtgcc tcactgatta agcattggta actgtcagac caagtttact 1080

catatatact ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga 1140

tccttttga taatctcatg accaaaatcc cttaacgtga gttttcgttc cactgagcgt 1200

cagaccccgt agaaaagatc aaaggatctt cttgagatcc ttttttttctg cgcgtaatct 1260

gctgcttgca aacaaaaaaa ccaccgctac cagcggtggt ttgtttgccg gatcaagagc 1320

taccaactct ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgttc 1380

ttctagtgta gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc 1440

tcgctctgct aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg 1500

ggttggactc aagacgatag ttaccggata aggcgcagcg gtcgggctga acgggggggtt 1560

cgtgcacaca gcccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg 1620

agctatgaga aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg 1680

gcagggtcgg aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggtatcttt 1740

atagtcctgt cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag 1800

ggggggcggag cctatggaaa aacgccagca acgcggcctt tttacggttc ctggcctttt 1860

gctggccttt tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta 1920

ttaccgcctt tgagtgagct gataccgctc gccgcagccg aacgaccgag cgcagcgagt 1980

cagtgagcga ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc gcgcgttggc 2040

cgattcatta atgcagctgg cacgacaggt ttcccgactg gaaagcgggc agtgagcgca 2100

acgcaattaa tgtgagttag ctcactcatt aggcacccca ggctttacac tttatgcttc 2160

cggctcgtat gttgtgtgga attgtgagcg gataacaatt tcacacagga aacagctatg 2220

accatgatta cgccaagctg ggtcaagtct tccagtttaa gcagcagagc ggtcagtttc 2280

tcatcccgag cagacgcgcg agaggccgcg ccgctcgcca ccaaagagct gtaaaggtcc 2340

gtagccatgc tgcgcgcggt cgcggcggcg gcggaggcgg cggcggaggt cgcggcgtcc 2400

agcggagttc ctcccacggt cgcgtaggcc attgtagacg aatttgaagg cagaacgggg 2460

cgtccatcca cgttggaacc catcacattc tgacgcactc cagcccagtg aggcatgcgc 2520

actgtcagat aggggctaaa gatgcttcca tcaaagctgt tgccggtgtc gctcatggcg 2580

gcggctgttg caagacaaaa cagagagacc cttagacccc caatttatac acgccccacc 2640

cttctagcca cgcccacctt acccacctca atcggtatcc tcatcgctag acccaaactc 2700

ggccctggtg caggccagca ccagatggtc aggcctctag ttattaatag taatcaatta 2760

cggggtcatt agttcatagc ccatatatgg agttccgcgt tacataactt acggtaaatg 2820

gcccgcctgg ctgaccgccc aacgaccccc gcccattgac gtcaataatg acgtatgttc 2880

ccatagtaac gccaataggg actttccatt gacgtcaatg ggtggagtat ttacggtaaa 2940

ctgcccactt ggcagtacat caagtgtatc atatgccaag tacgcccccc attgacgtca 3000

atgacggtaa atggcccgcc tggcattatg cccagtacat gaccttatgg gactttccta 3060

cttggcagta catctacgta ttagtcatcg ctattaccat ggtgatgcgg ttttggcagt 3120

acatcaatgg gcgtggatag cggtttgact cacggggatt tccaagtctc caccccattg 3180

acgtcaatgg gagtttgttt tggcaccaaa atcaacggga ctttccaaaa tgtcgtaaca 3240

actccgcccc attgacgcaa atgggcggta ggcgtgtacg gtgggaggtc tatataagca 3300

gagctctccc tatcagtgat agagatctcc ctatcagtga tagagatcgt cgacgagctc 3360

gtttagtgaa ccgtcagatc gcctggagac gccatccacg ctgttttgac ctccatagaa 3420

gacaccggga ccgatccagc ctccgcggcc gggaacggtg cattggaacg cggattcccc 3480

gtgccaagag tgacgtaagt accgcctata gagtctatag gcccaccccc ttggcttcac 3540

ttgaggtgtg gcaggcttga gatctggcca tacacttgag tgacaatgac atccactttg 3600

cctttctctc cacaggtgtc cactcccagg tccaactgca gccggatccg gtaccgccac 3660

catgaagcta ccgcagctct gtacagaagt gatgttccag gatcctcaag aacggcctcg 3720

gaaactacct cagctgtgta cagccttaca gacaacaata catgatataa tcctggagtg 3780

cgtctactgt aaacagcaac tgttgcgtcg cgaggtctat gatttcgcct tcagggatgg 3840

ttgtattgta tacagagacg gcaatccgta tgcagtgtgt gataagtgtc tcaagttcta 3900

tagcaaaatc agtgaatacc ggcactattg ctatagcctg tatggaacta cactagagca 3960

gcagtataac aagccactct gtgacctgct aattagatgt atcaactgcc agaagcctct 4020

gtgccccgaa gagaagcagc ggcaccttga caagaagcag cggtttcata atatcagagg 4080

gaggtggacc gggcggtgta tgtcctgctg ccgcagcagc aggacccgtc gggccgcggc 4140

ggcacagctg tacaacaaac cactgtgtga cgtgatgcca ggggacacgc ccacactcca 4200

cgagtacatg ctcgaccttc agccggaaac caccgatctc tacggctatg aacagttgaa 4260

cgacagctcc gaagaggaag atgagatcga cggcccagca ggacaggcgg cccctgacag 4320

agcacactac aatattgtta ccttctgctg caagtgcgac agcacgctgc gccgatgcgt 4380

acaatctacg catgtggaca ttaggaccct tgaggatctg cttatgggga cactcggaat 4440

tgtttgtccc atatgcagtc agaaacctcg gacactggaa gatttgctca tgggcgttat 4500

gaccaaccta gacaccgcga gcacgactct tctggcttgc ttcctgctat gtttttgcgt 4560

gctgctttgt gtttgcctac tcattcggcc cctgctgctg tctgtgagca cgtacacgag 4620

gtgcttcatt gtctatatta tcttcgttta cataccgctg ttcctgattc acaagctgcc 4680

cgatttgtgc acagaggtga tggcaagatt tgaagatccc acgcggcggc catacaaact 4740

ccctgatctc tgcacggcac tgaacacttc gttgcaggac atagaaatca cttgcgtgta 4800

ctgcaagact gtgctagagc tgaccgaggt gtttgagttt gccttcaagg acggttttgt 4860

ggtgtatcgg gatagcatcc cccatgccgc ctgccataaa tgtattgatt tctattcgag 4920

aattagagaa ctcaggcatt attccgactc cgtatacggc gacaccctag aaaaactgac 4980

caacaccggc ttgtataacc tcctcatccg ctgcctccga tgccagaagc cacttaaccc 5040

agccgagaaa ttacgccaca agctgacgaa caccggtttg tacaatgtgg agatcgacgg 5100

ggtcaaccat cagcacctgc cggccagacg agccgcccct cagcgccata ccatgctgtg 5160

catgtgttgc aagtgcgaag ccaggatcga aagggtggtg gaatctagcg ctgacgactt 5220

aagggcattc caacaactct ttcttaacac cctgagcttc gtgtgtcctt ggtgtgcttc 5280

ccaacagcgc gccttccaac aattgttcct caatgtaatg cttagtctga tttttctgtt 5340

ttgcttttgc gtgtgtatgt atgtctgctg ccacgtgcct ctcctaccat ctgtagtggt 5400

gattacatcc cccgcgactg ccttcaccgt gtacctgttg ccaatgctcc tccttcacat 5460

acacgccatc ctgagctaag cggccgctct cgagtctagc tagtctagac tagctagaaa 5520

gatccgggaa cttgtttatt gcagcttata atggttacaa ataaagcaat agcatcacaa 5580

atttcacaaa taaagcattt ttttcactgc attctagttg tggtttgtcc aaactcatca 5640

atgtatctta tcatgtctgg atcggtgatc accgatcccg atctgtcaaa tgacggtgac 5700

aataaaacgg agactttgac ccggaacgcg gaaattcacg taaaaaacac ctgggcgagt 5760

cctccacgta atcggtcaaa gtccctcggc cctcggtaaa tattacgcac tatgactaac 5820

gccctattat tcagttttca cttccccgtt tcacttttcg cgcgaaaatg gccaaatctt 5880

acatggtccc gcccaaaatt actacgatat ccggtgaaaa gcgcgcgaaa attggcactt 5940

ccggaggtag gcggcgctca tcaaaaacgt cacattttcc gcgacggaag cttgcatgtg 6000

agctcctccc acttgcaaat gccacacttc cgccacacct cccaacccta ctcgcgcgtc 6060

ctacgtcacc cgccccgcct ctccccgccc acctcattat catattggcc acaatccaaa 6120

ataaggtata ttattgatga tggtttaaac gcccaattca ctggccgtcg ttttacaacg 6180

tcgtgactgg gaaaaccctg gcgttaccca acttaatcgc cttgcagcac atcccccttt 6240

cgccagctgg cgtaatagcg aagaggcccg caccgatcgc ccttcccaac agttgcgcag 6300

cctgaatggc gaatggcgcc tgatgcggta ttttctcctt acgcatctgt gcggtatttc 6360

acaccgcata tggtgcactc tcagtacaat ctgctctgat gccgcatagt taagccagcc 6420

ccgacacccg ccaacacccg ctgacgcgcc ctgacgggct tgtctgctcc cggcatccgc 6480

ttacagacaa gctgtgaccg tctccgggag ctgcatgtgt cagaggtttt caccgtcatc 6540

accgaaacgc gcga 6554

<210> 59
<211> 6455
<212> DNA
<213> Artificial sequence

<220>
<223> HPV antigen design 4 full nucleotide sequences of gorilla adenovirus shuttle plasmid

<400> 59
gacgaaaggg cctcgtgata cgcctatttt tataggttaa tgtcatgata ataatggttt 60

cttagacgtc aggtggcact tttcggggaa atgtgcgcgg aacccctatt tgtttatttt 120

tctaaataca ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat 180

aatattgaaa aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt 240

ttgcggcatt ttgccttcct gtttttgctc acccagaaac gctggtgaaa gtaaaagatg 300

ctgaagatca gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga 360

tccttgagag ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc 420

tatgtggcgc ggtattatcc cgtattgacg ccgggcaaga gcaactcggt cgccgcatac 480

actattctca gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg 540

gcatgacagt aagagaatta tgcagtgctg ccataaccat gagtgataac actgcggcca 600

acttacttct gacaacgatc ggaggaccga aggagctaac cgcttttttg cacaacatgg 660

gggatcatgt aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaacg 720

acgagcgtga caccacgatg cctgtagcaa tggcaacaac gttgcgcaaa ctattaactg 780

gcgaactact tactctagct tcccggcaac aattaataga ctggatggag gcggataaag 840

ttgcaggacc acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg 900

gagccggtga gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct 960

cccgtatcgt agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac 1020

agatcgctga gataggtgcc tcactgatta agcattggta actgtcagac caagtttact 1080

catatatact ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga 1140

tccttttga taatctcatg accaaaatcc cttaacgtga gttttcgttc cactgagcgt 1200

cagaccccgt agaaaagatc aaaggatctt cttgagatcc ttttttttctg cgcgtaatct 1260

gctgcttgca aacaaaaaaa ccaccgctac cagcggtggt ttgtttgccg gatcaagagc 1320

taccaactct ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgttc 1380

ttctagtgta gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc 1440

tcgctctgct aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg 1500

ggttggactc aagacgatag ttaccggata aggcgcagcg gtcgggctga acgggggggtt 1560

cgtgcacaca gcccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg 1620

agctatgaga aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg 1680

gcagggtcgg aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggtatcttt 1740

atagtcctgt cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag 1800

gggggcggag cctatggaaa aacgccagca acgcggcctt tttacggttc ctggcctttt 1860

gctggccttt tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta 1920

ttaccgcctt tgagtgagct gataccgctc gccgcagccg aacgaccgag cgcagcgagt 1980

cagtgagcga ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc gcgcgttggc 2040

