

SEQUENCE LISTING

<110> Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas, O.A., M.P. (CIEMAT)
 Consorcio Centro de Investigación Biomédica en Red, M.P.
 (CIBER)
 Fundación Instituto de Investigación Sanitaria Fundación
 Jiménez Díaz (FIIS-FJD).
 Université Libre de Bruxelles
 Fundación para la Investigación Biomédica del Hospital
 Infantil Universitario Niño Jesús

<120> LENTIVIRAL VECTORS AND USES THEREOF

<130> 906 032

<160> 39

<170> BiSSAP 1.3.6

<210> 1

<211> 780

<212> DNA

<213> Artificial Sequence

<220>

<223> 5' LTR

<400> 1

gacattgatt attgactagt tattaatagt aatcaattac ggggtcatta gttcatagcc 60

catatatgga gttccgcgtt acataactta cggtaaattgg cccgcctggc tgaccgcca 120

acgacccccg cccattgacg tcaataatga cgtatgttcc catagtaacg ccaataggga 180

ctttccattg acgtcaatgg gtggagtatt tacggtaaac tgcccacttg gcagtacatc 240

aagtgtatca tatgccaagt acgcccccta ttgacgtcaa tgacggtaaa tggccgcct 300

ggcattatgc ccagtacatg accttatggg actttcctac ttggcagtac atctacgtat 360

tagtcatcgc tattaccatg gtgatgcggt ttggcagta catcaatggg cgtggatagc 420

ggtttgactc acgggggattt ccaagtctcc acccattga cgtcaatggg agtttgtttt 480

ggcaccaaaa tcaacgggac ttccaaaat gtcgtaacaa ctccgcccc ttgacgcaaa 540

tgggcggtag gcgtgtacgg tgggaggtct atataagcag agctcgttta gtgaaccggg 600

gtctctctgg ttagaccaga tctgagcctg ggagctctct ggctaactag ggaaccact 660

gcttaagcct caataaagct tgccttgagt gcttcaagta gtgtgtgccc gtctgttg 720

tgactctggt aactagagat ccctcagacc ctttagtca gtgtggaaaa tctctagcag 780

<210> 2

<211> 584

<212> DNA

<213> Artificial Sequence

<220>

<223> Chimeric CMV promoter

<400> 2

gacattgatt attgactagt tattaatagt aatcaattac ggggtcatta gttcatagcc 60

catatatgga gttccgcgtt acataactta cggtaaattgg cccgcctggc tgaccgcca 120

acgacccccg ccattgacg tcaataatga cgtatgttcc catagtaacg ccaataggga 180

cttccattg acgtcaatgg gtggagtatt tacggtaaac tgcccacttg gcagtacatc 240

aagtgtatca tatgccaagt acgcccccta ttgacgtcaa tgacggtaaa tggccgcct 300

ggcattatgc ccagtacatg accttatggg actttcctac ttggcagtac atctacgtat 360

tagtcatcgc tattaccatg gtgatgcggt ttggcagta catcaatggg cgtggatagc 420

ggtttgactc acgggggattt ccaagtctcc accccattga cgtcaatggg agtttgtttt 480

ggcaccaaaa tcaacgggac ttccaaaat gtcgtaacaa ctccgccccca ttgacgcaaa 540

tgggcggtag gcgtgtacgg tgggaggtct atataagcag agct 584

<210> 3

<211> 380

<212> DNA

<213> Artificial Sequence

<220>

<223> CMV enhancer

<400> 3

gacattgatt attgactagt tattaatagt aatcaattac ggggtcatta gttcatagcc 60

catatatgga gttccgcgtt acataactta cggtaaattgg cccgcctggc tgaccgcca 120

acgacccccg cccattgacg tcaataatga cgtatgttcc catagtaacg ccaataggga 180
 ctttcattg acgtcaatgg gtggagtatt tacggtaaac tgcccacttg gcagtacatc 240
 aagtgtatca tatgccaagt acgcccccta ttgacgtcaa tgacggtaaa tggcccgct 300
 ggcatatgc ccagtacatg accttatggg actttctac ttggcagtac atctacgtat 360
 tagtcatcgc tattaccatg 380

<210> 4
 <211> 204
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> CMV promoter

<400> 4
 gtgatgcggt ttggcagta catcaatggg cgtggatagc ggtttgactc acgggggattt 60
 ccaagtctcc accccattga cgtcaatggg agtttgttt ggcacaaaaa tcaacggggac 120
 ttccaaaat gtcgtaacaa ctccgcccc ttgacgcaaa tgggcggtag gcgtgtacgg 180
 tgggaggtct atataagcag agct 204

<210> 5
 <211> 182
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> RU5. Truncated 5' LTR without RU3

<400> 5
 gggctctctt ggtagacca gatctgagcc tgggagctct ctggctaact agggaaccca 60
 ctgcttaagc ctcaataaag ctgccttga gtgctcaag tagtgtgtgc ccgtctgttg 120
 tgtgactctg gtaactagag atccctcaga cccttttagt cagtgtggaa aatctctagc 180
 ag 182

<210> 6
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PBS SL123 (Primer Binding Site)

<400> 6
 tggcgcccgac acagggac 18

<210> 7
 <211> 126
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> packaging signal

