

# SEQUENCE LISTING

<110> Prevail Therapeutics, Inc.  
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SEVIGNY, Jeffrey  
LEWIS, Travis  
USPENSKAYA, Olga

<120> GENE THERAPIES FOR LYSOSOMAL DISORDERS

<130> PRVL-014/01WO 334806-2134

<150> US 63/063,851

<151> 2020-08-10

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<170> PatentIn version 3.5

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<211> 11171

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|-------------------------------------------------------------------|-----|

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| ctagttatta atagtaatca attacgggggt cattagttca tagcccatat atggagttcc | 360  |
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| gccaactcca tcactagggg ttcctgctag ctctgggtat ttaagcccga gtgagcacgc | 180 |
| agggtctcca ttttgaagcg ggaggttacg cgttcgtcga ctactagtgg gtaccagagc | 240 |
| tccctaggtt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcggtag | 300 |
| ctagttatta atagtaatca attacggggg cattagttca tagcccatat atggagttcc | 360 |
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| gagcgcg                |     |
| cag agagggagtg         |     |
| gccaactatt agatctgat   | 180 |
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| gtgagcacgc             |     |
| aggggtctcca ttttgaagc  | 240 |
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| aaaagataca             |     |
| aaaaagaaca             |     |
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<220>

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| cttacggtaa atggcccgcc tggctgaccg cccaacgacc cccgcccatt gacgtcaata | 180 |
| atgacgtatg ttcccatagt aacgccaata gggactttcc attgacgtca atgggtggag | 240 |
| tatttacggg aaactgccc cttggcagta catcaagtgt atcatatgcc aagtacgccc  | 300 |
| cctattgacg tcaatgacgg taaatggccc gcctggcatt atgccagta catgacctta  | 360 |
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| tatttattta tttttaatt attttgatga gcgatggggg cggggggggg gggggggcgc  | 540 |

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| gccaactcca tcactagggg ttctgctag ctctgggtat ttaagcccga gtgagcacgc  | 180 |
| agggtctcca ttttgaagcg ggagggttac cgttcgtcga ctactagtgg gtaccagagc | 240 |
| tccctaggtt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcgttac | 300 |
| cctagttatt aatagtaatc aattacgggg tcattagttc atagccata tatggagttc  | 360 |

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|             |             |            |             |            |            |      |
|-------------|-------------|------------|-------------|------------|------------|------|
| agaggacaaa  | cagaacaaga  | aagagtctgg | aaatacacag  | gatgttcttg | gcctcctcaa | 6900 |
| agcaagtgca  | agcagatagt  | accagcagcc | ccaggctatc  | agagcccagt | gaagagaagt | 6960 |
| accatgaaag  | ccacagctct  | aaccaccctg | ttccagagtg  | acagacagtc | cccaagacaa | 7020 |
| gccagcctga  | gccagagaga  | gaactgcaag | agaaagtttc  | taatttaggt | tctgttagat | 7080 |
| tcagacaagt  | gcaggtcatc  | ctctctccac | agctactcac  | ctctccagcc | taacaaagcc | 7140 |
| tgcagtccac  | actccaacc   | tggtgtctca | cctcctagcc  | tctcccaaca | tcctgctctc | 7200 |
| tgaccatctt  | ctgcatctct  | catctcacca | tctcccactg  | tctacagcct | actcttgcaa | 7260 |
| ctaccatctc  | atcttctgac  | atcctgtcta | catcttctgc  | catactctgc | catctaccat | 7320 |
| accacctctt  | accatctacc  | acaccatctt | ttatctccat  | ccctctcaga | agcctccaag | 7380 |
| ctgaatcctg  | ctttatgtgt  | tcatctcagc | ccctgcatgg  | aaagctgacc | ccagaggcag | 7440 |
| aactattccc  | agagagcttg  | gccaagaaaa | acaaaactac  | cagcctggcc | aggctcagga | 7500 |
| gtagtaagct  | gcagtgtctg  | ttgtgttcta | gcttcaacag  | ctgcaggagt | tccactctca | 7560 |
| aatgctccac  | atcttctaca  | tcctcctgat | tctggtcact  | acccatcttc | aaagaacaga | 7620 |
| atatctcaca  | tcagcatact  | gtgaaggact | agtcatgggt  | gcagctgctc | agagctgcaa | 7680 |
| agtcattctg  | gatgggtggag | agcttacaaa | catttcatga  | tgctcccccc | gctctgatgg | 7740 |
| ctggagccca  | atccctacac  | agactcctgc | tgtatgtgtt  | ttcctttcac | tctgagccac | 7800 |
| agccagaggg  | caggcattca  | gtctcctctt | caggctgggg  | ctggggcact | gagaactcac | 7860 |
| ccaacacctt  | gctctcactc  | cttctgcaaa | acaagaaaga  | gctttgtgct | gcagtagcca | 7920 |
| tgaagaatga  | aaggaaggct  | ttaactaaaa | aatgtcagag  | attattttca | acccttact  | 7980 |
| gtggatcacc  | agcaaggagg  | aaacacaaca | cagagacatt  | ttttcccctc | aaattatcaa | 8040 |
| aagaatcact  | gcatttggtta | aagagagcaa | ctgaatcagg  | aagcagagtt | ttgaacatat | 8100 |
| cagaagttag  | gaatctgcat  | cagagacaaa | tgcatgcatg  | gttgtttgct | gcataccagc | 8160 |
| cctaattcatt | agaagcctca  | tggacttcaa | acatcattcc  | ctctgacaag | atgctctagc | 8220 |
| ctaactccat  | gagataaaat  | aatctgcct  | ttcagagcca  | aagaagagtc | caccagcttc | 8280 |
| ttctcagtgt  | gaacaagagc  | tccagtccag | ttagtccagtc | cagtgcagta | gaggagacca | 8340 |
| gtctgcatcc  | tctaattttc  | aaaggcaaga | agatttgttt  | accctggaca | ccaggcacia | 8400 |
| gtgaggtcac  | agagctctta  | gatatgcagt | cctcatgagt  | gaggagacta | aagcgcagtc | 8460 |

|                                                                    |       |
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| catcaagact tcagtgtaga gaaaacctcc aaaaaagcct cctcactact tctggaatag  | 8520  |
| ctcagaggcc gaggcggcct cggcctctgc ataaataaaa aaaattagtc agccatgggg  | 8580  |
| cggagaatgg gcggaactgg gcggagttag gggcgggatg ggcggagtta ggggcgggac  | 8640  |
| tatggttgct gactaattga gatgcatgct ttgcatactt ctgcctgctg gggagcctgg  | 8700  |
| ggactttcca cacctggttg ctgactaatt gagatgcatg ctttgcatac ttctgcctgc  | 8760  |
| tggggagcct ggggactttc cacaccctaa ctgacacaca ttccacagct gcattaatga  | 8820  |
| atcggccaac gcgcggggag aggcggtttg cgtattgggc gctcttccgc ttcctcgctc  | 8880  |
| actgactcgc tgcgctcggc cgttcggctg cggcgagcgg tatcagctca ctcaaaggcg  | 8940  |
| gtaatacggc tatccacaga atcaggggat aacgcaggaa agaacatgtg agcaaaaggc  | 9000  |
| cagcaaaagg ccaggaaccg taaaaaggcc gcgttgctgg cgtttttcca taggctccgc  | 9060  |
| ccccctgacg agcatcacia aaatcgacgc tcaagtcaga ggtggcgaaa cccgacagga  | 9120  |
| ctataaagat accaggcgtt tccccctgga agctccctcg tgcgctctcc tgttccgacc  | 9180  |
| ctgccgctta ccggatacct gtccgccttt ctcccttcgg gaagcgtggc gctttctcat  | 9240  |
| agctcacgct gtaggtatct cagttcggtg taggtcgttc gctccaagct gggctgtgtg  | 9300  |
| cacgaacccc ccgttcagcc cgaccgctgc gccttatccg gtaactatcg tcttgagtcc  | 9360  |
| aacccggtaa gacacgactt atcgccactg gcagcagcca ctggtaacag gattagcaga  | 9420  |
| gcgaggatat taggcggctg tacagagttc ttgaagtggc ggcctaacta cggctacact  | 9480  |
| agaagaacag tatttggtat ctgcgctctg ctgaagccag ttaccttcgg aaaaagagtt  | 9540  |
| ggtagctctt gatccggcaa acaaaccacc gctggtagcg gtgggtttttt tgtttgcaag | 9600  |
| cagcagatta cgcgcagaaa aaaaggatct caagaagatc ctttgatctt ttctacgggg  | 9660  |
| tctgacgctc agtggaacga aaactcacgt taagggattt tggatcatgag attatcaaaa | 9720  |
| aggatcttca cctagatcct tttaaattaa aaatgaagtt ttaaatcaat ctaaagtata  | 9780  |
| tatgagtaaa cttggtctga cagttaccaa tgcttaatca gtgaggcacc tatctcagcg  | 9840  |
| atctgtctat ttcgttcac ctagttgcc tgactcctgc aaaccacgtt gtgtctcaaa    | 9900  |
| atctctgatg ttacattgca caagataaaa atatatcatc atgaacaata aaactgtctg  | 9960  |
| cttacataaa cagtaataca aggggtgtta tgagccatat tcaacgggaa acgtcttgct  | 10020 |
| cgaggccgcg attaaattcc aacatggatg ctgatttata tgggtataaa tgggctcgcg  | 10080 |

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 aagaatatcc tgattcaggt gaaaatattg ttgatgcgct ggacagtgttc ctgcgccggt 10380  
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<210> 14  
 <211> 536  
 <212> PRT  
 <213> Homo sapiens

<400> 14

Met Glu Phe Ser Ser Pro Ser Arg Glu Glu Cys Pro Lys Pro Leu Ser  
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Arg Val Ser Ile Met Ala Gly Ser Leu Thr Gly Leu Leu Leu Leu Gln  
 20 25 30

Ala Val Ser Trp Ala Ser Gly Ala Arg Pro Cys Ile Pro Lys Ser Phe  
 35 40 45

Gly Tyr Ser Ser Val Val Cys Val Cys Asn Ala Thr Tyr Cys Asp Ser  
 50 55 60

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

Ser Thr Arg Ser Gly Arg Arg Met Glu Leu Ser Met Gly Pro Ile Gln  
85 90 95

Ala Asn His Thr Gly Thr Gly Leu Leu Leu Thr Leu Gln Pro Glu Gln  
100 105 110

Lys Phe Gln Lys Val Lys Gly Phe Gly Gly Ala Met Thr Asp Ala Ala  
115 120 125

Ala Leu Asn Ile Leu Ala Leu Ser Pro Pro Ala Gln Asn Leu Leu Leu  
130 135 140

Lys Ser Tyr Phe Ser Glu Glu Gly Ile Gly Tyr Asn Ile Ile Arg Val  
145 150 155 160