cgattcatta atgcagctgg cacgacaggt ttcccgactg gaaagcgggc agtgagcgca 2100

acgcaattaa tgtgagttag ctcactcatt aggcacccca ggctttacac tttatgcttc 2160

cggctcgtat gttgtgtgga attgtgagcg gataacaatt tcacacagga aacagctatg 2220

accatgatta cgccaagctg ggtcaagtct tccagtttaa gcagcagagc ggtcagtttc 2280

tcatcccgag cagacgcgcg agaggccgcg ccgctcgcca ccaaagagct gtaaaggtcc 2340

gtagccatgc tgcgcgcggt cgcggcggcg gcggaggcgg cggcggaggt cgcggcgtcc 2400

agcggagttc ctcccacggt cgcgtaggcc attgtagacg aatttgaagg cagaacgggg 2460

cgtccatcca cgttggaacc catcacattc tgacgcactc cagcccagtg aggcatgcgc 2520

actgtcagat aggggctaaa gatgcttcca tcaaagctgt tgccggtgtc gctcatggcg 2580

gcggctgttg caagacaaaa cagagagacc cttagacccc caatttatac acgccccacc 2640

cttctagcca cgcccacctt acccacctca atcggtatcc tcatcgctag acccaaactc 2700

ggccctggtg caggccagca ccagatggtc aggcctctag ttattaatag taatcaatta 2760

cggggtcatt agttcatagc ccatatatgg agttccgcgt tacataactt acggtaaatg 2820

gcccgcctgg ctgaccgccc aacgaccccc gcccattgac gtcaataatg acgtatgttc 2880

ccatagtaac gccaataggg actttccatt gacgtcaatg ggtggagtat ttacggtaaa 2940

ctgcccactt ggcagtacat caagtgtatc atatgccaag tacgcccccc attgacgtca 3000

atgacggtaa atggcccgcc tggcattatg cccagtacat gaccttatgg gactttccta 3060

cttggcagta catctacgta ttagtcatcg ctattaccat ggtgatgcgg ttttggcagt 3120

acatcaatgg gcgtggatag cggtttgact cacggggatt tccaagtctc caccccattg 3180

acgtcaatgg gagtttgttt tggcaccaaa atcaacggga ctttccaaaa tgtcgtaaca 3240

actccgcccc attgacgcaa atgggcggta ggcgtgtacg gtgggaggtc tatataagca 3300

gagctctccc tatcagtgat agagatctcc ctatcagtga tagagatcgt cgacgagctc 3360

gtttagtgaa ccgtcagatc gcctggagac gccatccacg ctgttttgac ctccatagaa 3420

gacaccggga ccgatccagc ctccgcggcc gggaacggtg cattggaacg cggattcccc 3480

gtgccaagag tgacgtaagt accgcctata gagtctatag gcccaccccc ttggcttcac 3540

ttgaggtgtg gcaggcttga gatctggcca tacacttgag tgacaatgac atccactttg 3600

cctttctctc cacaggtgtc cactcccagg tccaactgca gccggatccg gtaccgccac 3660

catgcaaacc gacagagagc ttaccgaggt tttcgagttt gcagcccggt actcccggag 3720

cgactacatt atttttgtct atatccctct cgcagacgca aagctgcctc aactgtgtac 3780

agaggttgat aatatgctac tgatgggcac tctcggcatc gtgccgctcc acgccgccgt 3840

gagcgccgac accctgcatg aatacatgct ggacctgaga aatcgggcaa ccgacttatc 3900

cgaggaggag aacgacgaaa ttgatggagt taatcaccag cacctaccag caagacgaat 3960

gcacgacaac ctactgatta gatgcttgag gtgtcccctt attttggcag ccagactcgc 4020

cgttctgttc ctgaacaccc tgagctttgt atgcccctgg tgtgccagct cgcacgcaga 4080

cgtgaaatgt attgacttct attccagaat cgacgaccta aaactgcctg atctctgtac 4140

agagcttgcg ttgcactggg cagccgccgt gaacaacgtg cagttgtttc tgaacacctt 4200

atccttcgtg ggcgctaaca aattccagca acttttcttg aacaccctaa acaacagagt 4260

ttatgacttt gctttcagag acctcccccc gttccttgct gccagagagg gatcatacga 4320

gaaactgaca aatacgggcc tctacaattt ggccaacaga ctgtgcatcg tgtacagaga 4380

tggcaatccc tacgccgttt gcgacgacca catgtacatg ctcgacctcc agccggagac 4440

aactcccaga gacttcgctt ttcgggacct gtgtatcgtg tatattgtaa gactcctgga 4500

cctggaagtg agccaaacaa gtaagctaac cagacaaaca gacagaacac ttgggatcgt 4560

gtgtcctatt gcagcccggt atagtaggtc agaccggact ctggaggacc tgttaatggg 4620

ggtggcggac gcaacaatcc acgacattat cttggagtgt gttgacaata tgcacctgga 4680

caagaaacag agattccaca acataccct gcacgcagcc gtcagcgcgg atactactct 4740

ggagcagcaa tataacaagc ccctgtgcga cctcctgcgg aatcgggcaa ctgatctctg 4800

tgacagtacc cttcgtttgt gcgttatgca cgacaggtgg actgggagat gtatgtcttg 4860

ctgtcctctc attctggccg caagactggc cgttagtctg caagacatcg agatcacctg 4920

tgtcagtcac gccgatgtgc tatgcgtgca gagcacccac gttgatattg atgacctagc 4980

acactacaac atcgttactt tttgctgtct acactgggcc gcagccgtga ataacgtgga 5040

cgacctacgc gctttccaac aactgttcct taacaccctg agcggcgcaa acaagatcag 5100

cgagtaccgc cactactgtt ataataaccg gaagctgcca cagctatgca cagagttgcc 5160

actgttcctg gcagcaagag agggatctta tgaaaagacc gtgctggagc tgacagaggt 5220

ggctaatcgc cgcacactgg aggacctgtt gatgggaacc gatcacatgt tcgcctttaa 5280

ggacctttc gttgttccca gagaccagct ttacaacaaa cctctatgcg acgtaatagt 5340

gaggaccttg caggatattg tgctccatct gctggaataa gcggccgctc tcgagtctag 5400

ctagtctaga ctagctagaa agatccggga acttgtttat tgcagcttat aatggttaca 5460

aataaagcaa tagcatcaca aatttcacaa ataaagcatt tttttcactg cattctagtt 5520

gtggtttgtc caaactcatc aatgtatctt atcatgtctg gatcggtgat caccgatccc 5580

gatctgtcaa atgacggtga caataaaacg gagactttga cccggaacgc ggaaattcac 5640

gtaaaaaaca cctgggcgag tcctccacgt aatcggtcaa agtccctcgg ccctcggtaa 5700

atattacgca ctatgactaa cgccctatta ttcagttttc acttccccgt ttcacttttc 5760

gcgcgaaaat ggccaaatct tacatggtcc cgcccaaaat tactacgata tccggtgaaa 5820

agcgcgcgaa aattggcact tccggaggta ggcggcgctc atcaaaaacg tcacattttc 5880

cgcgacggaa gcttgcatgt gagctcctcc cacttgcaaa tgccacactt ccgccacacc 5940

tcccaaccct actcgcgcgt cctacgtcac ccgccccgcc tctccccgcc cacctcatta 6000

tcatattggc cacaatccaa aataaggtat attattgatg atggtttaaa cgcccaattc 6060

actggccgtc gttttacaac gtcgtgactg ggaaaaccct ggcgttaccc aacttaatcg 6120

ccttgcagca catccccctt tcgccagctg gcgtaatagc gaagaggccc gcaccgatcg 6180

cccttcccaa cagttgcgca gcctgaatgg cgaatggcgc ctgatgcggt attttctcct 6240

tacgcatctg tgcggtattt cacaccgcat atggtgcact ctcagtacaa tctgctctga 6300

tgccgcatag ttaagccagc cccgacaccc gccaacaccc gctgacgcgc cctgacgggc 6360

ttgtctgctc ccggcatccg cttacagaca agctgtgacc gtctccggga gctgcatgtg 6420

tcagaggttt tcaccgtcat caccgaaacg cgcga 6455

<210> 60
<211> 6047
<212> DNA
<213> Artificial sequence

<220>
<223> HPV antigen design 5 full nucleotide sequences of gorilla adenovirus shuttle plasmid

<400> 60
gacgaaaggg cctcgtgata cgcctatttt tataggttaa tgtcatgata ataatggttt 60

cttagacgtc aggtggcact tttcggggaa atgtgcgcgg aacccctatt tgtttatttt 120

tctaaataca ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat 180

aatattgaaa aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt 240

ttgcggcatt ttgccttcct gtttttgctc acccagaaac gctggtgaaa gtaaaagatg 300

ctgaagatca gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga 360

tccttgagag ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc 420

tatgtggcgc ggtattatcc cgtattgacg ccgggcaaga gcaactcggt cgccgcatac 480

actattctca gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg 540

gcatgacagt aagagaatta tgcagtgctg ccataaccat gagtgataac actgcggcca 600

acttacttct gacaacgatc ggaggaccga aggagctaac cgcttttttg cacaacatgg 660

gggatcatgt aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaacg 720

acgagcgtga caccacgatg cctgtagcaa tggcaacaac gttgcgcaaa ctattaactg 780

gcgaactact tactctagct tcccggcaac aattaataga ctggatggag gcggataaag 840

ttgcaggacc acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg 900

gagccggtga gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct 960

cccgtatcgt agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac 1020

agatcgctga gataggtgcc tcactgatta agcattggta actgtcagac caagtttact 1080

catatatact ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga 1140

tccttttga taatctcatg accaaaatcc cttaacgtga gttttcgttc cactgagcgt 1200

cagaccccgt agaaaagatc aaaggatctt cttgagatcc ttttttttctg cgcgtaatct 1260

gctgcttgca aacaaaaaaa ccaccgctac cagcggtggt ttgtttgccg gatcaagagc 1320

taccaactct ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgttc 1380

ttctagtgta gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc 1440

tcgctctgct aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg 1500

ggttggactc aagacgatag ttaccggata aggcgcagcg gtcgggctga acgggggggtt 1560

cgtgcacaca gcccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg 1620

agctatgaga aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg 1680

gcagggtcgg aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggtatcttt 1740

atagtcctgt cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag 1800

gggggcggag cctatggaaa aacgccagca acgcggcctt tttacggttc ctggcctttt 1860

gctggccttt tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta 1920

ttaccgcctt tgagtgagct gataccgctc gccgcagccg aacgaccgag cgcagcgagt 1980

cagtgagcga ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc gcgcgttggc 2040

cgattcatta atgcagctgg cacgacaggt ttcccgactg gaaagcgggc agtgagcgca 2100

acgcaattaa tgtgagttag ctcactcatt aggcacccca ggctttacac tttatgcttc 2160

cggctcgtat gttgtgtgga attgtgagcg gataacaatt tcacacagga aacagctatg 2220

accatgatta cgccaagctg ggtcaagtct tccagtttaa gcagcagagc ggtcagtttc 2280

tcatcccgag cagacgcgcg agaggccgcg ccgctcgcca ccaaagagct gtaaaggtcc 2340

gtagccatgc tgcgcgcggt cgcggcggcg gcggaggcgg cggcggaggt cgcggcgtcc 2400

agcggagttc ctcccacggt cgcgtaggcc attgtagacg aatttgaagg cagaacgggg 2460

cgtccatcca cgttggaacc catcacattc tgacgcactc cagcccagtg aggcatgcgc 2520

actgtcagat aggggctaaa gatgcttcca tcaaagctgt tgccggtgtc gctcatggcg 2580

gcggctgttg caagacaaaa cagagagacc cttagacccc caatttatac acgccccacc 2640

cttctagcca cgcccacctt acccacctca atcggtatcc tcatcgctag acccaaactc 2700

ggccctggtg caggccagca ccagatggtc aggcctctag ttattaatag taatcaatta 2760

cggggtcatt agttcatagc ccatatatgg agttccgcgt tacataactt acggtaaatg 2820

gcccgcctgg ctgaccgccc aacgaccccc gcccattgac gtcaataatg acgtatgttc 2880

ccatagtaac gccaataggg actttccatt gacgtcaatg ggtggagtat ttacggtaaa 2940

ctgcccactt ggcagtacat caagtgtatc atatgccaag tacgcccccc attgacgtca 3000

atgacggtaa atggcccgcc tggcattatg cccagtacat gaccttatgg gactttccta 3060

cttggcagta catctacgta ttagtcatcg ctattaccat ggtgatgcgg ttttggcagt 3120

acatcaatgg gcgtggatag cggtttgact cacggggatt tccaagtctc caccccattg 3180

acgtcaatgg gagtttgttt tggcaccaaa atcaacggga ctttccaaaa tgtcgtaaca 3240

actccgcccc attgacgcaa atgggcggta ggcgtgtacg gtgggaggtc tatataagca 3300

gagctctccc tatcagtgat agagatctcc ctatcagtga tagagatcgt cgacgagctc 3360

gtttagtgaa ccgtcagatc gcctggagac gccatccacg ctgttttgac ctccatagaa 3420

gacaccggga ccgatccagc ctccgcggcc gggaacggtg cattggaacg cggattcccc 3480

gtgccaagag tgacgtaagt accgcctata gagtctatag gcccaccccc ttggcttcac 3540

ttgaggtgtg gcaggcttga gatctggcca tacacttgag tgacaatgac atccactttg 3600

cctttctctc cacaggtgtc cactcccagg tccaactgca gccggatccg gtaccgccac 3660

catgaagaaa gaattgaccg aagtatttga atttgccaag aagtacatca tctttgttta 3720

catacccctg aagaagaaat taccccagct gtgtacagag gtgaagaagt tattgatggg 3780

aacactcgga attgtgaaaa agaccctgca cgaatatatg ctagatttga agaagtctga 3840

ggaggagaac gacgagatcg acggggtgaa ccaccagcac ctccccgcca ggagaaagaa 3900

gaatcttctc atacggtgtc tgcggtgcaa aaagctgttc ctgaacaccc tgtcgttcgt 3960

atgtccctgg tgcgcttcca agaagaagtg catcgacttt tactctcgga tcaagaagaa 4020

gctgcccgat ctgtgtactg agctgaagaa gcaactgttc ctgaacacgc tgtcgtttgt 4080

gaagaagttt cagcagctgt tcctgaacac tctaaagaag gtgtacgatt ttgctttcag 4140

agacctgaaa aagaagttga caaatacggg gctgtataat ctgaagaaac tctgtatcgt 4200

ttacagggac ggtaaccctt acgctgtgtg tgacaaaaag tacatgctag acctccagcc 4260

cgaaacgacc aagaagttcg cgttcagaga cctgtgtatc gtctacaaga aaacactagg 4320

catcgtgtgt cccattaaga aacggactct tgaggaccta ttgatgggtg tgaaaaagac 4380

aattcatgac attatcttgg agtgtgtgaa gaaacatctc gataagaaac aaagattcca 4440

taacatcaaa aagacaaccc tggaacagca gtataacaag cctctttgcg atctgctaaa 4500

gaaatgtgac tccaccttga ggctgtgcgt aaagaagcga tggaccggaa gatgtatgtc 4560

ttgttgtaaa aagagtctcc aagatattga gattacttgc gtgaaaaagt tgtgcgttca 4620

gagtacacat gttgatatta agaaagccca ttataatatc gtgacatttt gctgtaagaa 4680

ggatgacctg agagcttttc agcagctgtt tctgaataca ctgagcaaga agatcagcga 4740

gtaccgacac tattgttaca agaaaaagct gccccagctg tgtaccgaat tgaagaagaa 4800

aaccgtccta gagcttaccg aagtgaagaa gcgtaccctg gaggacctgt taatgggcac 4860

gaagaagttt gcattcaagg acctgtttgt cgtgaaaaag cagctgtaca ataagcccct 4920

gtgcgacgtt aaaaagacac tccaagacat cgtcttacac ctgaaaaagt aagcggccgc 4980

tctcgagtct agctagtcta gactagctag aaagatccgg gaacttgttt attgcagctt 5040

ataatggtta caaataaagc aatagcatca caaatttcac aaataaagca ttttttcac 5100

tgcattctag ttgtggtttg tccaaactca tcaatgtatc ttatcatgtc tggatcggtg 5160

atcaccgatc ccgatctgtc aaatgacggt gacaataaaa cggagacttt gacccggaac 5220

gcggaaattc acgtaaaaaa cacctgggcg agtcctccac gtaatcggtc aaagtccctc 5280

ggccctcggt aaatattacg cactatgact aacgccctat tattcagttt tcacttcccc 5340

gtttcacttt tcgcgcgaaa atggccaaat cttacatggt cccgcccaaa attactacga 5400

tatccggtga aaagcgcgcg aaaattggca cttccggagg taggcggcgc tcatcaaaaa 5460

cgtcacattt tccgcgacgg aagcttgcat gtgagctcct cccacttgca aatgccacac 5520

ttccgccaca cctcccaacc ctactcgcgc gtcctacgtc acccgccccg cctctccccg 5580

cccacctcat tatcatattg gccacaatcc aaaataaggt atattattga tgatggttta 5640

aacgcccaat tcactggccg tcgttttaca acgtcgtgac tgggaaaacc ctggcgttac 5700

ccaacttaat cgccttgcag cacatccccc tttcgccagc tggcgtaata gcgaagaggc 5760

ccgcaccgat cgcccttccc aacagttgcg cagcctgaat ggcgaatggc gcctgatgcg 5820

gtattttctc cttacgcatc tgtgcggtat ttcacaccgc atatggtgca ctctcagtac 5880

aatctgctct gatgccgcat agttaagcca gccccgacac ccgccaacac ccgctgacgc 5940

gccctgacgg gcttgtctgc tcccggcatc cgcttacaga caagctgtga ccgtctccgg 6000

gagctgcatg tgtcagaggt tttcaccgtc atcaccgaaa cgcgcga 6047

<210> 61
<211> 10410
<212> DNA
<213> Artificial sequence

<220>
<223> GCAd-RTS-IL12 design 1

<400> 61
ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat aatattgaaa 60

aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt ttgcggcatt 120

ttgccttcct gtttttgctc acccagaaac gctggtgaaa gtaaaagatg ctgaagatca 180

gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga tccttgagag 240

ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc tatgtggcgc 300

ggtattatcc cgtattgacg ccgggcaaga gcaactcggt cgccgcatac actattctca 360

gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg gcatgacagt 420

aagagaatta tgcagtgctg ccataaccat gagtgataac actgcggcca acttacttct 480

gacaacgatc ggaggaccga aggagctaac cgcttttttg cacaacatgg gggatcatgt 540

aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaacg acgagcgtga 600

caccacgatg cctgtagcaa tggcaacaac gttgcgcaaa ctattaactg gcgaactact 660

tactctagct tcccggcaac aattaataga ctggatggag gcggataaag ttgcaggacc 720

acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg gagccggtga 780

gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct cccgtatcgt 840

agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac agatcgctga 900

gataggtgcc tcactgatta agcattggta actgtcagac caagtttact catatatact 960

ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga tccttttga 1020

taatctcatg accaaaatcc cttaacgtga gttttcgttc cactgagcgt cagaccccgt 1080

agaaaagatc aaaggatctt cttgagatcc ttttttttctg cgcgtaatct gctgcttgca 1140

aacaaaaaaa ccaccgctac cagcggtggt ttgtttgccg gatcaagagc taccaactct 1200

ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgttc ttctagtgta 1260

gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc tcgctctgct 1320

aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg ggttggactc 1380

aagacgatag ttaccggata aggcgcagcg gtcgggctga cgggggggtt cgtgcacaca 1440

gcccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg agctatgaga 1500

aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg gcagggtcgg 1560

aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggtatcttt atagtcctgt 1620

cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag gggggcggag 1680

cctatggaaa aacgccagca acgcggcctt tttacggttc ctggcctttt gctggccttt 1740

tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta ttaccgcctt 1800

tgagtgagct gataccgctc gccgcagccg aacgaccgag cgcagcgagt cagtgagcga 1860

ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc gcgcgttggc cgattcatta 1920