<400> 7
 ctctctcgac gcaggactcg gcttgctgaa gcgcgcacgg caagaggcga ggggcggcga 60
 ctggtgagta cgccaaaaat ttgactagc ggaggctaga aggagagaga tgggtgcgag 120
 agcgtc 126

<210> 8
 <211> 234
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> RRE

<400> 8
 aggagctttg ttcctgggt tcttgggagc agcaggaagc actatgggcg cagcgtcaat 60
 gacgctgacg gtacaggcca gacaattatt gtctggtata gtgcagcagc agaacaattt 120
 gctgagggct attgaggcgc aacagcatct gttgcaactc acagtctggg gcatcaagca 180
 gctccaggca agaatcctgg ctgtggaaag atacctaaag gatcaacagc toct 234

<210> 9

<211> 118
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> cPPT

<400> 9
 ttttaaaga aaagggggga ttggggggta cagtgcaggg gaaagaatag tagacataat 60
 agcaacagac atacaaacta aagaattaca aaaacaaatt acaaaaattc aaaatttt 118

<210> 10
 <211> 511
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Phospoglycerate kinase promoter PGK

<400> 10
 ggggttgggg ttgcgccttt tccaaggcag ccctggggtt gcgcagggac gcggctgctc 60
 tgggcgtggt tccgggaaac gcagcggcgc cgaccctggg tctgcacat tttcacgtc 120
 cgttgcagc gtcacccgga tcttcgccgc taccctgtg ggcccccg cgacgcttc 180
 tgctccgcc ctaagtcggg aagggtcctt gcggttcgc gcgtgccgga cgtgacaaac 240
 ggaagccgca cgtctacta gtacctgc agacggacag cgccaggag caatggcagc 300
 gcgccgacc cgatgggctg tggccaatag cggctgctca gcagggcgc cagagagcag 360
 cggccgggaa ggggcgggtgc gggaggcggg gtgtggggcg gtagtgtggg ccctgttcct 420
 gcccgcgcg tggtccgcat tctgcaagcc tccggagcgc acgtcggcag toggctccct 480
 cgttgaccga atcaccgacc tctctccca g 511

<210> 11
 <211> 251
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Elongation factor alpha short promoter (E1F α (s))

<400> 11

atcatggctc cggtgcccggt cagtgggcag agcgcacatc gccacagtc cccgagaagt 60

tggggggagg ggtcggcaat tgaaccgggtg cctagagaag gtggcgcggg gtaactggg 120

aaagtgatgt cgtgtactgg ctccgccttt ttccgaggg tgggggagaa ccgtatataa 180

gtgcagtagt cggcgtgaac gttcttttc gcaacgggtt tgccgccaga acacaggtgt 240

cgtgacgctc g 251

<210> 12

<211> 441

<212> DNA

<213> Artificial Sequence

<220>

<223> Codon optimized version of RPS19 (CoRPS19)

<400> 12

atgcccggcg tgaccgtgaa ggacgtgaac cagcaggagt tcgtgagggc cctggcagcc 60

tttctgaaga agagcggcaa gctgaagggtg cccgagtggg tggacacagt gaagctggcc 120

aagcacaagg agctggcccc ttacgatgag aactggttct ataccagggc agcctccaca 180

gcaaggcacc tgtacctgag gggaggagca ggagtgggct ctatgaccaa gatctatggc 240

ggcaggcagc gcaatggcgt gatgccatct cactttagcc ggggcagcaa gtccgtggca 300

aggagagtgc tgcaggccct ggagggcctg aagatggtgg agaaggacca ggatggcggc 360

agaaaagtga caccacaggg acagcgggac ctggatagaa tcgcaggaca ggtggcagca 420

gccaataaga agcactgata g 441

<210> 13

<211> 589

<212> DNA

<213> Artificial Sequence

<220>

<223> Mutated Wpre (Wpre*)

<400> 13

cgagcatctt accgccattt attcccatat ttgttctgtt ttcttgatt tgggtataca 60
 tttaaatgtt aataaaacaa aatgggtggg caatcattta catttttagg gatatgtaat 120
 tactagtcca ggtgtattgc cacaagacaa acatgttaag aaactttccc gttatttacg 180
 ctctgttctt gttaatcaac ctctggatta caaaatttgt gaaagattga ctgatattct 240
 taactatgtt gctcctttta cgctgtgtgg atatgtctgt ttaatgcctc tgtatcatgc 300
 tattgcttcc cgtaaggctt tcgttttctc ctcttctgtat aaatcctggg tgctgtctct 360
 ttatgaggag ttgtggcccg ttgtccgtca acgtggcgtg gtgtgctctg tgtttgctga 420
 cgcaaccccc actggctggg gcattgccac cacctgtcaa ctcttttctg ggactttcgc 480
 tttccccctc ccgatcgcca cggcagaact catcgccgcc tgccttgccc gctgctggac 540
 aggggctagg ttgctgggca ctgataattc cgtgggtgtg tcgggggaag 589

<210> 14

<211> 234

<212> DNA

<213> Artificial Sequence

<220>

<223> 3' LTR: DR3RU5

<400> 14

tggaagggtt aattcactcc caacgaagac aagatctgct tttgcttgt actgggtctc 60
 tctggttaga ccagatctga gcctgggagc tctctggcta actagggaac ccactgctta 120
 agcctcaata aagcttgctt tgagtgttc aagtagtggtg tgcccgtctg ttgtgtgact 180
 ctggtaacta gagatccctc agaccctttt agtcagtgtg gaaaatctct agca 234