Pro Met Ala Ser Cys Asp Phe Ser Ile Arg Thr Tyr Thr Tyr Ala Asp  
165 170 175

Thr Pro Asp Asp Phe Gln Leu His Asn Phe Ser Leu Pro Glu Glu Asp  
180 185 190

Thr Lys Leu Lys Ile Pro Leu Ile His Arg Ala Leu Gln Leu Ala Gln  
195 200 205

Arg Pro Val Ser Leu Leu Ala Ser Pro Trp Thr Ser Pro Thr Trp Leu  
210 215 220

Lys Thr Asn Gly Ala Val Asn Gly Lys Gly Ser Leu Lys Gly Gln Pro  
225 230 235 240

Gly Asp Ile Tyr His Gln Thr Trp Ala Arg Tyr Phe Val Lys Phe Leu  
245 250 255

Asp Ala Tyr Ala Glu His Lys Leu Gln Phe Trp Ala Val Thr Ala Glu  
260 265 270

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

Gly Phe Thr Pro Glu His Gln Arg Asp Phe Ile Ala Arg Asp Leu Gly  
290 295 300

Pro Thr Leu Ala Asn Ser Thr His His Asn Val Arg Leu Leu Met Leu  
305 310 315 320

Asp Asp Gln Arg Leu Leu Leu Pro His Trp Ala Lys Val Val Leu Thr  
325 330 335

Asp Pro Glu Ala Ala Lys Tyr Val His Gly Ile Ala Val His Trp Tyr  
340 345 350

Leu Asp Phe Leu Ala Pro Ala Lys Ala Thr Leu Gly Glu Thr His Arg  
355 360 365

Leu Phe Pro Asn Thr Met Leu Phe Ala Ser Glu Ala Cys Val Gly Ser  
370 375 380

Lys Phe Trp Glu Gln Ser Val Arg Leu Gly Ser Trp Asp Arg Gly Met  
385 390 395 400

Gln Tyr Ser His Ser Ile Ile Thr Asn Leu Leu Tyr His Val Val Gly  
405 410 415

Trp Thr Asp Trp Asn Leu Ala Leu Asn Pro Glu Gly Gly Pro Asn Trp  
420 425 430

Val Arg Asn Phe Val Asp Ser Pro Ile Ile Val Asp Ile Thr Lys Asp  
435 440 445

Thr Phe Tyr Lys Gln Pro Met Phe Tyr His Leu Gly His Phe Ser Lys  
450 455 460

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

Asn Asp Leu Asp Ala Val Ala Leu Met His Pro Asp Gly Ser Ala Val  
485 490 495

Val Val Val Leu Asn Arg Ser Ser Lys Asp Val Pro Leu Thr Ile Lys  
500 505 510

Asp Pro Ala Val Gly Phe Leu Glu Thr Ile Ser Pro Gly Tyr Ser Ile  
515 520 525

His Thr Tyr Leu Trp Arg Arg Gln  
530 535

<210> 15  
<211> 1608  
<212> DNA  
<213> Homo sapiens

<400> 15  
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agaccttgca tccccaaagag cttcggctac agcagcgtcg tgtgcgtgtg caatgccacc 180  
tactgcgaca gcttcgacct tcctaccttt cctgctctgg gcaccttcag cagatacgag 240  
agcaccagat ccggcagacg gatggaactg agcatgggac ccatccaggc caatcacaca 300  
ggcactggcc tgctgctgac actgcagcct gagcagaaat tccagaaagt gaaaggcttc 360  
ggcggagcca tgacagatgc cgccgctctg aatatcctgg ctctgtctcc accagctcag 420  
aacctgctgc tcaagagcta cttcagcgag gaaggcatcg gctacaacat catcagagtg 480  
cccatggcca gctgcgactt cagcatcagg acctacacct acgccgacac acccgacgat 540  
ttccagctgc acaacttcag cctgcctgaa gaggacacca agctgaagat ccctctgata 600  
cacagagccc tgcagctggc acaaagacct gtgtcactgc tggcctctcc atggacatct 660  
cccacctggc tgaaaacaaa tggcgccgtg aatggcaagg gcagcctgaa aggccaacct 720  
ggcgacatct accaccagac ctgggccaga tacttcgtga agttcctgga cgcctatgcc 780  
gagcacaagc tgcagttttg ggccgtgaca gccgagaacg aaccttctgc tggactgctg 840  
agcgggtacc cttttcagtg cctgggcttt acacccgagc accagcggga ctttatcgcc 900  
cgtgatctgg gaccacact ggccaatagc acccaccata atgtgctggc gctgatgctg 960  
gacgaccaga gactgcttct gccccactgg gctaaagtgg tgctgacaga tcctgaggcc 1020  
gccaaatacg tgcacggaat cgccgtgcac tggtatctgg actttctggc ccctgccaaag 1080

gccacactgg gagagacaca cagactgttc cccaacacca tgctgttcgc cagcgaagcc 1140  
 tgtgtgggca gcaagttttg ggaacagagc gtgcggctcg gcagctggga tagaggcatg 1200  
 cagtacagcc acagcatcat caccaacctg ctgtaccacg tcgtcggctg gaccgactgg 1260  
 aatctggccc tgaatcctga aggcggccct aactgggtcc gaaacttcgt ggacagcccc 1320  
 atcatcgtgg acatcaccaa ggacaccttc tacaagcagc ccatgttcta ccacctggga 1380  
 cacttcagca agttcatccc cgagggctct cagcgcgttg gactgggtggc ttcccagaag 1440  
 aacgatctgg acgccgtggc tctgatgcac cctgatggat ctgctgtggt ggtggtcctg 1500  
 aaccgcagca gcaaagatgt gcccctgacc atcaaggatc ccgccgtggg attcctggaa 1560  
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<210> 16  
 <211> 524  
 <212> PRT  
 <213> Homo sapiens

<400> 16

Met Tyr Ala Leu Phe Leu Leu Ala Ser Leu Leu Gly Ala Ala Leu Ala  
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Gly Pro Val Leu Gly Leu Lys Glu Cys Thr Arg Gly Ser Ala Val Trp  
 20 25 30

Cys Gln Asn Val Lys Thr Ala Ser Asp Cys Gly Ala Val Lys His Cys  
 35 40 45

Leu Gln Thr Val Trp Asn Lys Pro Thr Val Lys Ser Leu Pro Cys Asp  
 50 55 60

Ile Cys Lys Asp Val Val Thr Ala Ala Gly Asp Met Leu Lys Asp Asn  
 65 70 75 80

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

Leu Pro Lys Pro Asn Met Ser Ala Ser Cys Lys Glu Ile Val Asp Ser  
 100 105 110

Tyr Leu Pro Val Ile Leu Asp Ile Ile Lys Gly Glu Met Ser Arg Pro  
115 120 125

Gly Glu Val Cys Ser Ala Leu Asn Leu Cys Glu Ser Leu Gln Lys His  
130 135 140

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

Glu Leu Asp Met Thr Glu Val Val Ala Pro Phe Met Ala Asn Ile Pro  
165 170 175

Leu Leu Leu Tyr Pro Gln Asp Gly Pro Arg Ser Lys Pro Gln Pro Lys  
180 185 190

Asp Asn Gly Asp Val Cys Gln Asp Cys Ile Gln Met Val Thr Asp Ile  
195 200 205

Gln Thr Ala Val Arg Thr Asn Ser Thr Phe Val Gln Ala Leu Val Glu  
210 215 220

His Val Lys Glu Glu Cys Asp Arg Leu Gly Pro Gly Met Ala Asp Ile  
225 230 235 240

Cys Lys Asn Tyr Ile Ser Gln Tyr Ser Glu Ile Ala Ile Gln Met Met  
245 250 255

Met His Met Gln Pro Lys Glu Ile Cys Ala Leu Val Gly Phe Cys Asp  
260 265 270

Glu Val Lys Glu Met Pro Met Gln Thr Leu Val Pro Ala Lys Val Ala  
275 280 285

Ser Lys Asn Val Ile Pro Ala Leu Glu Leu Val Glu Pro Ile Lys Lys  
290 295 300

His Glu Val Pro Ala Lys Ser Asp Val Tyr Cys Glu Val Cys Glu Phe  
305 310 315 320

Leu Val Lys Glu Val Thr Lys Leu Ile Asp Asn Asn Lys Thr Glu Lys  
325 330 335

Glu Ile Leu Asp Ala Phe Asp Lys Met Cys Ser Lys Leu Pro Lys Ser  
340 345 350

Leu Ser Glu Glu Cys Gln Glu Val Val Asp Thr Tyr Gly Ser Ser Ile  
355 360 365

Leu Ser Ile Leu Leu Glu Glu Val Ser Pro Glu Leu Val Cys Ser Met  
370 375 380

Leu His Leu Cys Ser Gly Thr Arg Leu Pro Ala Leu Thr Val His Val  
385 390 395 400

Thr Gln Pro Lys Asp Gly Gly Phe Cys Glu Val Cys Lys Lys Leu Val  
405 410 415

Gly Tyr Leu Asp Arg Asn Leu Glu Lys Asn Ser Thr Lys Gln Glu Ile  
420 425 430

Leu Ala Ala Leu Glu Lys Gly Cys Ser Phe Leu Pro Asp Pro Tyr Gln  
435 440 445

Lys Gln Cys Asp Gln Phe Val Ala Glu Tyr Glu Pro Val Leu Ile Glu  
450 455 460

Ile Leu Val Glu Val Met Asp Pro Ser Phe Val Cys Leu Lys Ile Gly  
465 470 475 480