atgcagctgg cacgacaggt ttcccgactg gaaagcgggc agtgagcgca acgcaattaa 1980

tgtgagttag ctcactcatt aggcacccca ggctttacac tttatgcttc cggctcgtat 2040

gttgtgtgga attgtgagcg gataacaatt tcacacagga aacagctatg accatgatta 2100

cgccaagctg ggtcaagtct tccagtttaa gcagcagagc ggtcagtttc tcatcccgag 2160

cagacgcgcg agaggccgcg ccgctcgcca ccaaagagct gtaaaggtcc gtagccatgc 2220

tgcgcgcggt cgcggcggcg gcggaggcgg cggcggaggt cgcggcgtcc agcggagttc 2280

ctcccacggt cgcgtaggcc attgtagacg aatttgaagg cagaacgggg cgtccatcca 2340

cgttggaacc catcacattc tgacgcactc cagcccagtg aggcatgcgc actgtcagat 2400

aggggctaaa gatgcttcca tcaaagctgt tgccggtgtc gctcatggcg gcggctgttg 2460

caagacaaaa cagagagacc cttagacccc caatttatac acgccccacc cttctagcca 2520

cgcccacctt acccacctca atcggtatcc tcatcgctag acccaaactc ggccctggtg 2580

caggccagca ccagatggtc aggcctgcag gccgcaataa aatatcttta ttttcattac 2640

atctgtgtgt tggtttttg tgtgaatcga tagtactaac atacgctctc catcaaaaca 2700

aaacgaaaca aaacaaacta gcaaaatagg ctgtccccag tgcaagtgca ggtgccagaa 2760

catttctcta tcgataatgc aggtcggagt actgtcctcc gagcggagta ctgtcctccg 2820

agcggagtac tgtcctccga gcggagtact gtcctccgag cggagtactg tcctccgagc 2880

ggagtactgt cctccgagcg gagactcttc gaaggaagag gggcggggtc gatcgacccc 2940

gcccctcttc cttcgaagga agaggggcgg ggtcgaagac ctagagggta tataatgggt 3000

gccttagctg gtgtgtgagc tcatcttcct gtagatcacg cgtgccacca tgggtcacca 3060

gcagttggtc atctcttggt tttccctggt ttttctggca tctcccctcg tggccatatg 3120

ggaactgaag aaagatgttt atgtcgtaga attggattgg tatccggatg cccctggaga 3180

aatggtggtc ctcacctgtg acacccctga agaagatggt atcacctgga ccttggacca 3240

gagcagtgag gtcttaggct ctggcaaaac cctgaccatc caagtcaaag agtttggaga 3300

tgctggccag tacacctgtc acaaaggagg cgaggttcta agccattcgc tcctgctgct 3360

tcacaaaaag gaagatggaa tttggtccac tgatatttta aaggaccaga aagaacccaa 3420

aaataagacc tttctaagat gcgaggccaa gaattattct ggacgtttca cctgctggtg 3480

gctgacgaca atcagtactg atttgacatt cagtgtcaaa agcagcagag gctcttctga 3540

cccccaaggg gtgacgtgcg gagctgctac actctctgca gagagagtca gaggggacaa 3600

caaggagtat gagtactcag tggagtgcca ggaggacagt gcctgcccag ctgctgagga 3660

gagtctgccc attgaggtca tggtggatgc cgttcacaag ctcaagtatg aaaactacac 3720

cagcagcttc ttcatcaggg acatcatcaa acctgaccca cccaagaact tgcagctgaa 3780

gccattaaag aattctcggc aggtggaggt cagctgggag taccctgaca cctggagtac 3840

tccacattcc tacttctccc tgacattctg cgttcaggtc cagggcaaga gcaagagaga 3900

aaagaaagat agagtcttca cggacaagac ctcagccacg gtcatctgcc gcaaaaatgc 3960

cagcattagc gtgcgggccc aggaccgcta ctatagctca tcttggagcg aatgggcatc 4020

tgtgccctgc agttaggttg ggcgagctcg aattcattga tcccccgggc tgcaggaatt 4080

cgatatcaag ctcgggatcc gaattccgcc ccccccccc ccccccccct aacgttactg 4140

gccgaagccg cttggaataa ggccggtgtg cgtttgtcta tatgttattt tccaccatat 4200

tgccgtcttt tggcaatgtg agggcccgga aacctggccc tgtcttcttg acgagcattc 4260

ctaggggtct ttcccctctc gccaaaggaa tgcaaggtct gttgaatgtc gtgaaggaag 4320

cagttcctct ggaagcttct tgaagacaaa caacgtctgt agcgaccctt tgcaggcagc 4380

ggaacccccc acctggcgac aggtgcctct gcggccaaaa gccacgtgta taagatacac 4440

ctgcaaaggc ggcacaaccc cagtgccacg ttgtgagttg gatagttgtg gaaagagtca 4500

aatggctctc ctcaagcgta ttcaacaagg ggctgaagga tgcccagaag gtaccccatt 4560

gtatgggatc tgatctgggg cctcggtgca catgctttac atgtgtttag tcgaggttaa 4620

aaaaacgtct aggccccccg aaccacgggg acgtggtttt cctttgaaaa acacgatgat 4680

aatatggcca caaccatggg tccagcgcgc agcctcctcc ttgtggctac cctggtcctc 4740

ctggaccacc tcagtttggc cagaaacctc cccgtggcca ctccagaccc aggaatgttc 4800

ccatgccttc accactccca aaacctgctg agggccgtca gcaacatgct ccagaaggcc 4860

agacaaactc tagaatttta cccttgcact tctgaagaga ttgatcatga agatatcaca 4920

aaagataaaa ccagcacagt ggaggcctgt ttaccattgg aattaaccaa gaatgagagt 4980

tgcctaaatt ccagagagac ctctttcata actaatggga gttgcctggc ctccagaaag 5040

acctctttta tgatggccct gtgccttagt agtatttatg aagacttgaa gatgtaccag 5100

gtggagttca agaccatgaa tgcaaagctt ctgatggatc ctaagaggca gatctttcta 5160

gatcaaaaca tgctggcagt tattgatgag ctgatgcagg ccctgaattt caacagtgag 5220

actgtgccac aaaaatcctc ccttgaagaa ccggattttt ataaaactaa aatcaagctc 5280

tgcatacttc ttcatgcttt cagaattcgg gcagtgacta ttgatagagt gatgagctat 5340

ctgaatgctt cctaacgtac gtcgacatcg agaacttgtt tattgcagct tataatggtt 5400

acaaataaag caatagcatc acaaatttca caaataaagc atttttttca ctgcattcta 5460

gttgtggttt gtccaaactc atcaatgtat cttatcatgt ctgggcgcgc cggcctccgc 5520

gccgggtttt ggcgcctccc gcgggcgccc ccctcctcac ggcgagcgct gccacgtcag 5580

acgaagggcg cagcgagcgt cctgatcctt ccgcccggac gctcaggaca gcggcccgct 5640

gctcataaga ctcggcctta gaaccccagt atcagcagaa ggacatttta ggacgggact 5700

tgggtgactc tagggcactg gttttctttc cagagagcgg aacaggcgag gaaaagtagt 5760

cccttctcgg cgattctgcg gagggatctc cgtggggcgg tgaacgccga tgattatata 5820

aggacgcgcc gggtgtggca cagctagttc cgtcgcagcc gggatttggg tcgcggttct 5880

tgtttgtgga tcgctgtgat cgtcacttgg tgagtagcgg gctgctgggc tgggtacgtg 5940

cgctcggggt tggcgagtgt gttttgtgaa gttttttagg caccttttga aatgtaatca 6000

tttgggtcaa tatgtaattt tcagtgttag actagtaaat tgtccgctaa attctggccg 6060

tttttggctt ttttgttaga cgagctagcg ccgccaccat gggccctaaa aagaagcgta 6120

aagtcgcccc cccgaccgat gtcagcctgg gggacgagct ccacttagac ggcgaggacg 6180

tggcgatggc gcatgccgac gcgctagacg atttcgatct ggacatgttg ggggacgggg 6240

attccccggg tccgggattt acccccccacg actccgcccc ctacggcgct ctggatatgg 6300

ccgacttcga gtttgagcag atgtttaccg atgcccttgg aattgacgag tacggtgggg 6360

aattcgagat gcctgtggac aggatcctgg aggcagagct tgctgtggaa cagaagagtg 6420

accagggcgt tgagggtcct gggggaaccg ggggtagcgg cagcagccca aatgaccctg 6480

tgactaacat ctgtcaggca gctgacaaac agctattcac gcttgttgag tgggcgaaga 6540

ggatcccaca cttttcctcc ttgcctctgg atgatcaggt catattgctg cgggcaggct 6600

ggaatgaact cctcattgcc tccttttcac accgatccat tgatgttcga gatggcatcc 6660

tccttgccac aggtcttcac gtgcaccgca actcagccca ttcagcagga gtaggagcca 6720

tctttgatcg ggtgctgaca gagctagtgt ccaaaatgcg tgacatgagg atggacaaga 6780

cagagcttgg ctgcctgagg gcaatcattc tgtttaatcc agaggtgagg ggtttgaaat 6840

ccgcccagga agttgaactt ctacgtgaaa aagtatatgc cgctttggaa gaatatacta 6900

gaacaacaca tcccgatgaa ccaggaagat ttgcaaaact tttgcttcgt ctgccttctt 6960

tacgttccat aggccttaag tgtttggagc atttgttttt ctttcgcctt attggagatg 7020

ttccaattga tacgttcctg atggagatgc ttgaatcacc ttctgattca taatctagcc 7080

tagcccccct ctccctcccc ccccctaac gttactggcc gaagccgctt ggaataaggc 7140

cggtgtgcgt ttgtctatat gttattttcc accatattgc cgtcttttgg caatgtgagg 7200

gcccggaaac ctggccctgt cttcttgacg agcattccta ggggtctttc ccctctcgcc 7260

aaaggaatgc aaggtctgtt gaatgtcgtg aaggaagcag ttcctctgga agcttcttga 7320

agacaaacaa cgtctgtagc gacccttttgc aggcagcgga acccccccacc tggcgacagg 7380

tgcctctgcg gccaaaagcc acgtgtataa gatacacctg caaaggcggc acaaccccag 7440

tgccacgttg tgagttggat agttgtggaa agagtcaaat ggctctcctc aagcgtattc 7500

aacaaggggc tgaaggatgc ccagaaggta ccccattgta tgggatctga tctggggcct 7560

cggtgcacat gctttacatg tgtttagtcg aggttaaaaa acgtctaggc cccccgaacc 7620

acggggacgt ggttttcctt tgaaaaacac gatctctagg cgccaccatg aagctactgt 7680

cttctatcga acaagcatgc gatatttgcc gacttaaaaa gctcaagtgc tccaaagaaa 7740

aaccgaagtg cgccaagtgt ctgaagaaca actgggagtg tcgctactct cccaaaacca 7800

aaaggtctcc gctgactagg gcacatctga cagaagtgga atcaaggcta gaaagactgg 7860

aacagctatt tctactgatt tttcctcgag aagaccttga catgattttg aaaatggatt 7920

ctttacagga tataaaagca ttgttaacag gattatttgt acaagataat gtgaataaag 7980

atgccgtcac agatagattg gcttcagtgg agactgatat gcctctaaca ttgagacagc 8040

atagaataag tgcgacatca tcatcggaag agagtagtaa caaaggtcaa agacagttga 8100

ctgtatcgcc ggaattcccg gggatccggc ctgagtgcgt agtacccgag actcagtgcg 8160

ccatgaagcg gaaagagaag aaagcacaga aggagaagga caaactgcct gtcagcacga 8220

cgacggtgga cgaccacatg ccgcccatta tgcagtgtga acctccacct cctgaagcag 8280

caaggattca cgaagtggtc ccaaggtttc tctccgacaa gctgttggtg acaaaccggc 8340

agaaaaacat cccccagttg acagccaacc agcagttcct tatcgccagg ctcatctggt 8400

accaggacgg gtacgagcag ccttctgatg aagatttgaa gaggattacg cagacgtggc 8460

agcaagcgga cgatgaaaac gaagagtcgg acactccctt ccgccagatc acagagatga 8520

ctatcctcac ggtccaactt atcgtggagt tcgcgaaggg attgccaggg ttcgccaaga 8580

tctcgcagcc tgatcaaatt acgctgctta aggcttgctc aagtgaggta atgatgctcc 8640

gagtcgcgcg acgatacgat gcggcctcag acagtattct gttcgcgaac aaccaagcgt 8700

acactcgcga caactaccgc aaggctggca tggccgaggt catcgaggat ctactgcact 8760

tctgccggtg catgtactct atggcgttgg acaacatcca ttacgcgctg ctcacggctg 8820

tcgtcatctt ttctgaccgg ccagggttgg agcagccgca actggtggaa gagatccagc 8880

ggtactacct gaatacgctc cgcatctata tcctgaacca gctgagcggg tcggcgcgtt 8940

cgtccgtcat atacggcaag atcctctcaa tcctctctga gctacgcacg ctcggcatgc 9000

aaaactccaa catgtgcatc tccctcaagc tcaagaacag aaagctgccg cctttcctcg 9060

aggagatctg ggatgtggcg gacatgtcgc acacccaacc gccgcctatc ctcgagtccc 9120

ccacgaatct ctaggcggcc tctagagcgg ccgccaccgc ggggagatcc agacatgata 9180

agatacattg atgagtttgg acaaaccaca actagaatgc agtgaaaaaa atgctttatt 9240

tgtgaaattt gtgatgctat tgctttattt gtaaccatta taagctgcaa taaacaagtt 9300

aacaacaaca attgcattca ttttatgttt caggttcagg gggaggtgtg ggaggttttt 9360

taaagcaagt aaaacctcta caaatgtggt atggctgatt atgatcaccg gtcaaatgac 9420

ggtgacaata aaacggagac tttgacccgg aacgcggaaa ttcacgtaaa aaacacctgg 9480

gcgagtcctc cacgtaatcg gtcaaagtcc ctcggccctc ggtaaatatt acgcactatg 9540

actaacgccc tattattcag ttttcacttc cccgtttcac ttttcgcgcg aaaatggcca 9600

aatcttacat ggtcccgccc aaaattacta cgatatccgg tgaaaagcgc gcgaaaattg 9660

gcacttccgg aggtaggcgg cgctcatcaa aaacgtcaca ttttccgcga cggaagcttg 9720

catgtgagct cctcccactt gcaaatgcca cacttccgcc acacctccca accctactcg 9780

cgcgtcctac gtcacccgcc ccgcctctcc ccgcccacct cattatcata ttggccacaa 9840

tccaaaataa ggtatattat tgatgatggt ttaaacgccc aattcactgg ccgtcgtttt 9900

acaacgtcgt gactgggaaa accctggcgt tacccaactt aatcgccttg cagcacatcc 9960

ccctttcgcc agctggcgta atagcgaaga ggcccgcacc gatcgccctt cccaacagtt 10020

gcgcagcctg aatggcgaat ggcgcctgat gcggtatttt ctccttacgc atctgtgcgg 10080

tatttcacac cgcatatggt gcactctcag tacaatctgc tctgatgccg catagttaag 10140

ccagccccga cacccgccaa cacccgctga cgcgccctga cgggcttgtc tgctcccggc 10200

atccgcttac agacaagctg tgaccgtctc cgggagctgc atgtgtcaga ggttttcacc 10260

gtcatcaccg aaacgcgcga gacgaaaggg cctcgtgata cgcctatttt tataggttaa 10320

tgtcatgata ataatggttt cttagacgtc aggtggcact tttcggggaa atgtgcgcgg 10380

aacccctatt tgtttatttt tctaaataca 10410

<210> 62
<211> 10040
<212> DNA
<213> Artificial sequence

<220>
<223> GCAd-RTS-IL12 design 2

<400> 62
ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat aatattgaaa 60

aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt ttgcggcatt 120

ttgccttcct gtttttgctc acccagaaac gctggtgaaa gtaaaagatg ctgaagatca 180

gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga tccttgagag 240

ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc tatgtggcgc 300

ggtattatcc cgtattgacg ccgggcaaga gcaactcggt cgccgcatac actattctca 360

gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg gcatgacagt 420

aagagaatta tgcagtgctg ccataaccat gagtgataac actgcggcca acttacttct 480

gacaacgatc ggaggaccga aggagctaac cgcttttttg cacaacatgg gggatcatgt 540

aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaacg acgagcgtga 600

caccacgatg cctgtagcaa tggcaacaac gttgcgcaaa ctattaactg gcgaactact 660

tactctagct tcccggcaac aattaataga ctggatggag gcggataaag ttgcaggacc 720

acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg gagccggtga 780

gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct cccgtatcgt 840

agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac agatcgctga 900

gataggtgcc tcactgatta agcattggta actgtcagac caagtttact catatatact 960

ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga tccttttga 1020

taatctcatg accaaaatcc cttaacgtga gttttcgttc cactgagcgt cagaccccgt 1080

agaaaagatc aaaggatctt cttgagatcc ttttttttctg cgcgtaatct gctgcttgca 1140

aacaaaaaaa ccaccgctac cagcggtggt ttgtttgccg gatcaagagc taccaactct 1200

ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgttc ttctagtgta 1260

gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc tcgctctgct 1320

aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg ggttggactc 1380

aagacgatag ttaccggata aggcgcagcg gtcgggctga cgggggggtt cgtgcacaca 1440

gcccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg agctatgaga 1500

aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg gcagggtcgg 1560

aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggtatcttt atagtcctgt 1620

cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag gggggcggag 1680

cctatggaaa aacgccagca acgcggcctt tttacggttc ctggcctttt gctggccttt 1740

tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta ttaccgcctt 1800

tgagtgagct gataccgctc gccgcagccg aacgaccgag cgcagcgagt cagtgagcga 1860

ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc gcgcgttggc cgattcatta 1920