<210> 15

<211> 54

<212> DNA

<213> Artificial Sequence

<220>

<223> ΔU3

<400> 15

tggaagggt aattcactcc caacgaagac aagatctgct tttgcttgt actg 54

<210> 16

<211> 181

<212> DNA

<213> Artificial Sequence

<220>

<223> RU5

<400> 16

ggtctctctg gttagaccag atctgagcct gggagctctc tggctaacta gggaaccac 60

tgcttaagcc tcaataaagc ttgccttgag tgcttcaagt agtgtgtgcc cgtctgttg 120

gtgactctgg taactagaga tccctcagac ccttttagtc agtgtggaaa atctctagca 180

g

181

<210> 17

<211> 7821

<212> DNA

<213> Artificial Sequence

<220>

<223> PGK.CoRPS19. Wpre*- LV sequence

<400> 17

gtgtttaaac ctagatattg atagtctgat cgggtcaacgt ataatcgagt cctagctttt 60

gcaaacatct atcaagagac aggatcagca ggaggctttc gcatgattga acaagatgga 120

ttgcacgcag gttctccggc ggcttgggtg gagaggctat tcggctatga ctgggcacaa 180

cagacaatcg gctgctctga tgccgccgtg ttccggctgt cagcgcaggg gcgtccggtt 240

ctttttgtca agaccgacct gtccgggtgcc ctgaatgaac tgcaagacga ggcagcgcgg 300

ctatcgtggc tggcgacgac gggcggttct tgcgcggctg tgctcgacgt tgcactgaa 360

gcgggaaggg actggctgct attgggcgaa gtgccggggc aggatctct gtcactcac 420

cttgctcctg ccgagaaaat atccatcatg gctgatgcaa tgcggcggct gcatacgctt 480

gatccggcta cctgccatt cgaccaccaa gcgaaacatc gcatcgagcg agcacgtact 540

cggatggaag ccggtcttgt cgatcaggat gatctggacg aagagcatca ggggctcgcg 600
 ccagccgaac tgttcgccag gctcaaggcg tctatgccc acggcgagga tctcgtcgtg 660
 acccacggcg atgcctgctt gccgaatatc atggtggaaa atggccgctt ttctggattc 720
 atcgactgtg gccgtctggg tgtggcggac cgctatcagg acatagcgtt ggctaccgt 780
 gatattgtg aagagcttgg cggcgaatgg gctgaccgt tccttgtgt ttacgggtatc 840
 gccgcgccg attcgagcg catgccttc tatgccttc ttgacgagtt cttctgaccg 900
 attctagggtg cattggcgca gaaaaaatg cctgatgcga cgctgcgcgt cttatactcc 960
 cacatatgcc agattcagca acggatacgg ctccccaac ttgccactt ccatacgtgt 1020
 cctccttacc agaaatttat ccttaacgat cggacgggga gtcaggcaac tatggatgaa 1080
 cgaaatagac agatcgctga gatagggtcc tctactgatta agcattggta actgtcagac 1140
 caagtttact catatatact ttagattgat taaaacttc attttaatt taaaaggatc 1200
 taggtgaaga tccttttga taatctcatg accaaaatcc cttaacgtga gttttcgttc 1260
 cactgagcgt cagaccccg agaaaagatc aaaggatctt cttgagatcc ttttttctg 1320
 cgcgtaatct gctgcttgca aaaaaaaaa ccaccgctac cagcgggtgg ttgtttgccg 1380
 gatcaagagc taccaactct tttccgaag gtaactggct tcagcagagc gcagatacca 1440
 aatactgtcc ttctagtgt gccgtagtta ggccaccact tcaagaactc ttagtcaccg 1500
 cctacatacc tcgctctgct aatcctgtta ccagtggctg ctgccagtgg cgataagtgc 1560
 tgtcttaccg ggttggtactc aagacgatag ttaccggata aggcgcagcg gtcgggctga 1620
 acgggggggtt cgtgcacaca gccagcttg gagcgaacga cctacaccga actgagatac 1680
 ctacagcgtg agctatgaga aagcgccacg cttcccgaag ggagaaaggc ggacaggtat 1740
 ccggtaaagc gcaggggtcgg aacaggagag cgcacgaggg agcttcagg gggaaacgcc 1800
 tggatatctt atagtcctgt cgggtttcgc cacctctgac ttgagcgtc atttttgtga 1860
 tgctcgtcag gggggcggag cctatggaaa aacgccagca acgcggcctt ttacggttc 1920
 ctggcctttt gctggccttt tgctcacatg ttcttctg cgttatcccc tgattctgtg 1980
 gataaccgta ttaccgcctt tgagttagct gataccgctc gccgcagccg aacgaccgag 2040