Ala Cys Pro Ser Ala His Lys Pro Leu Leu Gly Thr Glu Lys Cys Ile  
485 490 495

Trp Gly Pro Ser Tyr Trp Cys Gln Asn Thr Glu Thr Ala Ala Gln Cys  
500 505 510

Asn Ala Val Glu His Cys Lys Arg His Val Trp Asn  
515 520

<210> 17  
<211> 1572  
<212> DNA  
<213> Homo sapiens

<400> 17

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| ggcctgaagg  | agtgaccccg | cggcagcgcc | gtgtggtgcc | agaacgtgaa | gaccgccagc  | 120  |
| gactgcggcg  | ccgtgaagca | ctgcctgcag | accgtgtgga | acaagcccac | cgtgaagagc  | 180  |
| ctgccctgcg  | acatctgcaa | ggacgtggtg | accgccgccg | gcgacatgct | gaaggacaac  | 240  |
| gccaccgagg  | aggagatcct | ggtgtacctg | gagaagacct | gcgactggct | gcccgaagccc | 300  |
| aacatgagcg  | ccagctgcaa | ggagatcgtg | gacagctacc | tgcccgtgat | cctggacatc  | 360  |
| atcaagggcg  | agatgagccg | ccccggcgag | gtgtgcagcg | ccctgaacct | gtgcgagagc  | 420  |
| ctgcagaagc  | acctggccga | gctgaaccac | cagaagcagc | tggagagcaa | caagatcccc  | 480  |
| gagctggaca  | tgaccgaggt | ggtggccccc | ttcatggcca | acatccccct | gctgctgtac  | 540  |
| ccccaggacg  | gccccgcag  | caagccccag | cccaaggaca | acggcgacgt | gtgccaggac  | 600  |
| tgcatccaga  | tggtgaccga | catccagacc | gccgtgcgca | ccaacagcac | cttcgtgcag  | 660  |
| gccctggtgg  | agcacgtgaa | ggaggagtgc | gaccgcctgg | gccccggcat | ggccgacatc  | 720  |
| tgcaagaact  | acatcagcca | gtacagcgag | atcgccatcc | agatgatgat | gcacatgcag  | 780  |
| cccaaggaga  | tctgcgccct | ggtgggcttc | tgcgacgagg | tgaaggagat | gcccattgcag | 840  |
| accctggtgc  | ccgccaaggt | ggccagcaag | aacgtgatcc | ccgccctgga | gctggtggag  | 900  |
| cccatcaaga  | agcacgaggt | gcccgccaag | agcgacgtgt | actgcgaggt | gtgcgagttc  | 960  |
| ctggtgaagg  | aggtgaccaa | gctgatcgac | aacaacaaga | ccgagaagga | gatcctggac  | 1020 |
| gccttcgaca  | agatgtgcag | caagctgccc | aagagcctga | gcgaggagtg | ccaggaggtg  | 1080 |
| gtggacacct  | acggcagcag | catcctgagc | atcctgctgg | aggaggtgag | ccccgagctg  | 1140 |
| gtgtgcagca  | tgctgcacct | gtgcagcggc | acccgcctgc | ccgccctgac | cgtgcacgtg  | 1200 |
| accagccca   | aggacggcgg | cttctgcgag | gtgtgcaaga | agctggtggg | ctacctggac  | 1260 |
| cgcaacctgg  | agaagaacag | caccaagcag | gagatcctgg | ccgccctgga | gaagggctgc  | 1320 |
| agcttcctgc  | ccgaccccta | ccagaagcag | tgcgaccagt | tcgtggccga | gtacgagccc  | 1380 |
| gtgctgatcg  | agatcctggt | ggaggtgatg | gacccagct  | tcgtgtgcct | gaagatcggc  | 1440 |
| gcctgccccca | gcgcccacaa | gcccctgctg | ggcaccgaga | agtgcatctg | gggccccagc  | 1500 |
| tactggtgcc  | agaacaccga | gaccgccgcc | cagtgaacg  | ccgtggagca | ctgcaagcgc  | 1560 |

cacgtgtgga ac

1572

<210> 18  
<211> 478  
<212> PRT  
<213> Homo sapiens

<400> 18

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

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

Ala Phe Asp Ser Trp Glu Lys Pro Pro Leu Pro Val Tyr Thr Gln Phe  
50 55 60

Tyr Phe Phe Asn Val Thr Asn Pro Glu Glu Ile Leu Arg Gly Glu Thr  
65 70 75 80

Pro Arg Val Glu Glu Val Gly Pro Tyr Thr Tyr Arg Glu Leu Arg Asn  
85 90 95

Lys Ala Asn Ile Gln Phe Gly Asp Asn Gly Thr Thr Ile Ser Ala Val  
100 105 110

Ser Asn Lys Ala Tyr Val Phe Glu Arg Asp Gln Ser Val Gly Asp Pro  
115 120 125

Lys Ile Asp Leu Ile Arg Thr Leu Asn Ile Pro Val Leu Thr Val Ile  
130 135 140

Glu Trp Ser Gln Val His Phe Leu Arg Glu Ile Ile Glu Ala Met Leu  
145 150 155 160

Lys Ala Tyr Gln Gln Lys Leu Phe Val Thr His Thr Val Asp Glu Leu  
165 170 175

Leu Trp Gly Tyr Lys Asp Glu Ile Leu Ser Leu Ile His Val Phe Arg  
180 185 190

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

Asn Asp Gly Asp Tyr Val Phe Leu Thr Gly Glu Asp Ser Tyr Leu Asn  
210 215 220

Phe Thr Lys Ile Val Glu Trp Asn Gly Lys Thr Ser Leu Asp Trp Trp  
225 230 235 240

Ile Thr Asp Lys Cys Asn Met Ile Asn Gly Thr Asp Gly Asp Ser Phe  
245 250 255

His Pro Leu Ile Thr Lys Asp Glu Val Leu Tyr Val Phe Pro Ser Asp  
260 265 270

Phe Cys Arg Ser Val Tyr Ile Thr Phe Ser Asp Tyr Glu Ser Val Gln  
275 280 285

Gly Leu Pro Ala Phe Arg Tyr Lys Val Pro Ala Glu Ile Leu Ala Asn  
290 295 300

Thr Ser Asp Asn Ala Gly Phe Cys Ile Pro Glu Gly Asn Cys Leu Gly  
305 310 315 320

Ser Gly Val Leu Asn Val Ser Ile Cys Lys Asn Gly Ala Pro Ile Ile  
325 330 335

Met Ser Phe Pro His Phe Tyr Gln Ala Asp Glu Arg Phe Val Ser Ala  
340 345 350

Ile Glu Gly Met His Pro Asn Gln Glu Asp His Glu Thr Phe Val Asp  
355 360 365

Ile Asn Pro Leu Thr Gly Ile Ile Leu Lys Ala Ala Lys Arg Phe Gln  
370 375 380

Ile Asn Ile Tyr Val Lys Lys Leu Asp Asp Phe Val Glu Thr Gly Asp  
385 390 395 400

Ile Arg Thr Met Val Phe Pro Val Met Tyr Leu Asn Glu Ser Val His  
405 410 415

Ile Asp Lys Glu Thr Ala Ser Arg Leu Lys Ser Met Ile Asn Thr Thr  
420 425 430

Leu Ile Ile Thr Asn Ile Pro Tyr Ile Ile Met Ala Leu Gly Val Phe  
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450 455 460

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465 470 475

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|                                                                   |      |
|-------------------------------------------------------------------|------|
| accaaggacg aggtgctgta cgtgttcccc agcgacttct gccgcagcgt gtacatcacc | 840  |
| ttcagcgact acgagagcgt gcagggcctg cccgccttcc gctacaaggt gcccgccgag | 900  |
| atcctggcca acaccagcga caacgccggc ttctgcatcc ccgagggcaa ctgcctgggc | 960  |
| agcggcgtgc tgaacgtgag catctgcaag aacggcgccc ccatcatcat gagcttcccc | 1020 |
| cacttctacc aggccgacga gcgcttcgtg agcgccatcg agggcatgca cccaaccag  | 1080 |
| gaggaccacg agaccttcgt ggacatcaac cccctgaccg gcatcatcct gaaggccgcc | 1140 |
| aagcgcttcc agatcaacat ctacgtgaag aagctggacg acttcgtgga gaccggcgac | 1200 |
| atccgcacca tggtgttccc cgtgatgtac ctgaacgaga gcgtgcacat cgacaaggag | 1260 |
| accgccagcc gcctgaagag catgatcaac accaccctga tcatcaccaa catcccctac | 1320 |
| atcatcatgg ccctgggcgt gttcttcggc ctggtgttca cctggctggc ctgcaagggc | 1380 |
| cagggcagca tggacgaggg caccgccgac gagcgcgccc ccctgatccg cacc       | 1434 |

<210> 20  
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<220>  
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<210> 21  
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<400> 26  
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<210> 27

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<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide

<400> 31

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<210> 32

<211> 4013

<212> DNA

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tccctagggt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcggtag 300

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gcgttacata acttacggta aatggcccgc ctggctgacc gcccaacgac ccccgcccat 420

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gccttcgccc cgtgccccgc tccgccgccc cctcgcgccg cccgccccgg ctctgactga 1020

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| caacgtgctg gttattgtgc tgtctcatca ttttggcaaa gaattcctcg aagatccgaa  | 1260 |
| gggaaagtct tccacgactg tgggatccgt tcgaagatat caccggttga gccaccatgg  | 1320 |
| aattcagcag ccccgagcaga gaggaatgcc ccaagcctct gagccgggtg tcaatcatgg | 1380 |
| ccggatctct gacaggactg ctgctgcttc aggccgtgtc ttgggcttct ggcgctagac  | 1440 |
| cttgcatccc caagagcttc ggctacagca gcgtcgtgtg cgtgtgcaat gccacctact  | 1500 |
| gcgacagctt cgaccctcct acctttcctg ctctgggcac cttcagcaga tacgagagca  | 1560 |
| ccagatccgg cagacggatg gaactgagca tgggacccat ccaggccaat cacacaggca  | 1620 |
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| gagccatgac agatgccgcc gctctgaata tcctggctct gtctccacca gctcagaacc  | 1740 |
| tgctgctcaa gagctacttc agcgaggaag gcacggtgta caacatcatc agagtgccca  | 1800 |
| tggccagctg cgacttcagc atcaggacct acacctacgc cgacacaccc gacgatttcc  | 1860 |
| agctgcacaa cttcagcctg cctgaagagg acaccaagct gaagatccct ctgatccaca  | 1920 |
| gagccctgca gctggcacia agacccgtgt cactgctggc ctctccatgg acatctccca  | 1980 |
| cctggctgaa aacaaatggc gccgtgaatg gcaagggcag cctgaaaggc caacctggcg  | 2040 |
| acatctacca ccagacctgg gccagatact tcgtgaagtt cctggacgcc tatgccgagc  | 2100 |
| acaagctgca gttttgggcc gtgacagccg agaacgaacc ttctgctgga ctgctgagcg  | 2160 |
| gctacccctt tcagtgcctg ggctttacac ccgagcacca gcgggacttt atcgcccgtg  | 2220 |
| atctgggacc cacactggcc aatagcacc accataatgt gcggctgctg atgctggacg   | 2280 |
| accagagact gtttctgccc cactgggcta aagtgggtgt gacagatcct gaggccgcca  | 2340 |
| aatacgtgca cggaatcgcc gtgcactggg atctggactt tctggcccct gccaaaggcca | 2400 |
| cactgggaga gacacacaga ctgttcccca acaccatgct gttcgccagc gaagcctgtg  | 2460 |
| tgggcagcaa gttttgggaa cagagcgtgc ggctcggcag ctgggataga ggcattgcagt | 2520 |
| acagccacag catcatcacc aacctgctgt accacgtcgt cggctggacc gactggaatc  | 2580 |
| tggccctgaa tcctgaaggc ggccctaact gggctccgaaa cttcgtggac agccccatca | 2640 |
| tcgtggacat caccaaggac accttctaca agcagcccat gttctaccac ctgggacact  | 2700 |