atgcagctgg cacgacaggt ttcccgactg gaaagcgggc agtgagcgca acgcaattaa 1980

tgtgagttag ctcactcatt aggcacccca ggctttacac tttatgcttc cggctcgtat 2040

gttgtgtgga attgtgagcg gataacaatt tcacacagga aacagctatg accatgatta 2100

cgccaagctg ggtcaagtct tccagtttaa gcagcagagc ggtcagtttc tcatcccgag 2160

cagacgcgcg agaggccgcg ccgctcgcca ccaaagagct gtaaaggtcc gtagccatgc 2220

tgcgcgcggt cgcggcggcg gcggaggcgg cggcggaggt cgcggcgtcc agcggagttc 2280

ctcccacggt cgcgtaggcc attgtagacg aatttgaagg cagaacgggg cgtccatcca 2340

cgttggaacc catcacattc tgacgcactc cagcccagtg aggcatgcgc actgtcagat 2400

aggggctaaa gatgcttcca tcaaagctgt tgccggtgtc gctcatggcg gcggctgttg 2460

caagacaaaa cagagagacc cttagacccc caatttatac acgccccacc cttctagcca 2520

cgcccacctt acccacctca atcggtatcc tcatcgctag acccaaactc ggccctggtg 2580

caggccagca ccagatggtc aggcctgcag gtacgtagcc gcaataaaat atctttattt 2640

tcattacatc tgtgtgttgg ttttttgtgt gaatccatag tactaacata cgctctccat 2700

caaaacaaaa cgaaacaaaa caaactagca aaataggctg tccccagtgc aagtccaggt 2760

gccagaacat ttctctatcc ataatgcagg ggtaccggaa ggaagagggg cggggtcgat 2820

cgaccccgcc cctcttcctt cgaaggaaga ggggcggggt ccaattgcgg agtactgtcc 2880

tccgagcgga gtactgtcct ccgagcggag tactgtcctc cgagcggagt actgtcctcc 2940

gagcggagta ctgtcctccg agcggagtac tgtcctccga gcggagagtc cccggggacc 3000

tagagggtat ataatgggtg ccttagctgg tgtgtgacct catcttcctg tacgcccctg 3060

caggagatca cgcgtgccac catgggtcac cagcagttgg tcatctcttg gttttccctg 3120

gtttttctgg catctcccct cgtggccata tgggaactga agaaagatgt ttatgtcgta 3180

gaattggatt ggtatccgga tgcccctgga gaaatggtgg tcctcacctg tgacacccct 3240

gaagaagatg gtatcacctg gaccttggac cagagcagtg aggtcttagg ctctggcaaa 3300

accctgacca tccaagtcaa agagtttgga gatgctggcc agtacacctg tcacaaagga 3360

ggcgaggttc taagccattc gctcctgctg cttcacaaaa aggaagatgg aatttggtcc 3420

actgatattt taaaggacca gaaagaaccc aaaaataaga cctttctaag atgcgaggcc 3480

aagaattatt ctggacgttt cacctgctgg tggctgacga caatcagtac tgatttgaca 3540

ttcagtgtca aaagcagcag aggctcttct gacccccaag gggtgacgtg cggagctgct 3600

acactctctg cagagagagt cagaggggac aacaaggagt atgagtactc agtggagtgc 3660

caggaggaca gtgcctgccc agctgctgag gagagtctgc ccattgaggt catggtggat 3720

gccgttcaca agctcaagta tgaaaactac accagcagct tcttcatcag ggacatcatc 3780

aaacctgacc cacccaagaa cttgcagctg aagccattaa agaattctcg gcaggtggag 3840

gtcagctggg agtaccctga cacctggagt actccacatt cctacttctc cctgacattc 3900

tgcgttcagg tccagggcaa gagcaagaga gaaaagaaag atagagtctt cacggacaag 3960

acctcagcca cggtcatctg ccgcaaaaat gccagcatta gcgtgcgggc ccaggaccgc 4020

tactatagct catcttggag cgaatgggca tctgtgccct gcagtctcga gggcggcgga 4080

gagggcagag gaagtcttct aacatgcggt gacgtggagg agaatcccgg ccctaggatg 4140

ggtccagcgc gcagcctcct ccttgtggct accctggtcc tcctggacca cctcagtttg 4200

gccagaaacc tccccgtggc cactccagac ccaggaatgt tcccatgcct tcaccactcc 4260

caaaacctgc tgagggccgt cagcaacatg ctccagaagg ccagacaaac tctagaattt 4320

taccttgca cttctgaaga gattgatcat gaagatatca caaaagataa aaccagcaca 4380

gtggaggcct gtttaccatt ggaattaacc aagaatgaga gttgcctaaa ttccagagag 4440

acctctttca taactaatgg gagttgcctg gcctccagaa agacctcttt tatgatggcc 4500

ctgtgcctta gtagtattta tgaagacttg aagatgtacc aggtggagtt caagaccatg 4560

aatgcaaagc ttctgatgga tcctaagagg cagatctttc tagatcaaaa catgctggca 4620

gttattgatg agctgatgca ggccctgaat ttcaacagtg agactgtgcc acaaaaatcc 4680

tcccttgaag aaccggattt ttataaaact aaaatcaagc tctgcatact tcttcatgct 4740

ttcagaattc gggcagtgac tattgataga gtgatgagct atctgaatgc ttcctaaatc 4800

gatttattta tcggcataaa taatttttt gaagaagtaa tactattttt ctttttttt 4860

gtaaataaat gggttaaggg atgtaacatt gtttgttgtt tggtgggggt tggggcctcc 4920

gcgccgggtt ttggcgcctc ccgcgggcgc ccccctcctc acggcgagcg ctgccacgtc 4980

agacgaaggg cgcagcgagc gtcctgatcc ttccgcccgg acgctcagga cagcggcccg 5040

ctgctcataa gactcggcct tagaacccca gtatcagcag aaggacattt taggacggga 5100

cttgggtgac tctagggcac tggttttctt tccagagagc ggaacaggcg aggaaaagta 5160

gtcccttctc ggcgattctg cggagggatc tccgtggggc ggtgaacgcc gatgattata 5220

taaggacgcg ccgggtgtgg cacagctagt tccgtcgcag ccgggatttg ggtcgcggtt 5280

cttgtttgtg gatcgctgtg atcgtcactt ggtgagtagc gggctgctgg gctgggtacg 5340

tgcgctcggg gttggcgagt gtgttttgtg aagtttttta ggcacctttt gaaatgtaat 5400

catttgggtc aatatgtaat tttcagtgtt agactagtaa attgtccgct aaattctggc 5460

cgtttttggc ttttttgtta gacgagctag cgccgccacc atgggcccta aaaagaagcg 5520

taaagtcgcc cccccgaccg atgtcagcct gggggacgag ctccacttag acggcgagga 5580

cgtggcgatg gcgcatgccg acgcgctaga cgatttcgat ctggacatgt tgggggacgg 5640

ggattccccg ggtccgggat ttacccccca cgactccgcc ccctacggcg ctctggatat 5700

ggccgacttc gagtttgagc agatgtttac cgatgccctt ggaattgacg agtacggtgg 5760

ggaattcgag atgcctgtgg acaggatcct ggaggcagag cttgctgtgg aacagaagag 5820

tgaccagggc gttgagggtc ctgggggaac cgggggtagc ggcagcagcc caaatgaccc 5880

tgtgactaac atctgtcagg cagctgacaa acagctattc acgcttgttg agtgggcgaa 5940

gaggatccca cacttttcct ccttgcctct ggatgatcag gtcatattgc tgcgggcagg 6000

ctggaatgaa ctcctcattg cctccttttc acaccgatcc attgatgttc gagatggcat 6060

cctccttgcc acaggtcttc acgtgcaccg caactcagcc cattcagcag gagtaggagc 6120

catctttgat cgggtgctga cagagctagt gtccaaaatg cgtgacatga ggatggacaa 6180

gacagagctt ggctgcctga gggcaatcat tctgtttaat ccagaggtga ggggtttgaa 6240

atccgcccag gaagttgaac ttctacgtga aaaagtatat gccgctttgg aagaatatac 6300

tagaacaaca catcccgatg aaccaggaag atttgcaaaa cttttgcttc gtctgccttc 6360

tttacgttcc ataggcctta agtgtttgga gcatttgttt ttctttcgcc ttattggaga 6420

tgttccaatt gatacgttcc tgatggagat gcttgaatca ccttctgatt cataatctag 6480

cctagccccc ctctccctcc ccccccccta acgttactgg ccgaagccgc ttggaataag 6540

gccggtgtgc gtttgtctat atgttatttt ccaccatatt gccgtctttt ggcaatgtga 6600

gggcccggaa acctggccct gtcttcttga cgagcattcc taggggtctt tcccctctcg 6660

ccaaaggaat gcaaggtctg ttgaatgtcg tgaaggaagc agttcctctg gaagcttctt 6720

gaagacaaac aacgtctgta gcgacccttt gcaggcagcg gaaccccca cctggcgaca 6780

ggtgcctctg cggccaaaag ccacgtgtat aagatacacc tgcaaaggcg gcacaacccc 6840

agtgccacgt tgtgagttgg atagttgtgg aaagagtcaa atggctctcc tcaagcgtat 6900

tcaacaaggg gctgaaggat gcccagaagg taccccattg tatgggatct gatctggggc 6960

ctcggtgcac atgctttaca tgtgtttagt cgaggttaaa aaacgtctag gccccccgaa 7020

ccacggggac gtggttttcc tttgaaaaac acgatctcta ggcgccacca tgaagctact 7080

gtcttctatc gaacaagcat gcgatatttg ccgacttaaa aagctcaagt gctccaaaga 7140

aaaaccgaag tgcgccaagt gtctgaagaa caactgggag tgtcgctact ctcccaaaac 7200

caaaaggtct ccgctgacta gggcacatct gacagaagtg gaatcaaggc tagaaagact 7260

ggaacagcta tttctactga tttttcctcg agaagacctt gacatgattt tgaaaatgga 7320

ttctttacag gatataaaag cattgttaac aggattattt gtacaagata atgtgaataa 7380

agatgccgtc acagatagat tggcttcagt ggagactgat atgcctctaa cattgagaca 7440

gcatagaata agtgcgacat catcatcgga agagagtagt aacaaaggtc aaagacagtt 7500

gactgtatcg ccggaattcc cggggatccg gcctgagtgc gtagtacccg agactcagtg 7560

cgccatgaag cggaaagaga agaaagcaca gaaggagaag gacaaactgc ctgtcagcac 7620

gacgacggtg gacgaccaca tgccgcccat tatgcagtgt gaacctccac ctcctgaagc 7680

agcaaggatt cacgaagtgg tcccaaggtt tctctccgac aagctgttgg tgacaaaccg 7740

gcagaaaaac atcccccagt tgacagccaa ccagcagttc cttatcgcca ggctcatctg 7800

gtaccaggac gggtacgagc agccttctga tgaagatttg aagaggatta cgcagacgtg 7860

gcagcaagcg gacgatgaaa acgaagagtc ggacactccc ttccgccaga tcacagagat 7920

gactatcctc acggtccaac ttatcgtgga gttcgcgaag ggattgccag ggttcgccaa 7980

gatctcgcag cctgatcaaa ttacgctgct taaggcttgc tcaagtgagg taatgatgct 8040

ccgagtcgcg cgacgatacg atgcggcctc agacagtatt ctgttcgcga acaaccaagc 8100

gtacactcgc gacaactacc gcaaggctgg catggccgag gtcatcgagg atctactgca 8160

cttctgccgg tgcatgtact ctatggcgtt ggacaacatc cattacgcgc tgctcacggc 8220

tgtcgtcatc ttttctgacc ggccagggtt ggagcagccg caactggtgg aagagatcca 8280

gcggtactac ctgaatacgc tccgcatcta tatcctgaac cagctgagcg ggtcggcgcg 8340

ttcgtccgtc atatacggca agatcctctc aatcctctct gagctacgca cgctcggcat 8400

gcaaaactcc aacatgtgca tctccctcaa gctcaagaac agaaagctgc cgcctttcct 8460

cgaggagatc tgggatgtgg cggacatgtc gcacacccaa ccgccgccta tcctcgagtc 8520

ccccacgaat ctctaaatcg attacgctcc tctactcttt gagacatcac tggcctataa 8580

taaatgggtt aatttatgta acaaaattgc cttggcttgt taactttatt agacattctg 8640

atgtttgcat tgtgtaaata ctgttgtatt ggaaaagcgt gccaagatgg attattgtaa 8700

ttcagtgtct tttttagtag cgtcacgtgc caaacactgt tagtcacaga gggcatgaga 8760

cagcctgtgc tggaacagct cagttcatag ggctatggag atggggagaa aggggcgctt 8820

ctgtcagaga caagctgtgg tctgggaagg ccttagcact aaaagcacca caatgagaag 8880

caaccgccag aagcagggcc cgcaggcctt tgttccagct gcaaagagaa aggaaaaagt 8940

ggggaataag agttggggct gcggaggggg tggggagcat tgtgcaggtt ccgtacttga 9000

acagaaagca gggaccaaca caaggaaggg cgcgccaccg gtcaaatgac ggtgacaata 9060

aaacggagac tttgacccgg aacgcggaaa ttcacgtaaa aaacacctgg gcgagtcctc 9120

cacgtaatcg gtcaaagtcc ctcggccctc ggtaaatatt acgcactatg actaacgccc 9180

tattattcag ttttcacttc cccgtttcac ttttcgcgcg aaaatggcca aatcttacat 9240

ggtcccgccc aaaattacta cgatatccgg tgaaaagcgc gcgaaaattg gcacttccgg 9300

aggtaggcgg cgctcatcaa aaacgtcaca ttttccgcga cggaagcttg catgtgagct 9360

cctcccactt gcaaatgcca cacttccgcc acacctccca accctactcg cgcgtcctac 9420

gtcacccgcc ccgcctctcc ccgcccacct cattatcata ttggccacaa tccaaaataa 9480

ggtatattat tgatgatggt ttaaacgccc aattcactgg ccgtcgtttt acaacgtcgt 9540

gactgggaaa accctggcgt tacccaactt aatcgccttg cagcacatcc cctttcgcc 9600

agctggcgta atagcgaaga ggcccgcacc gatcgccctt cccaacagtt gcgcagcctg 9660

aatggcgaat ggcgcctgat gcggtatttt ctccttacgc atctgtgcgg tatttcacac 9720

cgcatatggt gcactctcag tacaatctgc tctgatgccg catagttaag ccagccccga 9780

cacccgccaa cacccgctga cgcgccctga cgggcttgtc tgctcccggc atccgcttac 9840

agacaagctg tgaccgtctc cgggagctgc atgtgtcaga ggttttcacc gtcatcaccg 9900

aaacgcgcga gacgaaaggg cctcgtgata cgcctatttt tataggttaa tgtcatgata 9960

ataatggttt cttagacgtc aggtggcact tttcggggaa atgtgcgcgg aacccctatt 10020

tgtttatttt tctaaataca 10040

<210> 63
<211> 9949
<212> DNA
<213> Artificial sequence

<220>
<223> GCAd-RTS-IL12 design 3

<400> 63
ttcaaatatg tatccgctca tgagacaata accctgataa atgcttcaat aatattgaaa 60

aaggaagagt atgagtattc aacatttccg tgtcgccctt attccctttt ttgcggcatt 120

ttgccttcct gtttttgctc acccagaaac gctggtgaaa gtaaaagatg ctgaagatca 180

gttgggtgca cgagtgggtt acatcgaact ggatctcaac agcggtaaga tccttgagag 240

ttttcgcccc gaagaacgtt ttccaatgat gagcactttt aaagttctgc tatgtggcgc 300

ggtattatcc cgtattgacg ccgggcaaga gcaactcggt cgccgcatac actattctca 360

gaatgacttg gttgagtact caccagtcac agaaaagcat cttacggatg gcatgacagt 420

aagagaatta tgcagtgctg ccataaccat gagtgataac actgcggcca acttacttct 480

gacaacgatc ggaggaccga aggagctaac cgctttttg cacaacatgg gggatcatgt 540

aactcgcctt gatcgttggg aaccggagct gaatgaagcc ataccaaacg acgagcgtga 600

caccacgatg cctgtagcaa tggcaacaac gttgcgcaaa ctattaactg gcgaactact 660

tactctagct tcccggcaac aattaataga ctggatggag gcggataaag ttgcaggacc 720

acttctgcgc tcggcccttc cggctggctg gtttattgct gataaatctg gagccggtga 780

gcgtgggtct cgcggtatca ttgcagcact ggggccagat ggtaagccct cccgtatcgt 840

agttatctac acgacgggga gtcaggcaac tatggatgaa cgaaatagac agatcgctga 900

gataggtgcc tcactgatta agcattggta actgtcagac caagtttact catatatact 960

ttagattgat ttaaaacttc atttttaatt taaaaggatc taggtgaaga tccttttga 1020

taatctcatg accaaaatcc cttaacgtga gttttcgttc cactgagcgt cagaccccgt 1080

agaaaagatc aaaggatctt cttgagatcc ttttttttctg cgcgtaatct gctgcttgca 1140

aacaaaaaaa ccaccgctac cagcggtggt ttgtttgccg gatcaagagc taccaactct 1200

ttttccgaag gtaactggct tcagcagagc gcagatacca aatactgttc ttctagtgta 1260

gccgtagtta ggccaccact tcaagaactc tgtagcaccg cctacatacc tcgctctgct 1320

aatcctgtta ccagtggctg ctgccagtgg cgataagtcg tgtcttaccg ggttggactc 1380

aagacgatag ttaccggata aggcgcagcg gtcgggctga acgggggggtt cgtgcacaca 1440

gcccagcttg gagcgaacga cctacaccga actgagatac ctacagcgtg agctatgaga 1500

aagcgccacg cttcccgaag ggagaaaggc ggacaggtat ccggtaagcg gcagggtcgg 1560

aacaggagag cgcacgaggg agcttccagg gggaaacgcc tggtatcttt atagtcctgt 1620

cgggtttcgc cacctctgac ttgagcgtcg atttttgtga tgctcgtcag gggggcggag 1680

cctatggaaa aacgccagca acgcggcctt tttacggttc ctggcctttt gctggccttt 1740

tgctcacatg ttctttcctg cgttatcccc tgattctgtg gataaccgta ttaccgcctt 1800

tgagtgagct gataccgctc gccgcagccg aacgaccgag cgcagcgagt cagtgagcga 1860

ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc gcgcgttggc cgattcatta 1920