cgagcgagtg cagtgagcga ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc 2100
 gcgcgttggc cgattcatta atgcagctgg cagcagaggt tccccactg gaaagcgggc 2160
 agtgagcgca acgcaattaa tgtgagttag ctactcatt aggcacccca ggctttacac 2220
 tttatgcttc cggctcgtat gttgtgtgga atttgagcg gataacaatt tcacacagga 2280
 aacagctatg accatgatta cgccaagcgc gcaattaacc ctactaaag ggaacaaaag 2340
 ctggagctgc aagcttggcc attgcatacg ttgtatccat atcataatat gtacatttat 2400
 attggctcat gtccaacatt accgcatgt tgacattgat tattgactag ttattaatag 2460
 taatcaatta cgggggtcatt agttcatagc ccatatatgg agttccgctg tacataactt 2520
 acggtaaatg gcccgcttgg ctgaccgcc aacgaccccc gccattgac gtcaataatg 2580
 acgtatgttc ccatagtaac gccaataggg actttocatt gacgtcaatg ggtggagtat 2640
 ttacggtaaa ctgccactt ggagtagat caagtgtatc atatgccaag tacgccccct 2700
 attgacgtca atgacggtaa atggcccgcc tggcattatg ccagtagat gaccttatgg 2760
 gactttccta cttggcagta catctacgta ttagtcatcg ctattacat ggtgatgcgg 2820
 ttttggcagt acatcaatgg gcgtggatag cgtttgact cacggggatt tccaagtctc 2880
 caccatttg acgtcaatgg gagtttgtt tggcaccaaa atcaacggga ctttcaaaa 2940
 tgtcgaaca actccgcccc attgacgcaa atgggcggta ggctgtacg gtgggaggtc 3000
 tatataagca gagctcgtt agtgaaccgg ggtctctctg gtagaccag atctgacct 3060
 gggagctctc tggctaacta gggaaccac tgcttaagcc tcaataaagc ttgccttgag 3120
 tgcttcaagt agtgtgtgcc cgtctgtgt gtgactctgg taactagaga tccctcagac 3180
 ccttttagtc agtgtggaat atctctagca gtggcgcccg aacagggact tgaaagcgaa 3240
 agggaaacca gaggagctct ctgacgcag gactcggctt gctgaagcgc gcacggcaag 3300
 aggcgagggg cggcgactgg tgagtacgc aaaaatttg actagcggag gctagaagga 3360
 gagagatggg tgcgagagcg tcagtattaa gggggggaga attagatcgc gatgggaaaa 3420
 aattcggta aggccagggg gaaagaaaa atataaatta aaacatatag tatgggcaag 3480
 caggagcta gaacgattcg cagttaatcc tggcctgtta gaaacatcag aaggctgtag 3540

acaaatactg ggacagctac aaccatccct tcagacagga tcagaagaac ttagatcatt 3600
 atataataca gtagcaaccc tctattgtgt gcatcaaagg atagagataa aagacaccaa 3660
 ggaagcttta gacaagatag aggaagagca aaacaaaagt aagaccaccg cacagcaagc 3720
 ggccgctgat cttcagacct ggaggaggag atatgaggga caattggaga agtgaattat 3780
 ataaatataa agtagtaaaa attgaacat taggagtagc accaccaag gcaaagagaa 3840
 gagtgggtgca gagagaaaaa agagcagtgg gaataggagc ttgttcctt gggttcttgg 3900
 gagcagcagg aagcactatg ggcgagcgt caatgacgt gacggtacag gccagacaat 3960
 tattgtctgg tatagtgcag cagcagaaca attgtctgag ggctattgag gcgcaacagc 4020
 atctgttgca actcacagtc tggggcatca agcagctcca ggcaagaatc ctggctgtgg 4080
 aaagatacct aaaggatcaa cagctcctgg ggatttgggg ttgctctgga aaactcattt 4140
 gcaccactgc tgtgccttgg aatgctagtt ggagtaataa atctctggaa cagatttgga 4200
 atcacacgac ctggatggag tgggacagag aaattaacaa ttacacaagc ttaatacact 4260
 ccttaattga agaatcgcaa aaccagcaag aaaagaatga acaagaatta ttggaattag 4320
 ataatgggc aagtttggg aattggtta acataacaaa ttggctgtgg tatataaat 4380
 tattcataat gatagtagga ggcttgtag gttaagaat agttttgct gtactttcta 4440
 tagtgaatag agttaggcag ggatattcac cattatcgtt tcagaccac ctccaaccc 4500
 cgaggggacc cgacaggccc gaaggaatag aagaagaagg tggagagaga gacagagaca 4560
 gatccattcg attagtgaac ggatctcgac ggtatcggtt aacttttaa agaaaagggg 4620
 ggattggggg gtacagtga ggggaaagaa tagtagacat aatagcaaca gacatacaa 4680
 ctaaagaatt aaaaaaaca attacaaaaa tcaaaattt tatcgatcac gagactagcc 4740
 tcgagaagct tgatatgaa ttccacgggg ttgggttgc gcctttcca aggcagccct 4800
 gggtttgcg agggacgagg ctgcttggg cgtggttccg ggaaacgcag cggcgccgac 4860
 cctgggtctc gcacattctt cacgtccgtt cgcagcgtca cccggtctt cgccgctacc 4920
 cttgtgggcc cccggcgac gcttctgct ccgcccctaa gtgggaagg ttcttgcgg 4980
 ttgcggcgt gccggacgtg acaaacggaa gccgcacgtc tcactagtag cctcgagac 5040