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| atctggacgc cgtggctctg atgcaccctg atggatctgc tgtggtggtg gtcctgaacc  | 2820 |
| gcagcagcaa agatgtgccc ctgaccatca aggatcccgc cgtgggattc ctggaaacaa  | 2880 |
| tcagccctgg ctactccatc cacacctacc tgtggcgtag acagtgacaa ttgttaatta  | 2940 |
| agtttaaacc ctcgaggccg caagcttata gataatcaac ctctggatta caaaatttgt  | 3000 |
| gaaagattga ctggtattct taactatgtt gtccttttta cgctatgtgg atacgctgct  | 3060 |
| ttaatgcctt tgtatcatgc tattgcttcc cgtatggctt tcattttctc ctccttgat   | 3120 |
| aaatcctggg tgctgtctct ttatgaggag ttgtggcccg ttgtcaggca acgtggcgtg  | 3180 |
| gtgtgcactg tgtttgctga cgcaaccccc actggttggg gcattgccac cacctgtcag  | 3240 |
| ctcctttccg ggactttcgc tttccccctc cctattgcca cggcggaact catcgccgcc  | 3300 |
| tgccctgccc gctgctggac aggggctcgg ctgttgggca ctgacaattc cgtggtgttg  | 3360 |
| tcggggaaat catcgtcctt tccttggctg ctgcctgtg ttgccacctg gattctgcgc   | 3420 |
| gggacgtcct tctgctacgt cccttcggcc ctcaatccag cggaccttcc ttcccgcggc  | 3480 |
| ctgctgccgg ctctgcggcc tcttccgcgt cttgccttc gccctcagac gagtcggatc   | 3540 |
| tccctttggg ccgcctcccc gcatcgatac cgtcgactag agctcgctga tcagcctga   | 3600 |
| ctgtgccttc tagttgccag ccatctgttg tttgccctc ccccgctcct tccttgacct   | 3660 |
| tggaaggtgc cactcccact gtcctttcct aataaaatga ggaaattgca tcgcattgtc  | 3720 |
| tgagtaggtg tcattctatt ctggggggtg ggggtggggca ggacagcaag ggggaggatt | 3780 |
| gggaagacaa tagcaggcat gctggggaga gatccacgat aacaaacagc ttttttgggg  | 3840 |
| tgaacatatt gactgaattc cctgcaggtt ggccactccc tctctgcgcg ctcgctcgt   | 3900 |
| cactgaggcc gcccgggcaa agcccgggcg tcgggcgacc tttggtcgcc cggcctcagt  | 3960 |
| gagcgagcga gcgcgcagag agggagtggc caactccatc actaggggtt cct         | 4013 |

<210> 33

<211> 4013

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide

<400> 33

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| gccaactcca tcactagggg ttcctgctag ctctgggtat ttaagcccga gtgagcacgc  | 180  |
| agggctctcca ttttgaagcg ggaggttacg cgttcgtcga ctactagtgg gtaccagagc | 240  |
| tccctagggt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcggtag  | 300  |
| ctagttatta atagtaatca attacgggggt cattagttca tagcccatat atggagttcc | 360  |
| gcgttacata acttacggta aatggcccgc ctggctgacc gcccaacgac cccgcccatt  | 420  |
| tgacgtcaat aatgacgtat gttcccatag taacgccaat agggactttc cattgacgtc  | 480  |
| aatgggtgga gtattttacgg taaactgccc acttggcagt acatcaagtg tatcatatgc | 540  |
| caagtacgcc ccctattgac gtcaatgacg gtaaattggcc cgcctggcat tatgcccagt | 600  |
| acatgacctt atgggacttt cctacttggc agtacatcta cgtattagtc atcgctatta  | 660  |
| ccatggtcga ggtgagcccc acgttctgct tcactctccc catctcccc ccctccccac   | 720  |
| ccccaatttt gtattttattt attttttaat tattttgtgc agcgatgggg gcgggggggg | 780  |
| ggggggggcg cgcgccaggc ggggcggggc ggggcgaggg gcggggcggg gcgaggcgga  | 840  |
| gaggtgcggc ggagccaat cagagcggcg cgctccgaaa gtttcctttt atggcgaggc   | 900  |
| ggcggcgggc gcggccctat aaaaagcgaa gcgcgcggcg ggcgggagtc gctgcgcgt   | 960  |
| gccttcgccc cgtgccccgc tccgccgccg cctcgcgccg cccgccccgg ctctgactga  | 1020 |
| ccgcgttact cccacagggt agcgggcggg acggcccttc tcctccgggc tgtaattagc  | 1080 |
| gcttggttta atgacggctt gtttcctttc tgtggctgcg tgaaagcctt gaggggctcc  | 1140 |
| gggagctaga gcctctgcta accatgttca tgccttcttc tttttcctac agctcctggg  | 1200 |
| caacgtgctg gttattgtgc tgtctcatca ttttggcaaa gaattcctcg aagatccgaa  | 1260 |
| gggaaagtct tccacgactg tgggatccgt tcgaagatat caccggttga gccacatgg   | 1320 |
| aattcagcag ccccagcaga gaggaatgcc ccaagcctct gagccgggtg tcaatcatgg  | 1380 |
| ccggatctct gacaggactg ctgctgcttc aggccgtgtc ttgggcttct ggcgctagac  | 1440 |
| cttgcatccc caagagcttc ggctacagca gcgtcgtgtg cgtgtgcaat gccacctact  | 1500 |
| gcgacagctt cgaccctcct acctttcctg ctctgggcac cttcagcaga tacgagagca  | 1560 |
| ccagatccgg cagacggatg gaactgagca tgggacctat ccaggccaat cacacaggca  | 1620 |

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| ctggcctgct gctgacactg cagcctgagc agaaattcca gaaagtgaaa ggcttcggcg  | 1680 |
| gagccatgac agatgccgcc gctctgaata tcctggctct gtctccacca gctcagaacc  | 1740 |
| tgctgctcaa gagctacttc agcgaggaag gcatcggcta caacatcatc agagtgccca  | 1800 |
| tggccagctg cgacttcagc atcaggacct acacctacgc cgacacaccc gacgatttcc  | 1860 |
| agctgcacaa cttcagcctg cctgaagagg acaccaagct gaagatccct ctgatccaca  | 1920 |
| gagccctgca gctggcacia agacccgtgt cactgctggc ctctccatgg acatctccca  | 1980 |
| cctgggtgaa aacaaatggc gccgtgaatg gcaagggcag cctgaaaggc caacctggcg  | 2040 |
| acatctacca ccagacctgg gccagatact tcgtgaagtt cctggacgcc tatgccgagc  | 2100 |
| acaagctgca gttttgggcc gtgacagccg agaacgaacc ttctgctgga ctgctgagcg  | 2160 |
| gctacccctt tcagtgcctg ggctttacac ccgagcacca gcgggacttt atcgcccgtg  | 2220 |
| atctgggacc cacactggcc aatagcacc accataatgt gcggctgctg atgctggacg   | 2280 |
| accagagact gcttctgccc cactgggcta aagtgggtgct gacagatcct gaggccgcca | 2340 |
| aatacgtgca cggaatcgcc gtgcactggc atctggactt tctggcccct gccaaaggcca | 2400 |
| cactgggaga gacacacaga ctgttcccca acaccatgct gttcgccagc gaagcctgtg  | 2460 |
| tgggcagcaa gttttgggaa cagagcgtgc ggctcggcag ctgggataga ggcatgcagt  | 2520 |
| acagccacag catcatcacc aacctgctgt accacgtcgt cggctggacc gactggaatc  | 2580 |
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| atctggacgc cgtggctctg atgcaccctg atggatctgc tgtgggtggtg gtcctgaacc | 2820 |
| gcagcagcaa agatgtgccc ctgaccatca aggatccgc cgtgggattc ctggaaacaa   | 2880 |
| tcagccctgg ctactccatc cacacctacc tgtggcgtag acagtgacaa ttgttaatta  | 2940 |
| agtttaaacc ctcgaggccg caagcttatc gataatcaac ctctggatta caaaatttgt  | 3000 |
| gaaagattga ctgggtattct taactatgtt gtccttttta cgctatgtgg atacgtgct  | 3060 |
| ttaatgcctt tgtatcatgc tattgcttcc cgtatggctt tcattttctc ctccttgtat  | 3120 |
| aaatcctggc tgctgtctct ttatgaggag ttgtggcccg ttgtcaggca acgtggcgtg  | 3180 |
| gtgtgcactg tgtttgctga cgcaaccccc actggttggg gcattgccac cacctgtcag  | 3240 |

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| ctcctttccg ggactttcgc tttccccctc cctattgcc a cggcggaact catcgccgcc | 3300 |
| tgccttgccc gctgctggac aggggctcgg ctgttgggca ctgacaattc cgtggtgttg  | 3360 |
| tcggggaaat catcgtcctt tccttggctg ctgcctgtg ttgccacctg gattctgcgc   | 3420 |
| gggacgtcct tctgctacgt cccttcggcc ctcaatccag cggaccttcc ttcccgcggc  | 3480 |
| ctgctgccgg ctctgcggcc tcttcgcgt cttgccttc gccctcagac gagtcggatc    | 3540 |
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| gggaagacaa tagcaggcat gctggggaga gatccacgat aacaaacagc ttttttgggg  | 3840 |
| tgaacatatt gactgaattc cctgcaggtt ggccactccc tctctgcgcg ctgctcgtc   | 3900 |
| cactgaggcc gcccgggcaa agcccgggcg tcgggcgacc tttggtcgcc cggcctcagt  | 3960 |
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<211> 4162

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<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide

<400> 34

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| gccaaactcca tcactagggg ttcctgctag ctctgggtat ttaagcccga gtgagcacgc | 180 |
| agggtctcca ttttgaagcg ggaggttacg cgttcgtcga ctactagtgg gtaccagagc  | 240 |
| tccctaggtt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcggtac  | 300 |
| ctagttatta atagtaatca attacggggg cattagttca tagcccatat atggagttcc  | 360 |
| gcgttacata acttacggta aatggcccg cctggctgacc gcccaacgac ccccgcccat  | 420 |
| tgacgtcaat aatgacgtat gttcccatag taacgccaat agggactttc cattgacgtc  | 480 |
| aatgggtgga gtatttacgg taaactgccc acttggcagt acatcaagtg tatcatatgc  | 540 |

|                                                                     |      |
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| caagtacgcc ccctattgac gtcaatgacg gtaaatggcc cgcctggcat tatgcccagt   | 600  |
| acatgacctt atgggacttt cctacttggc agtacatcta cgtattagtc atcgctatta   | 660  |
| ccatggtcga ggtgagcccc acgttctgct tcaactctccc catctccccc ccctccccac  | 720  |
| ccccaatttt gtattttattt attttttaat tatttttgtgc agcgatgggg gcgggggggg | 780  |
| ggggggggcg cgcgccaggc ggggcggggc ggggcgaggg gcggggcggg gcgaggcgga   | 840  |
| gaggtgcggc ggcagccaat cagagcggcg cgctccgaaa gtttcctttt atggcgaggc   | 900  |
| ggcggcggcg gcggccctat aaaaagcgaa gcgcgcggcg ggcgggagtc gctgcgacgc   | 960  |
| tgcttctgcc ccgtgccccg ctccgccgcc gcctcgcgcc gcccgccccg gctctgactg   | 1020 |
| accgcgttac tcccacaggt gagcggggcg gacggccctt ctctcagcg ctgtaattag    | 1080 |
| cgcttggttt aatgacggct tgttgaggc ttgctgaagg ctgtatgctg ttgtctttag    | 1140 |
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| aaggcctgtt actagcactc acatggaaca aatggccacc gtgggaggat gacaatttct   | 1260 |
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| gccttcttct ttttcctaca gctcctgggc aacgtgctgg ttattgtgct gtctcatcat   | 1380 |
| tttggcaaag aattcctcga agatccgaag ggaaagtctt ccacgactgt gggatccgtt   | 1440 |
| cgaagatatc accggttgag ccaccatgga attcagcagc ccagcagag aggaatgccc    | 1500 |
| caagcctctg agccgggtgt caatcatggc cggatctctg acaggactgc tgctgcttca   | 1560 |
| ggccgtgtct tgggcttctg gcgctagacc ttgcatcccc aagagcttcg gctacagcag   | 1620 |
| cgtcgtgtgc gtgtgcaatg ccacctactg cgacagcttc gaccctccta ctttctctgc   | 1680 |
| tctgggcacc ttcagcagat acgagagcac cagatccggc agacggatgg aactgagcat   | 1740 |
| gggacccatc caggccaatc acacaggcac tggcctgctg ctgacactgc agcctgagca   | 1800 |
| gaaattccag aaagtgaaag gcttcggcgg agccatgaca gatgccgccg ctctgaatat   | 1860 |
| cctggctctg tctccaccag ctcagaacct gctgctcaag agctacttca gcgaggaagg   | 1920 |
| catcggctac aacatcatca gagtgcccat ggccagctgc gacttcagca tcaggaccta   | 1980 |
| cacctacgcc gacacacccg acgatttcca gctgcacaac ttcagcctgc ctgaagagga   | 2040 |
| caccaagctg aagatccctc tgatccacag agccctgcag ctggcacaaa gaccctgtgc   | 2100 |
| actgctggcc tctccatgga catctccac ctggctgaaa acaaatggcg ccgtgaatgg    | 2160 |

|                                                                    |      |
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| cgagcaccag cgggacttta tcgcccgtga tctgggaccc acactggcca atagcaccca  | 2400 |
| ccataatgtg cggctgctga tgctggacga ccagagactg cttctgcccc actgggctaa  | 2460 |
| agtgggtgctg acagatcctg aggccgcca atacgtgcac ggaatcgccg tgcactggta  | 2520 |
| tctggacttt ctggcccctg ccaaggccac actgggagag acacacagac tgttcccaa   | 2580 |
| caccatgctg ttcgccagcg aagcctgtgt gggcagcaag ttttgggaac agagcgtgcg  | 2640 |
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| ataatcaacc tctggattac aaaatttgtg aaagattgac tgggtattctt aactatgttg | 3180 |
| ctccttttac gctatgtgga tacgctgctt taatgccttt gtatcatgct attgcttccc  | 3240 |
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| ggtggggcag gacagcaagg gggaggattg ggaagacaat agcaggcatg ctgggggagag | 3960 |
| atccacgata acaaacagct tttttggggc ccacatgtac actgaattcc ctgcaggttg  | 4020 |
| gccactccct ctctgcgcgc tcgctcgtc actgaggccg cccgggcaaa gcccgggcgt   | 4080 |
| cgggcgacct ttggtcgccc ggcctcagt agcgagcgag cgcgagaga gggagtggcc    | 4140 |
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<220>  
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| gccaactcca tcactagggg ttcctgctag ctctgggtat ttaagcccga gtgagcacgc | 180 |
| agggtctcca ttttgaagcg ggaggttacg cgttcgtcga ctactagtgg gtaccagagc | 240 |
| tccctagggt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcggtag | 300 |
| ctagttatta atagtaatca attacggggg cattagttca tagcccatat atggagttcc | 360 |
| gcgttacata acttacggta aatggcccgc ctggctgacc gcccaacgac ccccgcccat | 420 |
| tgacgtcaat aatgacgtat gttcccatag taacgccaat agggactttc cattgacgtc | 480 |
| aatgggtgga gtatttacgg taaactgccc acttggcagt acatcaagt tatcatatgc  | 540 |
| caagtacgcc ccctattgac gtcaatgacg gtaaattggc cgcttggcat tatgcccagt | 600 |
| acatgacctt atgggacttt cctacttggc agtacatcta cgtattagtc atcgctatta | 660 |
| ccatggtcga ggtgagcccc acgttctgct tcaactctcc catctcccc ccctccccac  | 720 |
| ccccaatttt gtatttattt attttttaat tattttgtgc agcgatgggg gcgggggggg | 780 |
| ggggggggcg cgcgccaggc ggggcggggc ggggcgaggg gcggggcggg gcgaggcgga | 840 |
| gaggtgcggc ggcagccaat cagagcggcg cgctccgaaa gtttcctttt atggcgaggc | 900 |

|                                                                   |      |
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| accgcgttac tcccacaggt gagcggggcg gacggccctt ctctcagcg ctgtaattag  | 1080 |
| cgcttggttt aatgacggct tgttgaggc ttgctgaagg ctgtatgctg ttgtctttag  | 1140 |
| aaataagtgg tagtcaagtg aagccacaga tgtgactacc acttatttct aaaaggacac | 1200 |
| aaggcctgtt actagcactc acatggaaca aatggccacc gtgggaggat gacaatttct | 1260 |
| gtggctgcgt gaaagccttg aggggctccg ggagctagag cctctgctaa ccatgttcat | 1320 |
| gccttcttct ttttcctaca gtcctgggc aacgtgctgg ttattgtgct gtctcatcat  | 1380 |
| tttgcaaag aattcctcga agatccgaag ggaaagtctt ccacgactgt gggatccgtt  | 1440 |
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| cctggctctg tctccaccag ctcagaacct gctgctcaag agctacttca gcgaggaagg | 1920 |
| catcggctac aacatcatca gagtgcccat ggccagctgc gacttcagca tcaggaccta | 1980 |
| cacctacgcc gacacacccg acgatttcca gctgcacaac ttcagcctgc ctgaagagga | 2040 |
| caccaagctg aagatccctc tgatccacag agccctgcag ctggcacaaa gaccctgttc | 2100 |
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| caagggcagc ctgaaaggcc aacctggcga catctaccac cagacctggg ccagatactt | 2220 |
| cgtgaagtgc ctggacgcct atgccgagca caagctgcag ttttgggccg tgacagccga | 2280 |
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| cgagcaccag cgggacttta tcgcccgtga tctgggaccc aactggcca atagcaccca  | 2400 |
| ccataatgtg cggctgctga tgctggacga ccagagactg cttctgcccc actgggctaa | 2460 |
| agtgggtgctg acagatcctg aggccgcaa atacgtgcac ggaatcgccg tgcactggta | 2520 |

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| gctcggcagc tgggatagag gcatgcagta cagccacagc atcatcacca acctgctgta  | 2700 |
| ccacgtcgtc ggctggaccg actggaatct ggccctgaat cctgaaggcg gccctaactg  | 2760 |
| ggtccgaaac ttctgtgaca gccccatcat cgtggacatc accaaggaca ctttctacaa  | 2820 |
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| cgttggactg gtggcttccc agaagaacga tctggacgcc gtggctctga tgcaccctga  | 2940 |
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| ggatccccgcc gtgggattcc tggaaacaat cagccctggc tactccatcc acacctacct | 3060 |
| gtggcgtaga cagtgacaat tgttaattaa gtttaaacc tcgaggccgc aagcttatcg   | 3120 |
| ataatcaacc tctggattac aaaatttgtg aaagattgac tgggtattctt aactatgttg | 3180 |
| ctccttttac gctatgtgga tacgctgctt taatgccttt gtatcatgct attgcttccc  | 3240 |
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| gccactccct ctctgcgcgc tcgctcgtc actgaggccg cccgggcaaa gcccgggcgt   | 4080 |
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4162

<210> 36

<211> 3977

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide

<400> 36

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| gccaactcca tcactagggg ttcctgctag ctctgggtat ttaagcccga gtgagcacgc  | 180  |
| agggtctcca ttttgaagcg ggaggttacg cgttcgtcga ctactagtgg gtaccagagc  | 240  |
| tccctagggt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcggtag  | 300  |
| ctagttatta atagtaatca attacggggg cattagttca tagcccatat atggagttcc  | 360  |
| gcgttacata acttacggta aatggcccg ctaggtgacc gcccaacgac cccgcccac    | 420  |
| tgacgtcaat aatgacgtat gttcccatag taacgccaat agggactttc cattgacgtc  | 480  |
| aatgggtgga gtatttacgg taaactgccc acttggcagt acatcaagtg tatcatatgc  | 540  |
| caagtacgcc ccctattgac gtcaatgacg gtaaattggcc cgcctggcat tatgcccagt | 600  |
| acatgacctt atgggacttt cctacttggc agtacatcta cgtattagtc atcgctatta  | 660  |
| ccatggtcga ggtgagcccc acgttctgct tctctctccc catctcccc ccctccccac   | 720  |
| ccccaatttt gtatttatatt attttttaat tattttgtgc agcgatgggg gcgggggggg | 780  |
| ggggggggcg cgcgccaggc ggggcggggc ggggcgaggg gcggggcggg gcgaggcgga  | 840  |
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| gggagctaga gcctctgcta accatgttca tgccttcttc tttttcctac agctcctggg  | 1200 |
| caacgtgctg gttattgtgc tgtctcatca ttttggcaaa gaattcctcg aagatccgaa  | 1260 |

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| aggacggccc ccgcagcaag ccccagccca aggacaacgg cgacgtgtgc caggactgca  | 1920 |
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| gctttcattt tctcctcctt gtataaatcc tggttgctgt ctctttatga ggagttgtgg  | 3120 |
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<210> 37

<211> 4013

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic polynucleotide

<400> 37

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| gccaactcca tcactagggg ttctgctag ctctgggtat ttaagcccga gtgagcacgc  | 180 |