atgcagctgg cacgacaggt ttcccgactg gaaagcgggc agtgagcgca acgcaattaa 1980

tgtgagttag ctcactcatt aggcacccca ggctttacac tttatgcttc cggctcgtat 2040

gttgtgtgga attgtgagcg gataacaatt tcacacagga aacagctatg accatgatta 2100

cgccaagctg ggtcaagtct tccagtttaa gcagcagagc ggtcagtttc tcatcccgag 2160

cagacgcgcg agaggccgcg ccgctcgcca ccaaagagct gtaaaggtcc gtagccatgc 2220

tgcgcgcggt cgcggcggcg gcggaggcgg cggcggaggt cgcggcgtcc agcggagttc 2280

ctcccacggt cgcgtaggcc attgtagacg aatttgaagg cagaacgggg cgtccatcca 2340

cgttggaacc catcacattc tgacgcactc cagcccagtg aggcatgcgc actgtcagat 2400

aggggctaaa gatgcttcca tcaaagctgt tgccggtgtc gctcatggcg gcggctgttg 2460

caagacaaaa cagagagacc cttagacccc caatttatac acgccccacc cttctagcca 2520

cgcccacctt acccacctca atcggtatcc tcatcgctag acccaaactc ggccctggtg 2580

caggccagca ccagatggtc aggcctgcag gtacgtagcc gcaataaaat atctttattt 2640

tcattacatc tgtgtgttgg ttttttgtgt gaatccatag tactaacata cgctctccat 2700

caaaacaaaa cgaaacaaaa caaactagca aaataggctg tccccagtgc aagtccaggt 2760

gccagaacat ttctctatcc ataatgcagg ggtaccggaa ggaagagggg cggggtcgat 2820

cgaccccgcc cctcttcctt cgaaggaaga ggggcggggt ccaattgcgg agtactgtcc 2880

tccgagcgga gtactgtcct ccgagcggag tactgtcctc cgagcggagt actgtcctcc 2940

gagcggagta ctgtcctccg agcggagtac tgtcctccga gcggagagtc cccggggacc 3000

tagagggtat ataatgggtg ccttagctgg tgtgtgacct catcttcctg tacgcccctg 3060

caggcagccg ctaaatccaa ggtaaggtca gaagagctag cgccaccatg tgtcaccagc 3120

agttggtcat ctcttggttc agcctggttt ttctggcatc tcccctcgtg gccatctggg 3180

aactgaagaa agatgtttat gtcgtagaat tggattggta tcccgacgcc cctggagaaa 3240

tggtggtcct gacatgtgac acccctgaag aagatggtat cacctggacc ttggaccaga 3300

gcagtgaggt cttaggctct ggcaagaccc tgaccatcca agtcaaagag tttggagatg 3360

ctggccagta cacctgtcac aaaggaggcg aggttctaag ccattcgctc ctgctgcttc 3420

acaaaaagga agatggaatt tggtccactg acattctgaa ggaccagaaa gaacccaaga 3480

ataagacctt tctaagatgc gaggccaaga attattctgg acgtttcacc tgctggtggc 3540

tgacgacaat cagtactgat ttgacattca gtgtcaaaag cagcagaggc tcttctgacc 3600

cccaaggggt gacgtgcgga gctgctacac tcagcgccga gagagtcaga ggggacaaca 3660

aggagtatga gtactcagtg gagtgccagg aggacagtgc ctgcccagct gctgaggaga 3720

gtctgcccat tgaggtcatg gtggatgccg ttcacaagct caagtatgaa aactacacca 3780

gcagcttctt catcagggac atcatcaaac ctgacccacc caagaacttg cagctgaagc 3840

ccctgaagaa cagcagacag gtggaggtca gctgggagta ccctgacacc tggagtactc 3900

cacattccta cttctccctg acattctgcg ttcaggtcca gggcaagagc aagagagaaa 3960

agaaagatag agtcttcacg gacaagacct cagccacggt catctgccgc aaaaatgcca 4020

gcattagcgt gcgggcccag gaccgctact atagctcatc ttggagcgaa tgggcatctg 4080

tgccctgctc cggtggcggt ggcggcggat ctagaaacct ccccgtggcc actccagacc 4140

caggaatgtt cccatgcctt caccacagcc agaacctgct gagggccgtc agcaacatgc 4200

tccagaaggc cagacaaact ctagaatttt acccttgcac ttctgaagag attgatcatg 4260

aagatatcac aaaagataaa accagcacag tggaggcctg tttaccattg gaattaacca 4320

agaatgagag ttgcctaaat tccagagaga cctctttcat aactaatggg agttgcctgg 4380

cctccagaaa gacctctttt atgatggccc tgtgccttag tagtatttat gaagacttga 4440

agatgtacca ggtggagttc aagaccatga atgcaaagct gctgatggac cccaagaggc 4500

agatctttct agatcaaaac atgctggcag ttattgatga gctgatgcag gccctgaatt 4560

tcaacagtga gactgtgcca caaaaatcct cccttgaaga accggatttt tataaaacta 4620

aaatcaagct ctgcatactt cttcatgctt tcagaatcag agcagtgact attgatagag 4680

tgatgagcta tctgaatgct tcctaaatcg atttatttat cggcataaat aatttttttg 4740

aagaagtaat actatttttc ttttttttttg taaataaatg ggttaaggga tgtaacattg 4800

tttgttgttt ggtgggggtt ggggcctccg cgccgggttt tggcgcctcc cgcgggcgcc 4860

cccctcctca cggcgagcgc tgccacgtca gacgaagggc gcagcgagcg tcctgatcct 4920

tccgcccgga cgctcaggac agcggcccgc tgctcataag actcggcctt agaaccccag 4980

tatcagcaga aggacatttt aggacgggac ttgggtgact ctagggcact ggttttcttt 5040

ccagagagcg gaacaggcga ggaaaagtag tcccttctcg gcgattctgc ggagggatct 5100

ccgtggggcg gtgaacgccg atgattatat aaggacgcgc cgggtgtggc acagctagtt 5160

ccgtcgcagc cgggatttgg gtcgcggttc ttgtttgtgg atcgctgtga tcgtcacttg 5220

gtgagtagcg ggctgctggg ctgggtacgt gcgctcgggg ttggcgagtg tgttttgtga 5280

agtttttag gcacctttg aaatgtaatc atttgggtca atatgtaatt ttcagtgtta 5340

gactagtaaa ttgtccgcta aattctggcc gtttttggct tttttgttag acgagctagc 5400

gccgccacca tgggccctaa aaagaagcgt aaagtcgccc ccccgaccga tgtcagcctg 5460

ggggacgagc tccacttaga cggcgaggac gtggcgatgg cgcatgccga cgcgctagac 5520

gatttcgatc tggacatgtt gggggacggg gattccccgg gtccgggatt tacccccac 5580

gactccgccc cctacggcgc tctggatatg gccgacttcg agtttgagca gatgtttacc 5640

gatgcccttg gaattgacga gtacggtggg gaattcgaga tgcctgtgga caggatcctg 5700

gaggcagagc ttgctgtgga acagaagagt gaccagggcg ttgagggtcc tgggggaacc 5760

gggggtagcg gcagcagccc aaatgaccct gtgactaaca tctgtcaggc agctgacaaa 5820

cagctattca cgcttgttga gtgggcgaag aggatcccac acttttcctc cttgcctctg 5880

gatgatcagg tcatattgct gcgggcaggc tggaatgaac tcctcattgc ctccttttca 5940

caccgatcca ttgatgttcg agatggcatc ctccttgcca caggtcttca cgtgcaccgc 6000

aactcagccc attcagcagg agtaggagcc atctttgatc gggtgctgac agagctagtg 6060

tccaaaatgc gtgacatgag gatggacaag acagagcttg gctgcctgag ggcaatcatt 6120

ctgtttaatc cagaggtgag gggtttgaaa tccgcccagg aagttgaact tctacgtgaa 6180

aaagtatatg ccgctttgga agaatatact agaacaacac atcccgatga accaggaaga 6240

tttgcaaaac ttttgcttcg tctgccttct ttacgttcca taggccttaa gtgtttggag 6300

catttgtttt tctttcgcct tattggagat gttccaattg atacgttcct gatggagatg 6360

cttgaatcac cttctgattc ataatctagc ctagcccccc tctccctccc ccccccctaa 6420

cgttactggc cgaagccgct tggaataagg ccggtgtgcg tttgtctata tgttattttc 6480

caccatattg ccgtcttttg gcaatgtgag ggcccggaaa cctggccctg tcttcttgac 6540

gagcattcct aggggtcttt cccctctcgc caaaggaatg caaggtctgt tgaatgtcgt 6600

gaaggaagca gttcctctgg aagcttcttg aagacaaaca acgtctgtag cgacccttg 6660

caggcagcgg aacccccccac ctggcgacag gtgcctctgc ggccaaaagc cacgtgtata 6720

agatacacct gcaaaggcgg cacaacccca gtgccacgtt gtgagttgga tagttgtgga 6780

aagagtcaaa tggctctcct caagcgtatt caacaagggg ctgaaggatg cccagaaggt 6840

accccattgt atgggatctg atctggggcc tcggtgcaca tgctttacat gtgtttagtc 6900

gaggttaaaa aacgtctagg ccccccgaac cacggggacg tggttttcct ttgaaaaaca 6960

cgatctctag gcgccaccat gaagctactg tcttctatcg aacaagcatg cgatatttgc 7020

cgacttaaaa agctcaagtg ctccaaagaa aaaccgaagt gcgccaagtg tctgaagaac 7080

aactgggagt gtcgctactc tcccaaaacc aaaaggtctc cgctgactag ggcacatctg 7140

acagaagtgg aatcaaggct agaaagactg gaacagctat ttctactgat ttttcctcga 7200

gaagaccttg acatgatttt gaaaatggat tctttacagg atataaaagc attgttaaca 7260

ggattatttg tacaagataa tgtgaataaa gatgccgtca cagatagatt ggcttcagtg 7320

gagactgata tgcctctaac attgagacag catagaataa gtgcgacatc atcatcggaa 7380

gagagtagta acaaaggtca aagacagttg actgtatcgc cggaattccc ggggatccgg 7440

cctgagtgcg tagtacccga gactcagtgc gccatgaagc ggaaagagaa gaaagcacag 7500

aaggagaagg acaaactgcc tgtcagcacg acgacggtgg acgaccacat gccgcccatt 7560

atgcagtgtg aacctccacc tcctgaagca gcaaggattc acgaagtggt cccaaggttt 7620

ctctccgaca agctgttggt gacaaaccgg cagaaaaaca tcccccagtt gacagccaac 7680

cagcagttcc ttatcgccag gctcatctgg taccaggacg ggtacgagca gccttctgat 7740

gaagatttga agaggattac gcagacgtgg cagcaagcgg acgatgaaaa cgaagagtcg 7800

gacactccct tccgccagat cacagagatg actatcctca cggtccaact tatcgtggag 7860

ttcgcgaagg gattgccagg gttcgccaag atctcgcagc ctgatcaaat tacgctgctt 7920

aaggcttgct caagtgaggt aatgatgctc cgagtcgcgc gacgatacga tgcggcctca 7980

gacagtattc tgttcgcgaa caaccaagcg tacactcgcg acaactaccg caaggctggc 8040

atggccgagg tcatcgagga tctactgcac ttctgccggt gcatgtactc tatggcgttg 8100

gacaacatcc attacgcgct gctcacggct gtcgtcatct tttctgaccg gccagggttg 8160

gagcagccgc aactggtgga agagatccag cggtactacc tgaatacgct ccgcatctat 8220

atcctgaacc agctgagcgg gtcggcgcgt tcgtccgtca tatacggcaa gatcctctca 8280

atcctctctg agctacgcac gctcggcatg caaaactcca acatgtgcat ctccctcaag 8340

ctcaagaaca gaaagctgcc gcctttcctc gaggagatct gggatgtggc ggacatgtcg 8400

cacacccaac cgccgcctat cctcgagtcc cccacgaatc tctaaatcga ttacgctcct 8460

ctactctttg agacatcact ggcctataat aaatgggtta atttatgtaa caaaattgcc 8520

ttggcttgtt aactttatta gacattctga tgtttgcatt gtgtaaatac tgttgtattg 8580

gaaaagcgtg ccaagatgga ttattgtaat tcagtgtctt ttttagtagc gtcacgtgcc 8640

aaacactgtt agtcacagag ggcatgagac agcctgtgct ggaacagctc agttcatagg 8700

gctatggaga tggggagaaa ggggcgcttc tgtcagagac aagctgtggt ctgggaaggc 8760

cttagcacta aaagcaccac aatgagaagc aaccgccaga agcagggccc gcaggccttt 8820

gttccagctg caaagagaaa ggaaaaagtg gggaataaga gttggggctg cggagggggt 8880

ggggagcatt gtgcaggttc cgtacttgaa cagaaagcag ggaccaacac aaggaagggc 8940

gcgccaccgg tcaaatgacg gtgacaataa aacggagact ttgacccgga acgcggaaat 9000

tcacgtaaaa aacacctggg cgagtcctcc acgtaatcgg tcaaagtccc tcggccctcg 9060

gtaaatatta cgcactatga ctaacgccct attattcagt tttcacttcc ccgtttcact 9120

tttcgcgcga aaatggccaa atcttacatg gtcccgccca aaattactac gatatccggt 9180

gaaaagcgcg cgaaaattgg cacttccgga ggtaggcggc gctcatcaaa aacgtcacat 9240

tttccgcgac ggaagcttgc atgtgagctc ctcccacttg caaatgccac acttccgcca 9300

cacctcccaa ccctactcgc gcgtcctacg tcacccgccc cgcctctccc cgcccacctc 9360

attatcatat tggccacaat ccaaaataag gtatattatt gatgatggtt taaacgccca 9420

attcactggc cgtcgtttta caacgtcgtg actgggaaaa ccctggcgtt acccaactta 9480

atcgccttgc agcacatccc cctttcgcca gctggcgtaa tagcgaagag gcccgcaccg 9540

atcgcccttc ccaacagttg cgcagcctga atggcgaatg gcgcctgatg cggtattttc 9600

tccttacgca tctgtgcggt atttcacacc gcatatggtg cactctcagt acaatctgct 9660

ctgatgccgc atagttaagc cagccccgac acccgccaac acccgctgac gcgccctgac 9720

gggcttgtct gctcccggca tccgcttaca gacaagctgt gaccgtctcc gggagctgca 9780

tgtgtcagag gttttcaccg tcatcaccga aacgcgcgag acgaaagggc ctcgtgatac 9840

gcctattttt ataggttaat gtcatgataa taatggtttc ttagacgtca ggtggcactt 9900

ttcggggaaa tgtgcgcgga acccctattt gtttattttt ctaaataca 9949

<210> 64
<211> 54
<212> DNA
<213> Artificial sequence

<220>
<223> Whitlow Linker

<400> 64
ggcagcacct ccggcagcgg caagcctggc agcggcgagg gcagcaccaa gggc 54

<210> 65
<211> 78
<212> DNA
<213> Artificial sequence

<220>
<223> Linker

<400> 65
tctggcggag gatctggagg aggcggatct ggaggaggag gcagtggagg cggaggatct 60

ggcggaggat ctctgcag 78

<210> 66
<211> 9
<212> DNA
<213> Artificial sequence

<220>
<223> GSG linker

<400> 66
ggaagcgga 9

<210> 67
<211> 12
<212> DNA