ggacagcgcc agggagcaat ggcagcgcg cgaccgcgat gggctgtggc caatagcggc 5100
 tgctcagcag ggcgcgccga gagcagcggc cgggaagggg cggcgcggga ggcgggggtg 5160
 ggggcggtag tgtgggccct gttcctgcc gcgcgggtgt cgcattctg caagcctccg 5220
 gagcgcacgt cggcagtcgg ctccctcgtt gaccgaatca ccgaccttc tcccagggg 5280
 gatccgtcga cacaccggta tgcccgcggt gaccgtgaag gacgtgaacc agcaggagtt 5340
 cgtgagggcc ctggcagcct ttctgaagaa gagcggcaag ctgaagggtgc ccgagtgggt 5400
 ggacacagtg aagctggcca agcacaagga gctggcccct tacgatgaga actggttcta 5460
 taccagggca gcctccacag caaggcacct gtacctgagg ggaggagcag gagtgggctc 5520
 tatgaccaag atctatggcg gcaggcagcg caatggcgtg atgcatctc actttagccg 5580
 gggcagcaag tccgtggcaa ggagagtgtc gcaggccctg gagggcctga agatggtgga 5640
 gaaggaccag gatggcggca gaaagctgac accacaggga cagcgggacc tggatagaat 5700
 cgcaggacag gtggcagcag ccaataagaa gcactgatag gatccatct agaggatccc 5760
 ccgggctgca ggaattcgag catcttaccg ccatttattc ccatatttgt tctgttttc 5820
 ttgatttggg tatacattta aatgttaata aaacaaaatg gtggggcaat catttacatt 5880
 ttaggggata tgtaattact agttcagggtg tattgccaca agacaaacat gtaagaaac 5940
 ttcccgtta ttacgtctt gttcctgtta atcaacctct ggattacaaa atttgtaaa 6000
 gattgactga tattcttaac tatgtgtctc cttttacgt gtgtggatat gctgcttaa 6060
 tgcctctgta tcatgtatt gcttccgta cggctttcgt ttctcctcc ttgtataaat 6120
 cctggttgct gtctctttat gaggagtgtt gggccgttgt ccgtcaacgt ggcgtggtgt 6180
 gctctgtgtt tgctgacgca accccactg gctggggcat tgccaccacc tgtcaactcc 6240
 ttctgggac ttctgcttc cccctccga tcgccacggc agaactcatc gccgcctgcc 6300
 ttgcccgtg ctggacaggg gctaggttgc tgggcactga taattccgtg gtgtgtcgg 6360
 ggaagggcct gctgccggct ctgcggcctc ttccgctct tcgccttcgc cctcagacga 6420
 gtcggatctc ctttgggcc gcctccccgc ctggaattcg agctcgttac cttaagacc 6480
 aatgacttac aaggcagctg tagatcttag ccactttta aaagaaaagg ggggactgga 6540

agggctaatt cactcccaac gaagacaaga tctgctttt gcttgactg ggtctctctg 6600
 gttagaccag atctgagcct gggagctctc tggctaacta gggaaccac tgcttaagcc 6660
 tcaataaagc ttgccttgag tgcttcaagt agtgtgtgcc cgtctgttgt gtgactctgg 6720
 taactagaga tccctcagac ccttttagtc agtgtggaaa atctctagca gtagtagttc 6780
 atgtcatctt attattcagt attataact tgcaaagaaa tgaatatcag agagtgagag 6840
 gaacttggtt attgcagctt ataatggta caaataaagc aatagcatca caaatttcac 6900
 aaataaagca ttttttcac tgcatctag ttgtggttg tccaaactca tcaatgtatc 6960
 ttatcatgtc tggctctagc tatcccgccc ctaactccgc ccatcccgcc cctaactccg 7020
 cccatccgc ccctaactcc gccagttcc gccattctc cgcccatgg ctgactaatt 7080
 tttttattt atgcagaggc cgaggccgcc tcggcctctg agctattcca gaagtagtga 7140
 ggaggctttt ttggaggcct agggacgtac ccaattcgcc ctatagttag togtattacg 7200
 cgcgctcact ggccgtcgtt ttacaacgtc gtgactggga aaaccctggc gttaccaac 7260
 ttaatgcct tgagcacat cccctttcg ccagctggcg taatagcgaa gaggcccgca 7320
 ccgatcgccc ttccaacag ttgcgcagcc tgaatggcga atgggacgcg ccctgtagcg 7380
 gcgcattaag cgcggcgggt gtgggtggtta cgcgcagcgt gaccgctaca cttgccagcg 7440
 ccctagcgcc cgctccttc gctttcttc cttcctttct cgccacgttc gccggcttc 7500
 cccgtcaagc tctaaatcgg gggctccctt tagggttccg atttagtgct ttacggcacc 7560
 tcgaccccaa aaaacttgat tagggtagtg gttcacgtag tgggcatcg ccctgataga 7620
 cggttttcg cccttgacg ttggagtcca cgttcttta tagtggactc ttgtccaaa 7680
 ctggaacaac actcaaccct atctcggtct attctttga tttataaggg atttgccga 7740
 tttcggccta ttggttaaaa aatgagctga ttaacaaaa atttaacgcg aattttaaca 7800
 aaatcgttc ctcaggacgt c 7821