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| tccctagggtt ctagaaccgg tgacgtctcc catgggtgaag cttggatctg aattcggtag | 300  |
| ctagttatta atagtaatca attacgggggt cattagttca tagcccatat atggagttcc  | 360  |
| gcgttacata acttacggta aatggcccgc ctggctgacc gccaacgac ccccgcccat    | 420  |
| tgacgtcaat aatgacgtat gttcccatag taacgccaat agggactttc cattgacgtc   | 480  |
| aatgggtgga gtattttacgg taaactgccc acttggcagt acatcaagtg tatcatatgc  | 540  |
| caagtacgcc ccctattgac gtcaatgacg gtaaatggcc cgcctggcat tatgcccagt   | 600  |
| acatgacctt atgggacttt cctacttggc agtacatcta cgtattagtc atcgctatta   | 660  |
| ccatggtcga ggtgagcccc acgttctgct tcaactctccc catctcccc ccctccccac   | 720  |
| ccccaatttt gtattttattt attttttaat tattttgtgc agcgatgggg gcgggggggg  | 780  |
| ggggggggcg cgcgccaggc ggggcggggc ggggcgaggg gcggggcggg gcgaggcgga   | 840  |
| gaggtgcggc ggcagccaat cagagcggcg cgctccgaaa gtttcctttt atggcgaggc   | 900  |
| ggcggcgggc gcggccctat aaaaagcgaa gcgcgcggcg ggcgggagtc gctgcgcgt    | 960  |
| gccttcgccc cgtgccccgc tccgccgccg cctcgcgccg cccgccccgg ctctgactga   | 1020 |
| ccgcgttact cccacagggtg agcgggcggg acggcccttc tcctccgggc tgtaattagc  | 1080 |
| gcttggttta atgacggctt gtttcttttc tgtggctgcg tgaaagcctt gaggggctcc   | 1140 |
| gggagctaga gcctctgcta accatgttca tgccttcttc tttttcctac agctcctggg   | 1200 |
| caacgtgctg gttattgtgc tgtctcatca ttttggcaaa gaattcctcg aagatccgaa   | 1260 |
| gggaaagtct tccacgactg tgggatccgt tcgaagatat caccggttga gccaccatgg   | 1320 |
| aattcagcag cccagcaga gaggaatgcc ccaagcctct gagccgggtg tcaatcatgg    | 1380 |
| ccggatctct gacaggactg ctgctgcttc aggccgtgtc ttgggcttct ggcgctagac   | 1440 |
| cttgcatccc caagagcttc ggctacagca gcgtcgtgtg cgtgtgcaat gccacctact   | 1500 |
| gcgacagctt cgaccctcct acctttcctg ctctgggcac cttcagcaga tacgagagca   | 1560 |
| ccagatccgg cagacggatg gaactgagca tgggacccat ccaggccaat cacacaggca   | 1620 |
| ctggcctgct gctgacactg cagcctgagc agaaattcca gaaagtgaaa ggcttcggcg   | 1680 |
| gagccatgac agatgccgcc gctctgaata tcctggctct gtctccacca gctcagaacc   | 1740 |
| tgctgctcaa gagctacttc agcgaggaag gcacggcta caacatcatc agagtgccca    | 1800 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| tggccagctg cgacttcagc atcaggacct acacctacgc cgacacaccc gacgatttcc  | 1860 |
| agctgcacaa cttcagcctg cctgaagagg acaccaagct gaagatccct ctgatccaca  | 1920 |
| gagccctgca gctggcacaa agacccgtgt cactgctggc ctctccatgg acatctccca  | 1980 |
| cctggctgaa aacaaatggc gccgtgaatg gcaagggcag cctgaaaggc caacctggcg  | 2040 |
| acatctacca ccagacctgg gccagatact tcgtgaagtt cctggacgcc tatgccgagc  | 2100 |
| acaagctgca gttttgggcc gtgacagccg agaacgaacc ttctgctgga ctgctgagcg  | 2160 |
| gctacccctt tcagtgccctg ggctttacac ccgagcacca gcgggacttt atcgcccgtg | 2220 |
| atctgggacc cacactggcc aatagcacc accataatgt gcggctgctg atgctggacg   | 2280 |
| accagagact gcttctgccc cactgggcta aagtgggtgt gacagatcct gaggccgcca  | 2340 |
| aatacgtgca cggaatcgcc gtgcactggc atctggactt tctggcccct gccaaaggcca | 2400 |
| cactgggaga gacacacaga ctgttcccca acaccatgct gttcgccagc gaagcctgtg  | 2460 |
| tgggcagcaa gttttgggaa cagagcgtgc ggctcggcag ctgggataga ggcatgcagt  | 2520 |
| acagccacag catcatcacc aacctgctgt accacgtcgt cggctggacc gactggaatc  | 2580 |
| tggccctgaa tcctgaaggc ggccctaact gggtcgaaa cttcgtggac agcccatca    | 2640 |
| tcgtggacat caccaaggac accttctaca agcagcccat gttctaccac ctgggacact  | 2700 |
| tcagcaagtt catccccgag ggctctcagc gcgttggact ggtggcttcc cagaagaacg  | 2760 |
| atctggacgc cgtggctctg atgcaccctg atggatctgc tgtggtggtg gtcctgaacc  | 2820 |
| gcagcagcaa agatgtgccc ctgaccatca aggatccgc cgtgggattc ctggaaacaa   | 2880 |
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| gaaagattga ctggtattct taactatgtt gtccttttta cgctatgtgg atacgtgct   | 3060 |
| ttaatgcctt tgtatcatgc tattgcttcc cgtatggctt tcattttctc ctccttgat   | 3120 |
| aaatcctggc tgctgtctct ttatgaggag ttgtggcccg ttgtcaggca acgtggcgtg  | 3180 |
| gtgtgcactg tgtttgctga cgcaaccccc actggttggg gcattgccac cacctgtcag  | 3240 |
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| tgccttgccc gctgctggac aggggctcgg ctgttgggca ctgacaattc cgtggtgttg  | 3360 |
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|---------------------------------------------------------------------|------|
| gggacgtcct tctgctacgt cccttcggcc ctcaatccag cggaccttcc ttcccgcggc   | 3480 |
| ctgctgccgg ctctgcggcc tcttccgcgt cttgccttc gccctcagac gagtcggatc    | 3540 |
| tccctttggg ccgcctcccc gcatcgatac cgtcgactag agctcgctga tcagcctcga   | 3600 |
| ctgtgccttc tagttgccag ccatctgttg tttgcccctc ccccgtgcct tccttgaccc   | 3660 |
| tggaaggtgc cactcccact gtcctttcct aataaaatga ggaaattgca tcgcattgtc   | 3720 |
| tgagtaggtg tcattctatt ctgggggggtg ggggtggggca ggacagcaag ggggaggatt | 3780 |
| gggaagacaa tagcaggcat gctggggaga gatccacgat aacaaacagc ttttttgggg   | 3840 |
| tgaacatatt gactgaattc cctgcaggtt ggccactccc tctctgcgcg ctcgctcgct   | 3900 |
| cactgaggcc gcccgggcaa agcccgggcg tcgggcgacc tttggtcgcc cggcctcagt   | 3960 |
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 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Synthetic polynucleotide

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| cgacgcccgg gctttgcccg ggcggcctca gtgagcgagc gagcgcgag agagggagtg  | 120 |
| gccaactcca tcactagggg ttcctgctag ctctgggtat ttaagcccga gtgagcacgc | 180 |
| agggtctcca ttttgaagcg ggaggttacg cgttcgtcga ctactagtgg gtaccagagc | 240 |
| tccctaggtt ctagaaccgg tgacgtctcc catggtgaag cttggatctg agggcggagt | 300 |
| tagggcggag ccaatcagcg tgcgccgttc cgaaagttgc cttttatggc tgggcggaga | 360 |
| atgggcggtg aacgccgatg attatataag gacgcgccgg gtgtggcaca gctagttccg | 420 |
| tcgcagccgg gatttgggtc gcggttcttg tttgtggatc cctgtgatcg tcacttggtg | 480 |
| agtcactgac tgtctatgcc tgggaaaggg tgggcaggag atggggcagt gcaggaaaag | 540 |
| tggcactatg aaccctcctg gtggcgaggg gaggggggtg gtcctcgaac gccttgacga | 600 |
| actggcctgg atacagagtg gaccggctgg ccccatctgg aagacttcga gatacactgt | 660 |
| tgtcttactg cgctcaacag tgtatctcga agtcttccaa atggtgccag ccatcgcagc | 720 |

|                                                                    |      |
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| ggggtgcagg aaatgggggc agccccctt tttggctatc cttccacgtg ttcttttttg   | 780  |
| tatcttttgt gtttcctaga aaacatctca gtcaccaccg cagccctagg aatgcatcta  | 840  |
| gacaattgta ctaaccttct tctcttttct ctcctgacag tccggaaagc caccatgtac  | 900  |
| gccctgttcc tgctggccag cctgctgggc gccgccctgg ccggccccgt gctgggcctg  | 960  |
| aaggagtgca cccgcggcag cgccgtgtgg tgccagaacg tgaagaccgc cagcgactgc  | 1020 |
| ggcgccgtga agcactgcct gcagaccgtg tggaacaagc ccaccgtgaa gagcctgccc  | 1080 |
| tgcgacatct gcaaggacgt ggtgaccgcc gccggcgaca tgctgaagga caacgccacc  | 1140 |
| gaggaggaga tcctgggtga cctggagaag acctgcgact ggctgccccaa gccaacatg  | 1200 |
| agcgccagct gcaaggagat cgtggacagc tacctgcccg tgatcctgga catcatcaag  | 1260 |
| ggcgagatga gccgccccgg cgaggtgtgc agcgccctga acctgtgcga gagcctgcag  | 1320 |
| aagcacctgg ccgagctgaa ccaccagaag cagctggaga gcaacaagat ccccgagctg  | 1380 |
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| gagatctgcg ccctgggtggg cttctgcgac gaggtgaagg agatgcccac gcagaccctg | 1740 |
| gtgcccgcca aggtggccag caagaacgtg atccccgcc tggagctggg ggagcccac    | 1800 |
| aagaagcacg aggtgcccgc caagagcgac gtgtactgcg aggtgtgcga gttcctgggtg | 1860 |
| aaggaggtga ccaagctgat cgacaacaac aagaccgaga aggagatcct ggacgccttc  | 1920 |
| gacaagatgt gcagcaagct gcccaagagc ctgagcgagg agtgccagga ggtggtggac  | 1980 |
| acctacggca gcagcatcct gagcatcctg ctggaggagg tgagccccga gctggtgtgc  | 2040 |
| agcatgctgc acctgtgcag cggcaccgc ctgcccgcc tgaccgtgca cgtgaccag     | 2100 |
| cccaaggacg gcggcttctg cgaggtgtgc aagaagctgg tgggctacct ggaccgaac   | 2160 |
| ctggagaaga acagcaccaa gcaggagatc ctggccgcc tggagaaggg ctgcagcttc   | 2220 |
| ctgcccgacc cctaccagaa gcagtgcgac cagttcgtgg ccgagtacga gcccgctgctg | 2280 |
| atcgagatcc tggtggaggt gatggacccc agcttcgtgt gcctgaagat cggcgcctgc  | 2340 |