<213> Artificial sequence

<220>
<223> SGSG linker

<400> 67
agtggcagcg gc 12

<210> 68
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> (G4S)3 linker

<400> 68
ggtggcggtg gctcgggcgg tggtgggtcg ggtggcggcg gatct 45

<210> 69
<211> 12
<212> DNA
<213> Artificial sequence

<220>
<223> Furin cleavage site/ Furinlink1

<400> 69
cgtgcaaagc gt 12

<210> 70
<211> 84
<212> DNA
<213> Artificial sequence

<220>
<223> Fmdv

<400> 70
agagccaaga gggcaccggt gaaacagact ttgaattttg accttctgaa gttggcagga 60

gacgttgagt ccaaccctgg gccc 84

<210> 71
<211> 54
<212> DNA
<213> Artificial sequence

<220>
<223> Thosea asigna virus 2A region (T2A)

<400> 71
gagggcagag gaagtctgct aacatgcggt gacgtcgagg agaatcctgg acct 54

<210> 72
<211> 75

<212> DNA
<213> Artificial sequence

<220>
<223> Furin-GSG-T2A

<400> 72
agagctaaga ggggaagcgg agagggcaga ggaagtctgc taacatgcgg tgacgtcgag 60

gagaatcctg gacct 75

<210> 73
<211> 78
<212> DNA
<213> Artificial sequence

<220>
<223> Furin-SGSG-T2A

<400> 73
agggccaaga ggagtggcag cggcgagggc agaggaagtc ttctaacatg cggtgacgtg 60

gaggagaatc ccggccct 78

<210> 74
<211> 57
<212> DNA
<213> Artificial sequence

<220>
<223> Porcine teschovirus-1 2A region (P2A)

<400> 74
gcaacgaact tctctctcct aaaacaggct ggtgatgtgg aggagaatcc tggtcca 57

<210> 75
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> GSG-P2A

<400> 75
ggaagcggag ctactaactt cagcctgctg aagcaggctg gagacgtgga ggagaaccct 60

ggacct 66

<210> 76

<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> Equine rhinitis A virus 2A region (E2A)

<400> 76
cagtgtacta attatgctct cttgaaattg gctggagatg ttgagagcaa ccctggacct 60

<210> 77
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> Foot-and-mouth disease virus 2A region (F2A)

<400> 77
gtcaaacaga ccctaaactt tgatctgcta aaactggccg gggatgtgga aagtaatccc 60

ggcccc 66

<210> 78
<211> 93
<212> DNA
<213> Artificial sequence

<220>
<223> FP2A

<400> 78
cgtgcaaagc gtgcaccggt gaaacaggga agcggagcta ctaacttcag cctgctgaag 60

caggctggag acgtggagga gaaccctgga cct 93

<210> 79
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> Linker-GSG

<400> 79
gcaccggtga aacagggaag cgga 24

<210> 80
<211> 15

<212> DNA
<213> Artificial sequence

<220>
<223> Linker

<400> 80
gcaccggtga aacag 15

<210> 81
<211> 18
<212> PRT
<213> Artificial sequence

<220>
<223> Whitlow Linker Amino Acid Sequence

<400> 81

Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser Thr
1 5 10 15

Lys Gly

<210> 82
<211> 26
<212> PRT
<213> Artificial sequence

<220>
<223> Linker Amino Acid Sequence

<400> 82

Ser Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
1 5 10 15

Gly Gly Gly Ser Gly Gly Gly Ser Leu Gln
20 25

<210> 83
<211> 3
<212> PRT
<213> Artificial sequence

<220>
<223> GSG Linker Amino Acid Sequence

<400> 83

Gly Ser Gly
1

<210> 84
<211> 4
<212> PRT
<213> Artificial sequence

<220>
<223> SGSG Linker Amino Acid Sequence

<400> 84

Ser Gly Ser Gly
1

<210> 85
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> (G4S) 3 Linker Amino Acid sequence

<400> 85

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
1   5   10   15

<210> 86
<211> 4
<212> PRT
<213> Artificial sequence

<220>
<223> Linker Polypeptide component

<400> 86

Arg Ala Lys Arg
1

<210> 87
<211> 28
<212> PRT
<213> Artificial sequence

<220>
<223> Fmdv Amino Acid Sequence

<400> 87

Arg Ala Lys Arg Ala Pro Val Lys Gln Thr Leu Asn Phe Asp Leu Leu
1   5   10   15

Lys Leu Ala Gly Asp Val Glu Ser Asn Pro Gly Pro
            20   25

<210> 88
<211> 18
<212> PRT
<213> Artificial sequence

<220>
<223> Furin-GSG-T2A Amino Acid Sequence

<400> 88

Glu Gly Arg Gly Ser Leu Leu Thr Cys Gly Asp Val Glu Glu Asn Pro
1   5   10   15

Gly Pro

<210> 89
<211> 25
<212> PRT
<213> Artificial sequence

<220>
<223> Furin-SGSG-T2A Amino Acid Sequence

<400> 89

Arg Ala Lys Arg Gly Ser Gly Glu Gly Arg Gly Ser Leu Leu Thr Cys
1   5   10   15

Gly Asp Val Glu Glu Asn Pro Gly Pro
            20   25

<210> 90
<211> 26
<212> PRT

<213> Artificial sequence

<220>
<223> Furin-SGSG-T2A

<400> 90

Arg Ala Lys Arg Ser Gly Ser Gly Glu Gly Arg Gly Ser Leu Leu Thr
1 5 10 15

Cys Gly Asp Val Glu Glu Asn Pro Gly Pro
20 25

<210> 91
<211> 19
<212> PRT
<213> Artificial sequence

<220>
<223> Porcine teschovirus-1 2A region (P2A)

<400> 91

Ala Thr Asn Phe Ser Leu Leu Lys Gln Ala Gly Asp Val Glu Glu Asn
1 5 10 15

Pro Gly Pro

<210> 92
<211> 22
<212> PRT
<213> Artificial sequence

<220>
<223> GSG-P2A Amino Acid Sequence

<400> 92

Gly Ser Gly Ala Thr Asn Phe Ser Leu Leu Lys Gln Ala Gly Asp Val
1 5 10 15

Glu Glu Asn Pro Gly Pro
20

<210> 93
<211> 20

<212> PRT
<213> Artificial sequence

<220>
<223> Equine rhinitis A virus 2A region (E2A) Amino Acid Sequence

<400> 93

Gln Cys Thr Asn Tyr Ala Leu Leu Lys Leu Ala Gly Asp Val Glu Ser
1   5   10   15

Asn Pro Gly Pro
            20

<210> 94
<211> 22
<212> PRT
<213> Artificial sequence

<220>
<223> Foot-and-mouth disease virus 2A region (F2A) Amino Acid Sequence

<400> 94

Val Lys Gln Thr Leu Asn Phe Asp Leu Leu Lys Leu Ala Gly Asp Val
1   5   10   15

Glu Ser Asn Pro Gly Pro
            20

<210> 95
<211> 31
<212> PRT
<213> Artificial sequence

<220>
<223> FP2A Amino Acid Sequence

<400> 95

Arg Ala Lys Arg Ala Pro Val Lys Gln Gly Ser Gly Ala Thr Asn Phe
1   5   10   15

Ser Leu Leu Lys Gln Ala Gly Asp Val Glu Glu Asn Pro Gly Pro
            20   25   30

<210> 96

<211> 8
<212> PRT
<213> Artificial sequence

<220>
<223> Linker-GSG Amino Acid

<400> 96

Ala Pro Val Lys Gln Gly Ser Gly
1 5

<210> 97
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> Linker Amino Acid

<400> 97

Ala Pro Val Lys Gln
1 5

<210> 98
<211> 154
<212> PRT
<213> Artificial sequence

<220>
<223> HBV HBx domain of HBV design 1

<400> 98

Met Ala Ala Arg Leu Cys Cys Gln Leu Asp Pro Ala Arg Asp Val Leu
1 5 10 15

Cys Leu Arg Pro Val Gly Ala Glu Ser Arg Gly Arg Pro Phe Ser Gly
20 25 30

Pro Leu Gly Ala Leu Ser Ser Ser Ser Pro Pro Ala Val Pro Thr Asp
35 40 45

His Gly Ala His Leu Ser Leu Arg Gly Leu Pro Val Cys Ala Phe Ser
50 55 60

```
Ser Ala Gly Pro Cys Ala Leu Arg Phe Thr Ser Ala Arg Arg Met Glu
65                  70                  75                  80


Thr Thr Val Asn Ala His Gln Phe Leu Pro Lys Val Leu His Lys Arg
                85                  90                  95


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


Lys Asp Cys Leu Phe Lys Asp Trp Glu Glu Leu Gly Glu Glu Leu Arg
        115                 120                 125


Leu Lys Val Phe Val Leu Gly Gly Cys Arg His Lys Leu Val Cys Ala
    130                 135                 140


Pro Ala Pro Cys Asn Phe Phe Thr Ser Ala
145                 150


<210>  99
<211>  454
<212>  PRT
<213>  Artificial sequence

<220>
<223>  HBV Pol domain of HBV design 1

<400>  99

Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg Ile Pro Arg Thr
1               5                   10                  15


Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys Asn Pro His
            20                  25                  30


Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg
        35                  40                  45


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


Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Cys Trp Leu Ser Leu Asp
65                  70                  75                  80
```

```
Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala Met Pro
                85                  90                  95

His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val Ala Arg Leu
            100                 105                 110

Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Gly Thr Leu Gln Asn
        115                 120                 125

Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu
    130                 135                 140

Tyr Lys Thr Phe Gly Trp Lys Leu His Leu Tyr Ser His Pro Ile Ile
145                 150                 155                 160

Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu
                165                 170                 175

Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe
            180                 185                 190

Pro His Cys Leu Ala Phe Ser Gly Ala Lys Ser Val Gln His Leu Glu
        195                 200                 205

Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His
    210                 215                 220

Leu Asn Pro Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met
225                 230                 235                 240

Gly Tyr Val Ile Gly Ser Trp Gly Ser Leu Pro Gln Asp His Ile Arg
                245                 250                 255

His Lys Ile Lys Glu Cys Phe Arg Lys Leu Pro Val His Arg Pro Ile
            260                 265                 270

Asp Trp Lys Val Cys Gln Arg Ile Val Gly Leu Leu Gly Phe Ala Ala
        275                 280                 285
```

```
Pro Phe Thr Gln Cys Gly Tyr Pro Ala Leu Met Pro Leu Tyr Ala Cys
    290                 295                 300

Ile Gln Ser Lys Gln Ala Phe Thr Phe Ser Pro Thr Tyr Lys Ala Phe
305                 310                 315                 320

Leu Cys Lys Gln Tyr Leu Asn Leu Tyr Pro Val Ala Arg Gln Arg Pro
                325                 330                 335

Gly Leu Cys Gln Val Phe Ala Asp Ala Thr Pro Thr Gly Trp Gly Leu
            340                 345                 350

Val Met Gly His Gln Arg Met Arg Gly Thr Phe Ser Ser Arg Lys Tyr
        355                 360                 365

Thr Ser Phe Pro Trp Leu Leu Gly Cys Ala Ala Asn Trp Ile Leu Arg
    370                 375                 380

Gly Thr Ser Phe Val Tyr Val Pro Ser Ala Leu Asn Pro Ala Asp Asp
385                 390                 395                 400

Pro Ser Arg Gly Arg Leu Gly Pro Cys Arg Pro Leu Leu His Leu Pro
                405                 410                 415

Phe Arg Pro Thr Thr Gly Arg Thr Ser Leu Tyr Ala Asp Ser Pro Ser
            420                 425                 430

Val Pro Ser His Leu Pro Asp Arg Val His Phe Ala Ser Pro Leu His
        435                 440                 445

Val Ala Trp Arg Pro Pro
    450
```