<210> 18

<211> 7540

<212> DNA

<213> Artificial Sequence

<220>

<223> EF1 α (s).CoRPS19. Wpre*- LV sequence

<400> 18

gtgtttaaac ctagatatgg atagtctgat cgggtcaacgt ataatcgagt cctagctttt 60
 gcaaacatct atcaagagac aggatcagca ggaggctttc gcatgattga acaagatgga 120
 ttgcacgcag gttctccggc ggcttgggtg gagaggctat tcggctatga ctgggcacaa 180
 cagacaatcg gctgctctga tgccgccgtg ttccggctgt cagcgcaggg gcgtccggtt 240
 cttttgtca agaccgacct gtccgggtgcc ctgaatgaac tgcaagacga ggcagcgcgg 300
 ctatcgtggc tggcgacgac gggcggttct tgcgcggctg tgctcgacgt tgcactgaa 360
 gcgggaaggg actggctgct attgggcgaa gtgccggggc aggatctct gtcactcac 420
 cttgctctg ccgagaaaagt atccatcatg gctgatgcaa tgcggcggct gcatacgctt 480
 gatccggcta cctgcccatt cgaccaccaa gcgaaacatc gcatcgagcg agcacgtact 540
 cggatggaag ccggtcttgt cgatcaggat gatctggacg aagagcatca ggggctcgcg 600
 ccagccgaac tgttcgccag gctcaaggcg tctatgccc acggcgagga tctcgtcgtg 660
 acccacggcg atgcctgctt gccgaatatc atggtggaaa atggccgctt ttctggattc 720
 atcgactgtg gccgtctggg tgtggcggac cgctatcagg acatagcgtt ggctaccgt 780
 gatattgtg aagagcttgg cggcgaatgg gctgaccgct tccttgtgct ttacggtatc 840
 gccgcgccc attcgcagcg catgccttc tatgccttc ttgacgagtt cttctgaccg 900
 attctaggtg cattggcgca gaaaaaatg cctgatgcga cgctgcgctt cttatactcc 960
 cacatatgcc agattcagca acggatacgg cttccccaac ttgccactt ccatacgtgt 1020
 cctccttacc agaaatttat ccttaacgat cggacgggga gtcaggcaac tatggatgaa 1080
 cgaaatagac agatcgctga gataggtgcc tactgatta agcattggta actgtcagac 1140
 caagtttact catatatact ttgattgat taaaacttc attttaatt taaaaggatc 1200
 taggtgaaga tccttttga taatctcatg accaaaatcc cttaacgtga gtttctgtc 1260
 cactgagcgt cagaccccg agaaaagatc aaaggatctt cttgagatcc tttttctg 1320

cgcgtaatct gctgcttgca aacaaaaaaaa ccaccgctac cagcgggtggt ttgtttgccg 1380
 gatcaagagc taccaactct tttccgaag gtaactggct tcagcagagc gcagatacca 1440
 aatactgtcc ttctagtgtg gccgtagtta ggccaccact tcaagaactc tgtagcaccg 1500
 cctacatacc tcgctctgct aatcctgtta ccagtggctg ctgccagtgg cgataagtgc 1560
 tgtcttaccg ggttggactc aagacgatag ttaccggata aggcgcagcg gtcgggctga 1620
 acgggggggtt cgtgcacaca gccagcttg gagcgaacga cctacaccga actgagatac 1680
 ctacagcgtg agctatgaga aagcgccacg cttcccgaag ggagaaaggc ggacaggtat 1740
 ccggtaaagc gcagggtcgg aacaggagag cgacagaggg agcttcagg gggaaacgcc 1800
 tggatcttt atagtcctgt cgggtttcgc cacctctgac ttgagcgtcg atttttgtga 1860
 tgctcgtcag gggggcggag cctatgaaa aacgccagca acgcggcctt ttacggttc 1920
 ctggcctttt gctggccttt tgctcacatg ttcttctg cgttatcccc tgattctgtg 1980
 gataaccgta ttaccgcctt tgagttagct gataccgctc gccgcagccg aacgaccgag 2040
 cgcagcaggt cagttagcga ggaagcggaa gagcgcccaa tacgcaaacc gcctctcccc 2100
 gcgcgttggc cgattcatta atgcagctgg cacgacaggt tccccactg gaaagcgggc 2160
 agtgagcgca acgcaattaa tgtgagttag ctactcatt aggcacccca ggctttacac 2220
 tttatgcttc cggctcgtat gttgtgtgga attgtgagcg gataacaatt tcacacagga 2280
 aacagctatg accatgatta cgccaagcgc gcaattaacc ctactaaag ggaacaaaag 2340
 ctggagctgc aagcttgccc attgcatacg ttgatccat atcataatat gtacatttat 2400
 attggctcat gtccaacatt accgccatgt tgacattgat tattgactag ttattaatag 2460
 taatcaatta cgggggtcatt agttcatagc ccatatatgg agttccgcgt tacataactt 2520
 acggtaaatg gccgcctgg ctgaccgcc aacgaccccc gccattgac gtcaataatg 2580
 acgtatgttc ccatagtaac gccaataggg actttccatt gacgtcaatg ggtggagtat 2640
 ttacggtaaa ctgcccactt ggagctacat caagtgtatc atatgccaag tacgcccct 2700
 attgacgtca atgacggtaa atggccgcc tggcattatg ccagctacat gaccttatgg 2760
 gactttccta cttggcagta catctacgta ttagtcatcg ctattacat ggtgatgcgg 2820