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| cccagcggcc acaagcccct gctgggcacc gagaagtgca tctggggccc cagctactgg  | 2400 |
| tgccagaaca ccgagaccgc cgcccagtcg aacgccgtgg agcactgcaa gcgccacgtg  | 2460 |
| tggaacagaa gaaagagagg aagtggagag ggcagaggaa gtcttctgac atgcggagac  | 2520 |
| gtggaagaga atcccggccc tatggaattc agcagcccca gcagagagga atgccccaaag | 2580 |
| cctctgagcc ggggtgtcaat catggccgga tctctgacag gactgctgct gcttcaggcc | 2640 |
| gtgtcttggg cttctggcgc tagaccttgc atccccaaga gcttcggcta cagcagcgtc  | 2700 |
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| ttccagaaag tgaaaggctt cggcggagcc atgacagatg ccgccgctct gaatatcctg  | 2940 |
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| ggctacaaca tcatcagagt gcccatggcc agctgcgact tcagcatcag gacctacacc  | 3060 |
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| aagctgaaga tccctctgat ccacagagcc ctgcagctgg cacaaagacc cgtgtcactg  | 3180 |
| ctggcctctc catggacatc tcccacctgg ctgaaaacaa atggcgccgt gaatggcaag  | 3240 |
| ggcagcctga aaggccaacc tggcgacatc taccaccaga cctggggccag atacttcgtg | 3300 |
| aagttcctgg acgcctatgc cgagcacaag ctgcagtttt gggccgtgac agccgagaac  | 3360 |
| gaaccttctg ctggactgct gagcggctac ccctttcagt gcctgggctt tacaccgag   | 3420 |
| caccagcggg actttatcgc ccgtgatctg ggaccacac tggccaatag caccaccat    | 3480 |
| aatgtgcggc tgctgatgct ggacgaccag agactgcttc tgccccactg ggctaaagtg  | 3540 |
| gtgctgacag atcctgaggc cgccaaatac gtgcacggaa tcgccgtgca ctggtatctg  | 3600 |
| gactttctgg cccctgccaa ggccacactg ggagagacac acagactgtt cccaacacc   | 3660 |
| atgctgttcg ccagcgaagc ctgtgtgggc agcaagtttt gggaacagag cgtgcggctc  | 3720 |
| ggcagctggg atagaggcat gcagtacagc cacagcatca tcaccaacct gctgtaccac  | 3780 |
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| cccgccgtgg gattcctgga aacaatcagc cctggctact ccatccacac ctacctgtgg  | 4140 |
| cgtagacagt gacaattggt aattaagttt aaaccctcga ggccgcaagc cgcatcgata  | 4200 |
| ccgtcgacta gagctcgctg atcagcctcg actgtgcctt ctagttgcca gccatctgtt  | 4260 |
| gtttgcccct ccccgtgcc ttccttgacc ctggaagggt ccactccac tgtcctttcc    | 4320 |
| taataaaatg aggaaattgc atcgcatgtt ctgagtaggt gtcattctat tctggggggt  | 4380 |
| ggggtggggc aggacagcaa gggggaggat tgggaagaca atagcaggca tgctggggat  | 4440 |
| gtacactgaa ttccctgcag gttggccact ccctctctgc gcgctcgctc gctcactgag  | 4500 |
| gccgcccggg caaagcccgg gcgtcgggcg acctttggtc gcccggcctc agtgagcgag  | 4560 |
| cgagcgcgca gagagggagt ggccaactcc atcactaggg gttcct                 | 4606 |

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<211> 10699

<212> DNA

<213> Artificial Sequence

<220>

<223> PR001A vector first strand sequence

<400> 39

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| gccaactcca tcactagggg ttcctgctag ctctgggtat ttaagcccga gtgagcacgc | 180 |
| agggtctcca ttttgaagcg ggaggttacg cgttcgtcga ctactagtgg gtaccagagc | 240 |
| tccctaggtt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcggtag | 300 |
| ctagttatta atagtaatca attacggggg cattagttca tagcccatat atggagttcc | 360 |
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| tgacgtcaat aatgacgtat gttcccatag taacgccaat agggactttc cattgacgtc | 480 |
| aatgggtgga gtatttacgg taaactgccc acttggcagt acatcaagtg tatcatatgc | 540 |
| caagtacgcc ccctattgac gtcaatgacg gtaaatggcc cgcctggcat tatgcccagt | 600 |
| acatgacctt atgggacttt cctacttggc agtacatcta cgtattagtc atcgtatta  | 660 |

|                                                                     |      |
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| ggggggggcg cgcgccaggc ggggcggggc ggggcgaggg gcggggcggg gcgaggcgga   | 840  |
| gaggtgcggc ggcagccaat cagagcggcg cgctccgaaa gtttcctttt atggcgaggc   | 900  |
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| gccttcgccc cgtgccccgc tccgccgccg cctcgcgccg cccgccccgg ctctgactga   | 1020 |
| ccgcgttact cccacagggtg agcgggcggg acggcccttc tcctccgggc tgtaattagc  | 1080 |
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| gagccctgca gctggcacia agacccgtgt cactgctggc ctctccatgg acatctccca   | 1980 |
| cctggctgaa aacaaatggc gccgtgaatg gcaagggcag cctgaaaggc caacctggcg   | 2040 |
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| acaagctgca gttttgggcc gtgacagccg agaacgaacc ttctgctgga ctgctgagcg   | 2160 |
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| ctcctttccg ggactttcgc tttccccctc cctattgcca cggcggaact catcgccgcc   | 3300 |
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 <213> Artificial Sequence

<220>  
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| gcttgtttcg gcgtgggtat ggtggcaggc cgcccttaga aaaactcatc gagcatcaaa  | 180 |
| tgaaactgca atttattcat atcaggatta tcaataccat atttttgaaa aagccgtttc  | 240 |
| tgtaatgaag gagaaaactc accgaggcag ttccatagga tggcaagatc ctggtatcgg  | 300 |
| tctgcgattc cgactcgtcc aacatcaata caacctatta atttcccctc gtcaaaaata  | 360 |
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<220>

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| gccaactcca tctactagggg ttcctgctag ctctgggtat ttaagcccga gtgagcacgc | 180  |
| agggtctcca ttttgaagcg ggagggttac cgttcgtcga ctactagtgg gtaccagagc  | 240  |
| tccctaggtt ctagaaccgg tgacgtctcc catggtgaag cttggatctg aattcggtag  | 300  |
| cctagttatt aatagtaatc aattacgggg tcattagttc atagcccata tatggagttc  | 360  |
| cgcgttacat aacttacggt aaatggcccc cctggctgac cgcccaacga cccccgcca   | 420  |
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<213> Artificial Sequence

<220>

<223> PR004E vector second strand sequence

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| gcttgtttcg gcgtgggtat ggtggcaggc cgcccttaga aaaactcatc gagcatcaaa  | 180  |
| tgaaactgca atttattcat atcaggatta tcaataccat atttttgaaa aagccgtttc  | 240  |
| tgtaatgaag gagaaaactc accgaggcag ttccatagga tggcaagatc ctggtatcgg  | 300  |
| tctgcgattc cgactcgtcc aacatcaata caacctatta atttcccctc gtcaaaaata  | 360  |
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<211> 9348

<212> DNA

<213> Artificial Sequence

<220>

<223> PR014A vector first strand sequence

<400> 45

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<213> Artificial Sequence

<220>

<223> PR014A vector second strand sequence

<400> 46

|                                                                    |      |
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| gcttgtttcg gcgtgggtat ggtggcaggc cgcccttaga aaaactcatc gagcatcaaa  | 180  |
| tgaaactgca atttattcat atcaggatta tcaataccat atttttgaaa aagccgtttc  | 240  |
| tgtaatgaag gagaaaactc accgaggcag ttccatagga tggcaagatc ctggtatcgg  | 300  |
| tctgcgattc cgactcgtcc aacatcaata caacctatta atttcccctc gtcaaaaata  | 360  |
| aggttatcaa gtgagaaatc accatgagtg acgactgaat ccggtgagaa tggcaaaagc  | 420  |
| ttatgcattt ctttccagac ttgttcaaca ggccagccat tacgctcgtc atcaaaatca  | 480  |
| ctcgcacaa ccaaaccgtt attcattcgt gattgcgcct gagcgagacg aaatacgca    | 540  |
| tcgctgttaa aaggacaatt acaaacagga atcgaatgca accggcgcag gaacactgcc  | 600  |
| agcgcacaa caatatcttc acctgaatca ggatattctt ctaataacctg gaatgctgtt  | 660  |
| ttcccgggga tcgcagtggg gagtaaccat gcatcatcag gagtacggat aaaatgcttg  | 720  |
| atggtcggaa gaggcataaa ttccgtcagc cagtttagtc tgaccatctc atctgtaaca  | 780  |
| tcattggcaa cgctacctt gccatgtttc agaaacaact ctggcgcac gggcttccca    | 840  |
| tacaatcgat agattgtcgc acctgattgc ccgacattat cgcgagccca ttataccca   | 900  |
| tataaatcag catccatgtt ggaatttaat cgcggcctcg agcaagacgt ttcccgttga  | 960  |
| atatggctca taacaccctt tgtattactg tttatgtaag cagacagttt tattgttcat  | 1020 |
| gatgatatat ttttatcttg tgcaatgtaa catcagagat ttgagacac aacgtggttt   | 1080 |
| gcaggagtca ggcaactatg gatgaacgaa atagacagat cgctgagata ggtgcctcac  | 1140 |
| tgattaagca ttggtaactg tcagaccaag tttactcata tatacttttag attgatttaa | 1200 |
| aacttcattt ttaatttaaa aggatctagg tgaagatcct ttttgataat ctcacgacca  | 1260 |
| aaatccctta acgtgagttt tcgttccact gagcgtcaga ccccgtagaa aagatcaaag  | 1320 |
| gatcttcttg agatcctttt tttctgcgcg taatctgctg cttgcaaaca aaaaaaccac  | 1380 |
| cgctaccagc ggtggtttgt ttgccggatc aagagctacc aactcttttt ccgaaggtaa  | 1440 |
| ctggcttcag cagagcgcag ataccaaata ctgttcttct agtgtagccg tagttaggcc  | 1500 |
| accacttcaa gaactctgta gcaccgccta catacctcgc tctgctaata ctgttaccag  | 1560 |