<210> 100
<211> 226
<212> PRT
<213> Artificial sequence

<220>
<223> HBV Surface (Env1) domain of HBV domain 1

<400> 100

```
Met Glu Asn Ile Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln
1               5                  10                  15

Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
            20                  25                  30

Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Gly Thr Thr Val Cys
        35                  40                  45

Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
    50                  55                  60

Cys Pro Pro Thr Cys Val Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65                  70                  75                  80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
                85                  90                  95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
            100                 105                 110

Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
        115                 120                 125

Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
    130                 135                 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
145                 150                 155                 160

Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
                165                 170                 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
            180                 185                 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Thr
        195                 200                 205
```

Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Tyr Leu Trp Val
210 215 220

Tyr Ile
225

<210> 101
<211> 180
<212> PRT
<213> Artificial sequence

<220>
<223> HBV Core domain of HBV design 1

<400> 101

Met Gln Leu Phe His Leu Cys Leu Ile Ile Ser Cys Ser Cys Pro Thr
1 5 10 15

Val Gln Ala Ser Lys Leu Cys Leu Gly Trp Leu Trp Asp Met Asp Ile
20 25 30

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

Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp Thr Ala Thr
50 55 60

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

His Thr Ala Leu Arg His Val Cys Leu Cys Trp Gly Asp Leu Met Asn
85 90 95

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

Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys Phe Arg Gln
115 120 125

Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg Asp Leu Val
130 135 140

```
Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala
145                 150                 155                 160


Tyr Arg Pro Ser Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu Thr Thr
                165                 170                 175


Val Val Arg Gln
            180


<210>  102
<211>  226
<212>  PRT
<213>  Artificial sequence

<220>
<223>  SHB(Env) domain

<400>  102

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


Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
            20                  25                  30


Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Gly Thr Thr Val Cys
        35                  40                  45


Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
    50                  55                  60


Cys Pro Pro Thr Cys Val Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65                  70                  75                  80


Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
                85                  90                  95


Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
            100                 105                 110


Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
        115                 120                 125
```

Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
    130   135   140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
145   150   155   160

Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
                165   170   175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
            180   185   190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Thr
        195   200   205

Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Tyr Leu Trp Val
    210   215   220

Tyr Ile
225

<210> 103
<211> 180
<212> PRT
<213> Artificial sequence

<220>
<223> HBeAg domain

<400> 103

Met Gln Leu Phe His Leu Cys Leu Ile Ile Ser Cys Ser Cys Pro Thr
1   5   10   15

Val Gln Ala Ser Lys Leu Cys Leu Gly Trp Leu Trp Asp Met Asp Ile
            20   25   30

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

Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp Thr Ala Thr

```
    50                  55                  60

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

His Thr Ala Leu Arg His Val Cys Leu Cys Trp Gly Asp Leu Met Asn
                85                  90                  95

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

Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys Phe Arg Gln
        115                 120                 125

Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg Asp Leu Val
    130                 135                 140

Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala
145                 150                 155                 160

Tyr Arg Pro Ser Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu Thr Thr
                165                 170                 175

Val Val Arg Gln
            180


<210>  104
<211>  154
<212>  PRT
<213>  Artificial sequence

<220>
<223>  HBx domain

<400>  104

Met Ala Ala Arg Leu Cys Cys Gln Leu Asp Pro Ala Arg Asp Val Leu
1               5                   10                  15

Cys Leu Arg Pro Val Gly Ala Glu Ser Arg Gly Arg Pro Phe Ser Gly
            20                  25                  30
```

Pro Leu Gly Ala Leu Ser Ser Ser Ser Pro Pro Ala Val Pro Thr Asp
        35   40   45

His Gly Ala His Leu Ser Leu Arg Gly Leu Pro Val Cys Ala Phe Ser
    50   55   60

Ser Ala Gly Pro Cys Ala Leu Arg Phe Thr Ser Ala Arg Arg Met Glu
65   70   75   80

Thr Thr Val Asn Ala His Gln Phe Leu Pro Lys Val Leu His Lys Arg
                85   90   95

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

Lys Asp Cys Leu Phe Lys Asp Trp Glu Glu Leu Gly Glu Glu Leu Arg
        115   120   125

Leu Lys Val Phe Val Leu Gly Gly Cys Arg His Lys Leu Val Cys Ala
    130   135   140

Pro Ala Pro Cys Asn Phe Phe Thr Ser Ala
145   150

<210> 105
<211> 454
<212> PRT
<213> Artificial sequence

<220>
<223> Pol domain

<400> 105

Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg Ile Pro Arg Thr
1   5   10   15

Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys Asn Pro His
            20   25   30

Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg
        35   40   45

```
Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln
    50                  55                  60

Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Cys Trp Leu Ser Leu Asp
65                  70                  75                  80

Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala Met Pro
                85                  90                  95

His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val Ala Arg Leu
            100                 105                 110

Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Gly Thr Leu Gln Asn
        115                 120                 125

Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu
    130                 135                 140

Tyr Lys Thr Phe Gly Trp Lys Leu His Leu Tyr Ser His Pro Ile Ile
145                 150                 155                 160

Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu
                165                 170                 175

Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe
            180                 185                 190

Pro His Cys Leu Ala Phe Ser Gly Ala Lys Ser Val Gln His Leu Glu
        195                 200                 205

Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His
    210                 215                 220

Leu Asn Pro Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met
225                 230                 235                 240

Gly Tyr Val Ile Gly Ser Trp Gly Ser Leu Pro Gln Asp His Ile Arg
                245                 250                 255
```

```
His Lys Ile Lys Glu Cys Phe Arg Lys Leu Pro Val His Arg Pro Ile
            260                 265                 270

Asp Trp Lys Val Cys Gln Arg Ile Val Gly Leu Leu Gly Phe Ala Ala
        275                 280                 285

Pro Phe Thr Gln Cys Gly Tyr Pro Ala Leu Met Pro Leu Tyr Ala Cys
    290                 295                 300

Ile Gln Ser Lys Gln Ala Phe Thr Phe Ser Pro Thr Tyr Lys Ala Phe
305                 310                 315                 320

Leu Cys Lys Gln Tyr Leu Asn Leu Tyr Pro Val Ala Arg Gln Arg Pro
                325                 330                 335

Gly Leu Cys Gln Val Phe Ala Asp Ala Thr Pro Thr Gly Trp Gly Leu
            340                 345                 350

Val Met Gly His Gln Arg Met Arg Gly Thr Phe Ser Ser Arg Lys Tyr
        355                 360                 365

Thr Ser Phe Pro Trp Leu Leu Gly Cys Ala Ala Asn Trp Ile Leu Arg
    370                 375                 380

Gly Thr Ser Phe Val Tyr Val Pro Ser Ala Leu Asn Pro Ala Asp Asp
385                 390                 395                 400

Pro Ser Arg Gly Arg Leu Gly Pro Cys Arg Pro Leu Leu His Leu Pro
                405                 410                 415

Phe Arg Pro Thr Thr Gly Arg Thr Ser Leu Tyr Ala Asp Ser Pro Ser
            420                 425                 430

Val Pro Ser His Leu Pro Asp Arg Val His Phe Ala Ser Pro Leu His
        435                 440                 445

Val Ala Trp Arg Pro Pro
    450
```

<210> 106

<211> 1014
<212> PRT
<213> Artificial sequence

<220>
<223> HBV design 1

<400> 106

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

Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
20 25 30

Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Gly Thr Thr Val Cys
35 40 45

Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

Cys Pro Pro Thr Cys Val Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
100 105 110

Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
115 120 125

Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

```
Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
            180                 185                 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Thr
        195                 200                 205

Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Tyr Leu Trp Val
    210                 215                 220

Tyr Ile Met Gln Leu Phe His Leu Cys Leu Ile Ile Ser Cys Ser Cys
225                 230                 235                 240

Pro Thr Val Gln Ala Ser Lys Leu Cys Leu Gly Trp Leu Trp Asp Met
                245                 250                 255

Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Ser Val Glu Leu Leu Ser
            260                 265                 270

Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp Thr
        275                 280                 285

Ala Thr Ala Leu Tyr Arg Asp Ala Leu Glu Ser Pro Glu His Cys Thr
    290                 295                 300

Pro His His Thr Ala Leu Arg His Val Cys Leu Cys Trp Gly Asp Leu
305                 310                 315                 320

Met Asn Leu Ala Thr Trp Val Gly Thr Asn Leu Glu Asp Gln Ala Ser
                325                 330                 335

Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys Phe
            340                 345                 350

Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg Asp
        355                 360                 365

Leu Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro
    370                 375                 380

Pro Ala Tyr Arg Pro Ser Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu
```

385 390 395 400

Thr Thr Val Val Arg Gln Met Ala Ala Arg Leu Cys Cys Gln Leu Asp
405 410 415

Pro Ala Arg Asp Val Leu Cys Leu Arg Pro Val Gly Ala Glu Ser Arg
420 425 430

Gly Arg Pro Phe Ser Gly Pro Leu Gly Ala Leu Ser Ser Ser Ser Pro
435 440 445

Pro Ala Val Pro Thr Asp His Gly Ala His Leu Ser Leu Arg Gly Leu
450 455 460

Pro Val Cys Ala Phe Ser Ser Ala Gly Pro Cys Ala Leu Arg Phe Thr
465 470 475 480

Ser Ala Arg Arg Met Glu Thr Thr Val Asn Ala His Gln Phe Leu Pro
485 490 495

Lys Val Leu His Lys Arg Thr Leu Gly Leu Ser Ala Met Ser Thr Thr
500 505 510

Asp Leu Glu Ala Tyr Phe Lys Asp Cys Leu Phe Lys Asp Trp Glu Glu
515 520 525

Leu Gly Glu Glu Leu Arg Leu Lys Val Phe Val Leu Gly Gly Cys Arg
530 535 540

His Lys Leu Val Cys Ala Pro Ala Pro Cys Asn Phe Phe Thr Ser Ala
545 550 555 560

Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg Ile Pro Arg Thr
565 570 575

Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys Asn Pro His
580 585 590

Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg
595 600 605

```
Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln
    610                 615                 620

Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Cys Trp Leu Ser Leu Asp
625                 630                 635                 640

Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala Met Pro
                645                 650                 655

His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val Ala Arg Leu
            660                 665                 670

Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Gly Thr Leu Gln Asn
        675                 680                 685

Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu
    690                 695                 700

Tyr Lys Thr Phe Gly Trp Lys Leu His Leu Tyr Ser His Pro Ile Ile
705                 710                 715                 720

Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu
                725                 730                 735

Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe
            740                 745                 750

Pro His Cys Leu Ala Phe Ser Gly Ala Lys Ser Val Gln His Leu Glu
        755                 760                 765

Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His
    770                 775                 780

Leu Asn Pro Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met
785                 790                 795                 800

Gly Tyr Val Ile Gly Ser Trp Gly Ser Leu Pro Gln Asp His Ile Arg
                805                 810                 815
```

```
His Lys Ile Lys Glu Cys Phe Arg Lys Leu Pro Val His Arg Pro Ile
            820                 825                 830

Asp Trp Lys Val Cys Gln Arg Ile Val Gly Leu Leu Gly Phe Ala Ala
        835                 840                 845

Pro Phe Thr Gln Cys Gly Tyr Pro Ala Leu Met Pro Leu Tyr Ala Cys
    850                 855                 860

Ile Gln Ser Lys Gln Ala Phe Thr Phe Ser Pro Thr Tyr Lys Ala Phe
865                 870                 875                 880

Leu Cys Lys Gln Tyr Leu Asn Leu Tyr Pro Val Ala Arg Gln Arg Pro
                885                 890                 895

Gly Leu Cys Gln Val Phe Ala Asp Ala Thr Pro Thr Gly Trp Gly Leu
            900                 905                 910

Val Met Gly His Gln Arg Met Arg Gly Thr Phe Ser Ser Arg Lys Tyr
        915                 920                 925

Thr Ser Phe Pro Trp Leu Leu Gly Cys Ala Ala Asn Trp Ile Leu Arg
    930                 935                 940

Gly Thr Ser Phe Val Tyr Val Pro Ser Ala Leu Asn Pro Ala Asp Asp
945                 950                 955                 960

Pro Ser Arg Gly Arg Leu Gly Pro Cys Arg Pro Leu Leu His Leu Pro
                965                 970                 975

Phe Arg Pro Thr Thr Gly Arg Thr Ser Leu Tyr Ala Asp Ser Pro Ser
            980                 985                 990

Val Pro Ser His Leu Pro Asp Arg  Val His Phe Ala Ser  Pro Leu His
        995                 1000                1005

Val Ala  Trp Arg Pro Pro
    1010
```

<210> 107
<211> 1021
<212> PRT
<213> Artificial sequence

<220>
<223> HBV design 2

<400> 107

Ser Val Glu Leu Leu Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val
1 5 10 15

Arg Asp Leu Leu Asp Thr Ala Thr Ala Leu Tyr Arg Asp Ala Leu Glu
20 25 30

Ser Pro Glu His Cys Thr Pro His His Thr Ala Leu Arg His Val Cys
35 40 45

Leu Cys Trp Gly Asp Leu Met Asn Leu Ala Thr Trp Val Gly Thr Asn
50 55 60

Leu Glu Asp Gln Ala Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr
65 70 75 80

Asn Met Gly Leu Lys Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys
85 90 95

Leu Thr Phe Gly Arg Asp Leu Val Leu Glu Tyr Leu Val Ser Phe Gly
100 105 110

Val Trp Ile Arg Thr Pro Pro Ala Tyr Arg Pro Ser Asn Ala Pro Ile
115 120 125

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

Ile Val Leu His Lys Arg Thr Leu Gly Leu Met Gly Gln Asn Leu Ser
145 150 155 160

Thr Ser Asn Pro Leu Gly Phe Phe Pro Asp His Gln Leu Asp Pro Ala
165 170 175

```
Phe Arg Ala Asn Thr Asn Asn Pro Asp Trp Asp Phe Asn Pro Asn Lys
            180                 185                 190

Asp Thr Trp Pro Asp Ala Asn Lys Val Gly Ala Gly Ala Phe Gly Leu
        195                 200                 205

Gly Phe Thr Pro Pro His Gly Gly Leu Leu Gly Trp Ser Pro Gln Ala
    210                 215                 220

Gln Gly Ile Met Gln Thr Leu Pro Ala Asn Pro Pro Pro Ala Ser Thr
225                 230                 235                 240

Asn Arg Gln Ser Gly Arg Gln Pro Thr Pro Leu Leu Pro Lys Val Leu
                245                 250                 255

His Lys Arg Thr Leu Met Pro Leu Ser Tyr Gln His Phe Arg Lys Leu
            260                 265                 270

Leu Leu Leu Asp Asn Glu Ala Gly Pro Leu Glu Glu Glu Leu Pro Arg
        275                 280                 285

Leu Ala Asp Glu Asp Leu Asn Arg Arg Val Ala Glu Asp Leu Asn Leu
    290                 295                 300

Gly Asn Leu Asn Val Ser Ile Pro Trp Thr His Lys Val Gly Asn Phe
305                 310                 315                 320

Thr Gly Leu Tyr Ser Ser Ser Val Pro Val Phe Asn Pro His Trp Lys
                325                 330                 335

Thr Pro Ser Phe Pro Asn Ile His Leu His Gln Asp Ile Ile Lys Lys
            340                 345                 350

Cys Glu Gln Phe Val Gly Pro Leu Thr Val Asn Glu Lys Arg Arg Leu
        355                 360                 365

Lys Leu Ile Met Pro Ala Arg Phe Tyr Pro Asn Phe Thr Lys Tyr Leu
    370                 375                 380
```

```
Pro Leu Asp Lys Gly Ile Lys Pro Tyr Tyr Pro Glu His Leu Val Asn
385                 390                 395                 400

His Tyr Phe His Thr Arg His Tyr Leu His Thr Leu Trp Lys Ala Gly
                405                 410                 415

Ile Leu Tyr Lys Arg Val Ser Thr His Ser Ala Ser Phe Cys Gly Ser
            420                 425                 430

Pro Tyr Ser Trp Glu Gln Glu Leu Gln His Gly Ala Glu Ser Phe His
        435                 440                 445

Gln Gln Ser Ser Gly Ile Leu Ser Arg Pro Ser Val Gly Ser Ser Leu
    450                 455                 460

Gln Ser Lys His Gln Gln Ser Arg Leu Gly Leu Gln Ser Gln Gln Gly
465                 470                 475                 480

His Leu Ala Arg Arg Gln Gln Gly Arg Ser Trp Ser Ile Arg Thr Arg
                485                 490                 495

Val His Pro Thr Ala Arg Arg Pro Ser Gly Val Glu Pro Ser Gly Ser
            500                 505                 510

Gly His Asn Ala Asn Leu Ala Ser Lys Ser Ala Ser Cys Leu Tyr Gln
        515                 520                 525

Ser Thr Val Arg Thr Ala Ala Tyr Pro Ala Val Ser Thr Ser Glu Asn
    530                 535                 540

His Ser Ser Ser Gly His Ala Val Glu Leu His Asn Leu Pro Pro Asn
545                 550                 555                 560

Ser Ala Arg Ser Gln Ser Glu Arg Pro Val Ser Pro Cys Trp Trp Leu
                565                 570                 575

Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser His Ile
            580                 585                 590

Val Asn Leu Leu Glu Asp Trp Gly Pro Cys His Lys Arg Thr Leu Gly
```