ttttggcagt acatcaatgg gcgtggatag cggtttgact cacggggatt tccaagtctc 2880
 caccatttg acgtcaatgg gagtttgtt tggcaccaaa atcaacggga ctttcaaaa 2940
 tgctgtaaca actccgcccc attgacgcaa atgggcggtta ggcgtgtacg gtgggaggtc 3000
 tatataagca gagctcgttt agtgaaccgg ggtctctctg gttagaccag atctgagcct 3060
 gggagctctc tggctaacta gggaaccac tgcttaagcc tcaataaagc ttgccttgag 3120
 tgcttcaagt agtgtgtgcc cgtctgtgt gtgactctgg taactagaga tccctcagac 3180
 ccttttagtc agtgtggaaa atctctagca gtggcgccc aacagggact tgaaagcgaa 3240
 agggaaacca gaggagctct ctgacgcag gactcggctt gctgaagcgc gcacggcaag 3300
 aggcgagggg cggcgactgg tgagtacgcc aaaaatttg actagcggag gctagaagga 3360
 gagagatggg tgcgagagcg tcagtattaa gcgggggaga attagatcgc gatgggaaaa 3420
 aattcggta aggccagggg gaaagaaaa atataaatta aaacatatag tatgggcaag 3480
 caggagcta gaacgattcg cagttaatcc tggcctgtta gaaacatcag aaggctgtag 3540
 acaaatactg ggacagctac aaccatccct tcagacagga tcagaagaac ttagatcatt 3600
 atataataca gtagcaacc tctattgtgt gcatcaaagg atagagataa aagacaccaa 3660
 ggaagcttta gacaagatag aggaagagca aaacaaaagt aagaccaccg cacagcaagc 3720
 ggccgctgat cttcagacct ggaggaggag atatgaggga caattggaga agtgaattat 3780
 ataaatataa agtagtaaaa attgaacat taggagtagc accaccaag gcaaagagaa 3840
 gagtggtgca gagagaaaaa agagcagtgg gaataggagc ttgttcctt gggttcttgg 3900
 gagcagcagg aagcactatg ggcgacgct caatgacgct gacggtacag gccagacaat 3960
 tattgtctgg tatagtgcag cagcagaaca atttgtgag ggctattgag gcgcaacagc 4020
 atctgttga actcacagtc tggggcatca agcagctcca ggcaagaatc ctggctgtgg 4080
 aaagatacct aaaggatcaa cagctcctgg ggatttgggg ttgctctgga aaactcattt 4140
 gcaccactgc tgtgccttgg aatgctagtt ggagtaataa atctctggaa cagatttga 4200
 atcacacgac ctggatggag tgggacagag aaattaacaa ttacacaagc ttaatacact 4260
 ccttaattga agaatcgcaa aaccagcaag aaaagaatga acaagaatta ttggaattag 4320

ataaatgggc aagtttgtgg aattggttta acataacaaa ttggctgtgg tatataaat 4380
 tattcataat gatagtagga ggcttggtag gtttaagaat agtttttgc gtactttcta 4440
 tagtgaatag agttaggcag ggatattcac cattatcgtt tcagaccac ctccaaccc 4500
 cgaggggacc cgacaggccc gaaggaatag aagaagaagg tggagagaga gacagagaca 4560
 gatccattcg attagtgaac ggatctcgac ggtatcgtt aacttttaa agaaaagggg 4620
 ggattggggg gtacagtga ggggaaagaa tagtagacat aatagcaaca gacatacaa 4680
 ctaaagaatt aaaaaacaa attacaaaa ttcaaat ttcgatcac gagactagcc 4740
 tcgagaagct tgatatcatg gctccggtgc ccgtcagtg gcagagcgc catgcccac 4800
 agtccccgag aagttggggg gaggggtcgg caattgaacc ggtgcctaga gaagggtggcg 4860
 cggggtaaac tgggaaagt atgtcgtgta ctggctccgc cttttccg aggggtgggg 4920
 agaaccgtat ataagtgcag tagtcgccgt gaacgttctt ttcgcaacg ggtttgcgc 4980
 cagaacacag gtgtcgtgac gctcgtgac acaccggtat gcccggcgtg accgtgaagg 5040
 acgtgaacca gcaggagttc gtgagggccc tggcagcctt tctgaagaag agcggcaagc 5100
 tgaagggtcc cgagtgggtg gacacagtga agctggccaa gcacaaggag ctggcccctt 5160
 acgatgagaa ctggttctat accagggcag cctccacagc aaggcacctg tacctgaggg 5220
 gaggagcagg agtgggctct atgaccaaga tctatggcgg caggcagcgc aatggcgtga 5280
 tgccatctca cttagccgg ggcagcaagt ccgtggcaag gagagtgtg caggccctgg 5340
 agggcctgaa gatggtggag aaggaccagg atggcggcag aaagctgaca ccacaggac 5400
 agcgggacct ggatagaatc gcaggacagg tggcagcagc caataagaag cactgatagg 5460
 atcccatcta gaggatcccc cgggctgcag gaattcgagc atctaccgc cattattcc 5520
 catattgtt ctgttttct tgatttgggt atacattaa atgttaataa acaaaatgg 5580
 tggggcaatc attacattt ttagggatat gtaattacta gttcaggtgt attgccacaa 5640
 gacaaacatg ttaagaaact ttccgttat ttacgtctg ttctgttaa tcaacctctg 5700
 gattacaaaa tttgtgaaag attgactgat attcttaact atgttgctcc tttacgctg 5760
 tgtggatatg ctgcttaat gcctctgtat catgctattg cttcccgtag ggctttogtt 5820