|                                                                    |      |
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| cggataaggc gcagcggtcg ggctgaacgg ggggttcgtg cacacagccc agcttggagc  | 1680 |
| gaacgacctt caccgaactg agatacctac agcgtgagct atgagaaagc gccacgcttc  | 1740 |
| ccgaagggag aaaggcggac aggtatccgg taagcggcag ggtcggaca ggagagcgca   | 1800 |
| cgagggagct tccaggggga aacgcctggg atctttatag tcctgtcggg tttcgccacc  | 1860 |
| tctgacttga gcgtcgattt ttgtgatgct cgtcaggggg gcggagccta tggaaaaacg  | 1920 |
| ccagcaacgc ggccttttta cggttcctgg ctttttgctg gccttttgct cacatgttct  | 1980 |
| ttcctgcgtt atcccctgat tctgtggata accgtattac cgcctttgag tgagctgata  | 2040 |
| ccgctcgccg cagccgaacg accgagcgca gcgagtcagt gagcgaggaa gcggaagagc  | 2100 |
| gccaataacg caaacgcct ctccccgcgc gttggccgat tcattaatgc agctgtggaa   | 2160 |
| tgtgtgtcag ttaggggtgtg gaaagtcccc aggctccca gcaggcagaa gtatgcaaag  | 2220 |
| catgcatctc aattagtcag caaccaggtg tggaaagtcc ccaggctccc cagcaggcag  | 2280 |
| aagtatgcaa agcatgcatc tcaattagtc agcaaccata gtcccgcccc taactccgcc  | 2340 |
| catcccgccc ctaactccgc ccagttccgc ccattctccg ccccatggct gactaatttt  | 2400 |
| ttttatttat gcagaggccg aggccgcctc ggcctctgag ctattccaga agtagtgagg  | 2460 |
| aggctttttt ggaggttttc tctacactga agtcttgatg gcatgcgctt tagtctcctc  | 2520 |
| actcatgagg actgcatatc taagagctct gtgacctcac ttgtgcctgg tgtccagggt  | 2580 |
| aaacaaatct tcttgccctt gaaaattaga ggatgcagac tggctctctc tactgcactg  | 2640 |
| gactgactaa cctgactgga gctcttgctt acactgagaa gaagctgggtg gactcttctt | 2700 |
| tggctctgaa aggagattt attttatctc atggagttag gctagagcat cttgtcagag   | 2760 |
| ggaatgatgt ttgaagtcca tgaggcttct aatgattagg gctggtatgc agcaaacaac  | 2820 |
| catgactgca tttgtctctg atgcagattc ctaacttctg atatgttcaa aactctgctt  | 2880 |
| cctgattcag ttgctctctt taacaaatgc agtgattctt ttgataattt gaggggaaaa  | 2940 |
| aatgtctctg tgttgtgttt cctccttgct ggtgatccac agtaaggggt tgaaaataat  | 3000 |
| ctctgacatt ttttagttaa agccttcctt tcattcttca tggctactgc agcacaaagc  | 3060 |
| tctttcttgt tttgcagaag gagtgagagc aagggtgttg gtgagttctc agtgccccag  | 3120 |
| ccccagcctg aagaggagac tgaatgcctg ccctctggct gtggctcaga gtgaaaggaa  | 3180 |

|                                                                    |      |
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| aacacataca gcaggagtct gtgtagggat tgggctccag ccatcagagc ggggggagca  | 3240 |
| tcatgaaatg tttgtaagct ctccaccatc cagaatgact ttgcagctct gagcagctgc  | 3300 |
| acccatgact agtccttcac agtatgctga tgtgagatat tctgttcttt gaagatgggt  | 3360 |
| agtgaccaga atcaggagga tgtgagaaat gtggagcatt tgagagtgga actcctgcag  | 3420 |
| ctgttgaagc tagaacacaa cagacactgc agcttactac tcctgagcct ggccaggctg  | 3480 |
| gtagttttgt ttttcttggc caagctctct gggaatagtt ctgcctctgg ggtcagcttt  | 3540 |
| ccatgcaggg gctgagatga acacataaag caggattcag cttggaggct tctgagaggg  | 3600 |
| atggagataa aagatgggtg gtagatgggt aagaggtgggt atggtagatg gcagagtatg | 3660 |
| gcagaagatg tagacaggat gtcagaaaat gagatggtag ttgcaagagt aggctgtaga  | 3720 |
| cagtgggaga tggtgagatg agagatgcag aagatgggtca gagagcagga tgttgggaga | 3780 |
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| gaccatcttg tgtaaaatct taatctcagc agtcacattt gctgttgaag tgagtatgaa  | 4320 |
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| catgatgcct aattagggct ggagaggaca tcacagaaac agtggctctt gggtttgtcc  | 4500 |
| tgggtagggc agaggtaagg ttgaggagag ctagaaaact caggaaaaga aaaggctcag  | 4560 |
| gagaaagaag acagagagtt ccagttagca gagctgcctc tgctgctagg cttgtggtac  | 4620 |
| acaggttaaa gtttggcctt gtggcattca acagcctttg catcctactg accacactag  | 4680 |
| ccaggcagtt gaggctcagg gctggctttc ttgcacttgg agaacctttc ctaccttcaa  | 4740 |
| atgcttgaac cagaatacca gagaaaaaat gcaactctga aagcacaggc attctgtgaa  | 4800 |

|                                                                    |      |
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| tagccatcca gatttctgca ggctaaggaa aacagagatg gaggtctatg agggaaagaa  | 4860 |
| gagaagtcct catgagggct gataccagac agttgagtag gacactgagc acactcacca  | 4920 |
| ccagatgctc tgtctaagct gtagtttact aggaggttgt ttatttctctg agtcagattt | 4980 |
| gcttctgttt taagaaccct cacagcctct ctttctatct attctgatga aggttgagcc  | 5040 |
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| ttcaagtctc cacctattag ctctgcaaga gtgcagaagg ctgcacagca ctgcagatgg  | 5340 |
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| agagcaggct aagagtggag tgactgaaga cagaagctgg aggcacatca accattacaa  | 5460 |
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| aaacaggatg ttggcaaggg cttagtgtct ctgactgctg atgctggagt ctggcttccc  | 5640 |
| tgaccccagt agcagtggga cttagaagca tctcaggctc caggttctca cagctgactc  | 5700 |
| ctccttcctg aactgtaaga aacagaaatc cacttgctgc tctaaagtgg ggtcacttta  | 5760 |
| atggaaggaa cagccaacat atttggagag gggctggtgt ggggcttctt actgagagtg  | 5820 |
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| agatggggaa gccatgctaa tcagtgacat catctattct aagtttccta cctctgaatg  | 5940 |
| aatagttctg ctggcaaaaa tctgcttttt taagttgata caaatgtgtc ctgtcaagga  | 6000 |
| agtagagctc cttctcaatc cagcacatca gtaccataac ttgttcctgt gcatttggtt  | 6060 |
| aaagatggtg ataacatcat ttatcagtaa gtgcagccag gcatgatgca ctatctcctt  | 6120 |
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| tagtcctgag tagttctact gattttatta ttagtagaga gggtttcatc atgttggcca  | 6240 |
| ggctggtctg catgcttcta tattattttc taaaagattt aaagttttgc cttctccatt  | 6300 |
| tagacttata attcactgga atttttttgt gtgtatggta tgacatatgg gttccctttt  | 6360 |
| attttttaca tataaatata tttccctgtt tttctaaaaa agaaaaagac catcattttc  | 6420 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| ccattgtaaa atgccatatt tttttcatag gtcacttaca tatatcaatg ggtctgtttc  | 6480 |
| tgagctctac tctattttat cagcctcact gtctatcccc acacatctca tgctttgctc  | 6540 |
| taaatcttga tatttagtgg aacattcttt cccattttgt tctacaagaa tatttttgtt  | 6600 |
| attgtctttt gggcttctat atacatttta gaatgaggtt ggcaagttat cctgcaggaa  | 6660 |
| ttcctcgaga ccgtacgagc ggccgcttgg ccactccctc tctgcgcgct cgctcgctca  | 6720 |
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| aacatggtta gcagaggctc tagctcccgg agcccctcaa ggctttcacg cagccacaga  | 7980 |
| aagggtggtga ctgagatgtt ttctaggaaa caaaaagat aaaaaaaga acacgtggaa   | 8040 |

|                                                                     |      |
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| ggatagccaa aaaggggggc tgccccatt tcctgcaccc cgctgcgatg gctggcacca    | 8100 |
| tttggaaagac ttcgagatac actgtttgagc gcagtaagac aacagtgtat ctcgaagtct | 8160 |
| tccagatggg gccagccggt ccactctgta tccaggccag ttctgcaagg cgttcgagga   | 8220 |
| ccacccccct cccctcgcca ccaggacaag ccgtcattaa accaagcgct aattacagcg   | 8280 |
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| ctccgccccg ccgcgcgctt cgctttttat agggccgccc ccgccgccgc ctcgccataa   | 8460 |
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| atgggctatg aactaatgac cccgtaattg attactatta ataactaggt accgaattca   | 9060 |
| gatccaagct tcacatggg agacgtcacc ggttctagaa cctagggagc tctggtaccc    | 9120 |
| actagtagtc gacgaacgcg taacctccc cttcaaaatg gagaccctgc gtgctcactc    | 9180 |
| gggcttaa at acccagagct agcaggaacc ctagtgatg gagttggcca ctccctctct   | 9240 |
| gcgcgctcgc tcgctcactg aggccgggcg accaaaggct gcccgacgcc cgggctttgc   | 9300 |
| ccgggcggcc tcagtgcgc agcgcgcgc cagagaggga gtggccaa                  | 9348 |

<210> 47

<211> 263

<212> DNA

<213> Artificial Sequence

<220>

<223> First strand sequence encoding aSyn shRNA

<400> 47

|                                                                    |     |
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| cctggtggcg aggggagggg ggtggtcctc gaacgccttg cagaactggc ctggatacag  | 60  |
| agtggaccgg ctggcccat ctggaagact tcgagataca ctgttgtctt actgcgctca   | 120 |
| acagtgtatc tcgaagtctt ccaaattggtg ccagccatcg cagcggggtg caggaaatgg | 180 |
| gggcagcccc cttttttggc tatccttcca cgtgttcttt ttgtatctt ttgtgtttcc   | 240 |
| tagaaaacat ctcagtcacc acc                                          | 263 |

<210> 48  
 <211> 263  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Second strand sequence encoding aSyn shRNA

|                                                                               |     |
|-------------------------------------------------------------------------------|-----|
| <400> 48<br>ggtggtgact gagatgtttt ctaggaaaca caaaagatac aaaaaagaac acgtggaagg | 60  |
| atagccaaaa aggggggctg cccccatttc ctgcaccccg ctgcgatggc tggcaccatt             | 120 |
| tggaagactt cgagatacac tgttgagcgc agtaagacaa cagtgtatct cgaagtcttc             | 180 |
| cagatggggc cagccggtcc actctgtatc caggccagtt ctgcaaggcg ttcgaggacc             | 240 |
| acccccctcc cctcgccacc agg                                                     | 263 |