595 600 605

Leu Ser Ala Met Ser Pro Pro Leu Arg Thr Thr His Pro Gln Ala Met
610 615 620

Gln Trp Asn Ser Thr Thr Phe His Gln Thr Leu Gln Asp Pro Arg Val
625 630 635 640

Arg Gly Leu Tyr Leu Pro Ala Gly Gly Ser Ser Ser Gly Thr Val Asn
645 650 655

Pro Val Pro Thr Thr Ala Ser Pro Thr Leu Ser Thr Ser Ser Arg Ile
660 665 670

Gly Asp Pro Ala Leu Asn Gln Phe Leu Pro Lys Val Leu His Lys Arg
675 680 685

Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro Asn
690 695 700

Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Cys Trp Leu Ser
705 710 715 720

Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala
725 730 735

Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val Ala
740 745 750

Arg Leu Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Gly Thr Leu
755 760 765

Gln Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu Leu
770 775 780

Leu Leu Tyr Lys Thr Phe Gly Trp Lys Leu His Leu Tyr Ser His Pro
785 790 795 800

Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser Pro
805 810 815

```
Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Thr Val Asn Ala His Gln
            820                 825                 830

Phe Leu Pro Lys Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro
        835                 840                 845

Thr Ser Cys Pro Pro Thr Cys Val Gly Tyr Arg Trp Met Cys Leu Arg
    850                 855                 860

Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu
865                 870                 875                 880

Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile
                885                 890                 895

Pro Gly Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr
            900                 905                 910

Pro Ala Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro
        915                 920                 925

Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe
    930                 935                 940

Gly Lys Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser
945                 950                 955                 960

Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val
                965                 970                 975

Trp Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr
            980                 985                 990

Asn Thr Leu Ser Pro Phe Leu Pro  Leu Leu Pro Ile Phe  Phe Tyr Leu
        995                 1000                1005

Trp Val  Tyr Ile Leu Ser Ala  Met Ser Thr Thr Asp  Leu
    1010                1015                1020
```

<210> 108
<211> 532
<212> PRT
<213> Artificial sequence

<220>
<223> HBV design 3

<400> 108

Met Gln Thr Asp Arg Thr Gly Glu Thr Ala Leu His Leu Ala Ala Arg
1 5 10 15

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

Asp Ala Gly Val Trp Ile Arg Thr Pro Pro Ala Asp Asn Met Glu Tyr
35 40 45

Leu Val Ser Phe Gly Val Trp Pro Leu His Ala Ala Val Ser Ala Asp
50 55 60

Cys Trp Gly Glu Leu Met Thr Leu Arg Asn Arg Ala Thr Asp Leu Gly
65 70 75 80

Gly Pro Asn Leu Asp Asn Ile Leu Met His Asp Ile Leu Arg Ser Phe
85 90 95

Ile Pro Leu Leu Pro Leu Ile Leu Ala Ala Arg Leu Ala Val Ser Thr
100 105 110

Leu Pro Glu Thr Thr Val Val Arg Arg Ser His Ala Asp Val Phe Leu
115 120 125

Gly Gly Pro Pro Val Cys Leu Asp Asp Leu Phe Leu Leu Thr Arg Ile
130 135 140

Leu Thr Ile Ala Leu His Trp Ala Ala Ala Val Asn Asn Val Leu Thr
145 150 155 160

Phe Gly Arg Glu Thr Val Leu Glu Tyr Gly Ala Asn Lys Trp Leu Ser
165 170 175

```
Leu Leu Val Pro Phe Val Asn Asn Arg Phe Leu Lys Gln Gln Tyr Met
            180                 185                 190

Asn Leu Pro Leu Phe Leu Ala Ala Arg Glu Gly Ser Tyr Glu Asp Leu
        195                 200                 205

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

Tyr Met Asp Leu Asp His Met Thr Val Ser Thr Lys Leu Cys Lys Ile
225                 230                 235                 240

Pro Arg Asp Leu Trp Phe His Ile Ser Cys Leu Thr Phe Ile Val Arg
                245                 250                 255

Leu Leu Asp Leu Glu Val Ser Gln Thr Ser Lys Leu Thr Arg Gln Thr
            260                 265                 270

Asp Arg Thr Gly Glu Thr Ala Leu His Leu Ala Ala Arg Tyr Ser Arg
        275                 280                 285

Ser Asp Leu Thr Thr Val Pro Ala Ala Ser Leu Leu Ala Ala Asp Ala
    290                 295                 300

Gly Leu Ser Arg Tyr Val Ala Arg Leu Asp Asn Met Lys Leu His Leu
305                 310                 315                 320

Tyr Ser His Pro Ile Pro Leu His Ala Ala Val Ser Ala Asp Gly Leu
                325                 330                 335

Ser Pro Thr Val Trp Leu Ser Val Arg Asn Arg Ala Thr Asp Leu Phe
            340                 345                 350

Leu Leu Ser Leu Gly Ile His Leu Met His Asp Ser Leu Tyr Ala Asp
        355                 360                 365

Ser Pro Ser Val Pro Leu Ile Leu Ala Ala Arg Leu Ala Val His Lys
    370                 375                 380
```

```
Arg Thr Leu Gly Leu Ser Ala Met Ser His Ala Asp Val Thr Leu Cys
385                 390                 395                 400


Ile Pro His Val Ala Val Asp Asp Leu Leu Leu Leu Lys Ala Thr Leu
                405                 410                 415


Cys Ile Ala Leu His Trp Ala Ala Ala Val Asn Asn Val Gln Phe Leu
            420                 425                 430


Pro Lys Val Leu His Lys Arg Gly Ala Asn Lys Ala Leu Met Pro Leu
        435                 440                 445


Tyr Ala Cys Ile Asn Asn Arg Thr Val Asn Ala His Gln Phe Leu Pro
    450                 455                 460


Lys Pro Leu Phe Leu Ala Ala Arg Glu Gly Ser Tyr Glu Leu Pro Lys
465                 470                 475                 480


Val Leu His Lys Arg Thr Leu Ala Asn Arg Val Leu His Lys Arg Thr
                485                 490                 495


Leu Gly Leu Asp His Met Leu Ser Ala Met Ser Thr Thr Asp Leu Pro
            500                 505                 510


Arg Asp Leu Leu Val Pro Phe Val Gln Trp Phe Val Ile Val Arg Leu
        515                 520                 525


Leu Asp Leu Glu
    530


<210>  109
<211>  368
<212>  PRT
<213>  Artificial sequence

<220>
<223>  HBV design 4

<400>  109

Lys Lys Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Lys Lys Cys Trp
1               5                   10                  15
```

```
Gly Glu Leu Met Thr Leu Lys Lys Gly Val Trp Ile Arg Thr Pro Pro
            20                  25                  30

Ala Lys Lys Ser Thr Leu Pro Glu Thr Thr Val Val Arg Arg Lys Lys
        35                  40                  45

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

Asp Thr Ala Ser Ala Leu Tyr Lys Lys Leu Trp Phe His Ile Ser Cys
65                  70                  75                  80

Leu Thr Phe Lys Lys Glu Tyr Leu Val Ser Phe Gly Val Trp Lys Lys
                85                  90                  95

Gly Gly Pro Asn Leu Asp Asn Ile Leu Lys Lys Leu Thr Thr Val Pro
            100                 105                 110

Ala Ala Ser Leu Leu Ala Lys Lys Ile Leu Arg Ser Phe Ile Pro Leu
        115                 120                 125

Leu Lys Lys Phe Leu Gly Gly Pro Pro Val Cys Leu Lys Lys Phe Leu
    130                 135                 140

Leu Thr Arg Ile Leu Thr Ile Lys Lys Trp Leu Ser Leu Leu Val Pro
145                 150                 155                 160

Phe Val Lys Lys Gly Leu Ser Pro Thr Val Trp Leu Ser Val Lys Lys
                165                 170                 175

Leu Leu Val Pro Phe Val Gln Trp Phe Val Lys Lys Phe Leu Lys Gln
            180                 185                 190

Gln Tyr Met Asn Leu Lys Lys Phe Leu Ser Lys Gln Tyr Met Asp Leu
        195                 200                 205

Lys Lys Thr Val Ser Thr Lys Leu Cys Lys Ile Lys Lys Gly Leu Ser
    210                 215                 220
```

Arg Tyr Val Ala Arg Leu Lys Lys Lys Leu His Leu Tyr Ser His Pro
225 230 235 240

Ile Lys Lys Phe Leu Leu Ser Leu Gly Ile His Leu Lys Lys Ser Leu
245 250 255

Tyr Ala Asp Ser Pro Ser Val Lys Lys Ala Leu Met Pro Leu Tyr Ala
260 265 270

Cys Ile Lys Lys Leu Leu Leu Lys Ala Thr Leu Cys Ile Lys Lys Thr
275 280 285

Leu Cys Ile Pro His Val Ala Val Lys Lys Val Leu His Lys Arg Thr
290 295 300

Leu Gly Leu Lys Lys Leu Pro Lys Val Leu His Lys Arg Thr Leu Lys
305 310 315 320

Lys His Lys Arg Thr Leu Gly Leu Ser Ala Met Lys Lys Gln Phe Leu
325 330 335

Pro Lys Val Leu His Lys Arg Lys Lys Thr Val Asn Ala His Gln Phe
340 345 350

Leu Pro Lys Lys Lys Leu Ser Ala Met Ser Thr Thr Asp Leu Lys Lys
355 360 365

<210> 110
<211> 20
<212> DNA
<213> Artificial sequence

<220>
<223> splice primer

<400> 110
tgccaagagt gacgtgtcca 20

<210> 111
<211> 21
<212> DNA
<213> Artificial sequence

<220>
<223> splice probe

<400> 111
cccaggtcca actgcagccg g 21

<210> 112
<211> 12
<212> DNA
<213> Artificial sequence

<220>
<223> Furin linker polypeptide

<400> 112
agagctaaga gg 12

<210> 113
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 113

His Leu Asp Lys Lys Gln Arg Phe His Asn Ile
1 5 10

<210> 114
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 114

Arg Trp Thr Gly Arg Cys Met Ser Cys Cys
1 5 10

<210> 115
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 115

Thr Thr Leu Glu Gln Gln Tyr Asn Lys Pro Leu Cys Asp Leu Leu
1   5   10   15

<210> 116
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 116

Ile Ser Glu Tyr Arg His Tyr Cys Tyr
1   5

<210> 117
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 117

Val Tyr Asp Phe Ala Phe Arg Asp Leu
1   5

<210> 118
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 118

Thr Ile His Asp Ile Ile Leu Glu Cys Val
1   5   10

<210> 119
<211> 9

<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 119

Lys Leu Pro Gln Leu Cys Thr Glu Leu
1   5

<210> 120
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 120

Phe Ala Phe Arg Asp Leu Cys Ile Val Tyr
1   5   10

<210> 121
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E6

<400> 121

Leu Cys Ile Val Tyr Arg Asp Gly Asn Pro Tyr Ala Val Cys Asp
1   5   10   15

<210> 122
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E7

<400> 122

Leu Cys Val Gln Ser Thr His Val Asp Ile
1   5   10

<210> 123
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E7

<400> 123

Arg Thr Leu Glu Asp Leu Leu Met Gly Thr
1   5   10

<210> 124
<211> 8
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E7

<400> 124

Thr Leu Gly Ile Val Cys Pro Ile
1   5

<210> 125
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E7

<400> 125

Leu Leu Met Gly Thr Leu Gly Ile Val
1   5

<210> 126
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E7

<400> 126

Thr Leu His Glu Tyr Met Leu Asp Leu
1   5

<210> 127
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E7

<400> 127

Ala His Tyr Asn Ile Val Thr Phe Cys Cys
1   5   10

<210> 128
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E7

<400> 128

Tyr Met Leu Asp Leu Gln Pro Glu Thr Thr
1   5   10

<210> 129
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E7

<400> 129

Cys Asp Ser Thr Leu Arg Leu Cys Val
1   5

<210> 130
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 130

Tyr Ile Ile Phe Val Tyr Ile Pro Leu
1 5

<210> 131
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 131

Lys Leu Thr Asn Thr Gly Leu Tyr Asn Leu
1 5 10

<210> 132
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 132

Lys Cys Ile Asp Phe Tyr Ser Arg Ile
1 5

<210> 133
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 133

Phe Ala Phe Lys Asp Leu Phe Val Val
1 5

<210> 134
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 134

Asn Leu Leu Ile Arg Cys Leu Arg Cys
1   5

<210> 135
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 135

Lys Leu Pro Asp Leu Cys Thr Glu Leu
1   5

<210> 136
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 136

Glu Leu Thr Glu Val Phe Glu Phe Ala
1   5

<210> 137
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 137

Ser Leu Gln Asp Ile Glu Ile Thr Cys Val
1   5   10

<210> 138

<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV16-E5

<400> 138

Lys Thr Val Leu Glu Leu Thr Glu Val
1 5

<210> 139
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> HPV18-E7

<400> 139

Asp Asp Leu Arg Ala Phe Gln Gln Leu Phe Leu Asn Thr Leu Ser
1 5 10 15

<210> 140
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV18-E7

<400> 140

Phe Gln Gln Leu Phe Leu Asn Thr Leu
1 5

<210> 141
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> HPV18-E7

<400> 141

Gln Leu Phe Leu Asn Thr Leu Ser Phe Val
1 5 10

<210> 142
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> HPV18-E7

<400> 142

Leu Phe Leu Asn Thr Leu Ser Phe Val Cys Pro Trp Cys Ala Ser
1 5 10 15

<210> 143
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> HPV18-E7

<400> 143

Thr Leu Gln Asp Ile Val Leu His Leu
1 5

<210> 144
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> HPV18-E7

<400> 144

Ser Glu Glu Glu Asn Asp Glu Ile Asp Gly Val Asn His Gln His Leu
1 5 10 15

Pro Ala Arg Arg
20

<210> 145
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> Agonist peptides

<400> 145

Lys Leu Pro Gln Leu Cys Thr Glu Val
1   5

<210> 146
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> Agonist peptides

<400> 146

Gln Leu Tyr Asn Lys Pro Leu Cys Asp Val
1   5   10

<210> 147
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> Agonist peptides

<400> 147

Arg Thr Leu Glu Asp Leu Leu Met Gly Val
1   5   10