ttctcctcct tgtataaatc ctggttgctg tctcttatg aggagttgtg gcccgttgtc 5880
 cgtcaacgtg gcgtgggtg ctctgtgttt gctgacgcaa cccccactgg ctggggcatt 5940
 gccaccacct gtcaactcct ttctgggact ttcgctttcc ccctcccgat cgccaaggca 6000
 gaactcatcg ccgcctgcct tgcccgctgc tggacagggg ctaggttgct gggcactgat 6060
 aattccgtgg tgtgtcggg gaagggcctg ctgccggctc tgcggcctct tccgcgtctt 6120
 cgccttcgcc ctacagacgag tcggatctcc cttggggccg cctccccgcc tggaattcga 6180
 gctcgggtacc ttaagacca atgacttaca aggcagctgt agatcttagc cacttttta 6240
 aagaaaaggg gggactggaa gggctaattc actccaacg aagacaagat ctgcttttg 6300
 cttgtactgg gtctctctgg ttagaccaga tctgagcctg ggagctctct ggctaactag 6360
 ggaaccact gcttaagcct caataaagct tgccttgagt gcttcaagta gtgtgtgcc 6420
 gtctgttg tgactctggt aactagagat ccctcagacc ctttagtca gtgtggaaaa 6480
 tctctagcag tagtagtca tgcacttta ttattcagta ttataactt gcaaagaaat 6540
 gaatatcaga gagtgagagg aactgttta ttgcagctta taatggttac aaataaagca 6600
 atagcatcac aaattcaca aataaagcat tttttcact gcattctagt tgtggtttgt 6660
 ccaaactcat caatgtatct tatcatgtct ggctctagct atccgcccc taactccgcc 6720
 catcccgccc ctaactccgc ccatcccgcc cctaactccg ccagttccg ccattctcc 6780
 gccccatggc tgactaattt ttttattta tgacagggcc gagggccgct cggcctctga 6840
 gctattccag aagtagtgag gaggcctttt tggaggccta gggacgtacc caattcgccc 6900
 tatagttagt cgtattacgc gcgctcactg gccgtcgttt tacaacgtcg tgactgggaa 6960
 aacctggcg ttaccaact taatgcctt gcagcacatc ccccttcgc cagctggcgt 7020
 aatagcgaag agggccgcac cgatcgccct tccaacagt tgcgcagcct gaatggcgaa 7080
 tgggacgcgc cctgtagcgg cgcattaagc gggcggggtg tgggtgttac gcgcagcgtg 7140
 accgtacac ttgccagcgc ctagcgccc gctccttcg ctttctccc ttctttctc 7200
 gccacgttcg ccggctttcc ccgtcaagct ctaaactggg ggctccctt agggttccga 7260
 ttagtgctt tacggcacct cgacccaaa aaacttgatt aggggtgatg ttacgtagt 7320

gggccatcgc cctgatagac ggtttttcgc cctttgacgt tggagtccac gttctttaat 7380
 agtggactct tgttccaaac tggaacaaca ctcaacccta tctcggctta ttctttgat 7440
 ttataaggga ttttccgat ttcggcctat tggtaaaaa atgagctgat ttaacaaaaa 7500
 ttaacgcga attttaacaa aatcgttccc tcaggacgtc 7540

<210> 19
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Forward

<400> 19
 caggactcgg cttgctgaag 20

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

<220>
 <223> Reverse

<400> 20
 tccccgctt aatactgacg 20

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

<220>
 <223> Probe

<400> 21
 cgcacggcaa gaggcgagg 19

<210> 22
 <211> 21

<212> DNA
<213> Artificial Sequence

<220>
<223> Forward

<400> 22
gctgtcatct cttgtgggct g 21

<210> 23
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse

<400> 23
actcatggga gctgctggtt c 21

<210> 24
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 24
cctgtcatgc ccacacaaat ctctcc 26

<210> 25
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward

<400> 25
caggactcgg cttgctgaag 20

<210> 26
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse

<400> 26
tccccgcgtt aatactgacg 20

<210> 27
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 27
cgcacggcaa gaggcgagg 19

<210> 28
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward

<400> 28
aaaacgagca gtgacgtgag c 21

<210> 29
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse

<400> 29
ttcagtcatg ctgctagcgc 20

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

<220>
 <223> Probe

<400> 30
 tgcacggaag cgtctcgtct cagtc 25

<210> 31
 <400> 31
 000

<210> 32
 <400> 32
 000

<210> 33
 <211> 122
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> SV40 Polyadenylation (PolyA) signal sequence

<400> 33
 aactgttta ttgcagctta taatgggttac aaataaagca atagcatcac aaattcaca 60

aaataaagcat tttttcact gcattctagt tgggtttgt ccaaactcat caatgtatct 120

ta 122

<210> 34
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> hGAPDH Fw

<400> 34

gctctctgct cctcctgttc

20

<210> 35

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> hGAPDH Rv

<400> 35

acgaccaaatt ccgttgactc

20

<210> 36

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> RPS19 Fw

<400> 36

agccgaggct ccaagagt

18

<210> 37

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> RPS19 Rv

<400> 37

ccctgagggtg tcagtttgc

19

<210> 38

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> CoRPS19 Fw

24

<400> 38

gtgaaccagc aggagttcgt

20

<210> 39

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> CoRPS19 Rv

<400> 39

tcagcttgcc gctcttct

18