

# SEQUENCE LISTING

<110> Laboratorios del Dr. ESTEVE S.A.  
 Universitat Aut3noma de Barcelona

<120> ADENOASSOCIATED VIRUS VECTORS FOR THE TREATMENT OF LYSOSOMAL  
 STORAGE DISORDERS

<130> PCT2212.5

<150> EP14382171  
 <151> 2014-05-14

<160> 24

<170> PatentIn version 3.5

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| ctccatcact aggggttcct tgtagttaat gattaacccg ccatgctact tatctactcg | 180 |
| acattgatta ttgactagtt attaatagta atcaattacg gggtcattag ttcatagccc | 240 |
| atatatggag ttccgcgtta cataacttac ggtaaatggc ccgcctggct gaccgccc   | 300 |
| cgacccccgc ccattgacgt caataatgac gtatgttccc atagtaacgc caatagggac | 360 |
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| cagtcatagc tgtccctctt ctcttatgga gatccctcga cctgcagccc aagctgtaga  | 4740 |
| taagtagcat ggcggggtta tcattaacta caaggaaccc ctagtgatgg agttggccac  | 4800 |
| tccctctctg cgcgctcgct cgctcactga ggccgcccgg gctttgcccg ggcggcctca  | 4860 |
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<210> 10

<211> 4886

<212> DNA

<213> Artificial Sequence

<220>

<223> AAV9-CAG-cohNaGlu Nucleotide sequence

<400> 10

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| ctccatcact aggggttcct tgtagttaat gattaacccg ccatgctact tatctactcg | 180 |
| acattgatta ttgactagtt attaatagta atcaattacg gggtcattag ttcatagccc | 240 |
| atatatggag ttccgcgtta cataacttac ggtaaatggc ccgcctggct gaccgccc   | 300 |

|                                                                   |      |
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| cgacccccgc ccattgacgt caataatgac gtatgttccc atagtaacgc caatagggac | 360  |
| tttccattga cgtcaatggg tggagtattt acggtaaact gccacttgg cagtacatca  | 420  |
| agtgtatcat atgccaagta cgccccctat tgacgtcaat gacggtaaatt ggcccgctg | 480  |
| gcattatgcc cagtacatga ccttatggga ctttcctact tggcagtaca tctacgtatt | 540  |
| agtcacgct attaccatgg tcgaggtgag cccacgttc tgcttcactc tccccatctc   | 600  |
| ccccccctcc ccacccccaa ttttgtattt atttattttt taattatttt gtgcagcgat | 660  |
| gggggcgggg gggggggggg ggcgcgcgcc aggcggggcg gggcggggcg aggggcgggg | 720  |
| cggggcgagg cggagaggtg cggcggcagc caatcagagc ggcgcgctcc gaaagtttcc | 780  |
| ttttatggcg aggcggcggc ggcggcggcc ctataaaaag cgaagcgcgc ggcgggcggg | 840  |
| agtcgctgcg ttgccttcgc cccgtgcccc gctccgccgc cgcctcgcgc cgcccgcgcc | 900  |
| ggctctgact gaccgcgtta ctcccacagg tgagcgggcg ggacggccct tctcctcggg | 960  |
| gctgtaatta gcgcttggtt taatgacggc ttgtttcttt tctgtggctg cgtgaaagcc | 1020 |
| ttgaggggct ccgggagggc cttttgtgcg gggggagcgg ctcggggggg gcgtgcgtgt | 1080 |
| gtgtgtgcgt ggggagcgcc gcgtgcggct ccgcgctgcc cggcggctgt gagcgctgcg | 1140 |
| ggcgcggcg gcggccttgc gcgctccgca gtgtgcgcga ggggagcgcg gccgggggcg  | 1200 |
| gtgccccgcg gtgcgggggg ggctgcgagg ggaacaaagg ctgcgtgcgg ggtgtgtgcg | 1260 |
| tgggggggtg agcagggggg gtgggcgcgt cggtcgggct gcaaccccc ctgcaccccc  | 1320 |
| ctccccgagt tgctgagcac ggcccggctt cgggtgcggg gctccgtacg gggcgtggcg | 1380 |
| cggggctcgc cgtgccgggc ggggggtggc ggcaggtggg ggtgccgggc ggggcggggc | 1440 |
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| gtcgaggcgc ggcgagccgc agccattgcc ttttatggta atcgtgcgag agggcgcagg | 1560 |
| gacttccttt gtcccaaadc tgtgcggagc cgaaatctgg gaggcgccgc cgcacccct  | 1620 |
| ctagcgggcg cggggcgaag cgggtgcggc ccggcaggaa ggaaatgggc ggggagggcc | 1680 |
| ttcgtgcgtc gccgcgccgc cgtccccttc tccctctcca gcctcggggc tgtccgcggg | 1740 |
| gggacggctg ctttcggggg ggacggggca gggcgggggt cggcttctgg cgtgtgaccg | 1800 |
| gcggctctag agcctctgct aaccatgttc atgccttctt ctttttccta cagctcctgg | 1860 |
| gcaacgtgct ggttattgtg ctgtctcatc attttgcaa agaattgatt aattcgagcg  | 1920 |

|                                                                   |      |
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| aacgcgtgcc accatggaag ctgtggctgt ggcagctgct gtgggcgtgc tgctgctggc | 1980 |
| aggcgctggc ggagctgctg gggatgaagc tagagaagct gccgctgtgc gggccctggt | 2040 |
| ggctagactg ctgggacctg gacctgccgc cgacttctcc gtgtctgtgg aaagagccct | 2100 |
| ggccgccaag cctggcctgg acacatattc tctgggcgga ggcggcgctg ctcgctcag  | 2160 |
| agtgcgagga tctacaggcg tggccgctgc tgccggactg cacagatacc tgagagactt | 2220 |
| ctgcggctgc catgtggctt ggagcggcag ccagctgaga ctgcctagac ctctgcctgc | 2280 |
| tgtgcctggc gagctgacag aggccacccc taacagatac cggtactacc agaacgtgtg | 2340 |
| cacccagagc tacagcttcg tgtggtggga ctgggccaga tgggagcgcg agatcgattg | 2400 |
| gatggccctg aacggcatca acctggccct ggcttggagt ggccaggaag ccatctggca | 2460 |
| gagagtgtac ctggctctgg gcctgaccca ggccgagatc aacgagttct ttaccggccc | 2520 |
| tgcccttctg gcctggggca gaatgggcaa cctgcacaca tgggacggcc ccctgcctcc | 2580 |
| tagctggcac atcaagcagc tgtacctgca gcacagagt ctggaccaga tgagaagctt  | 2640 |
| cggcatgacc cccgtgctgc ctgcttttgc tggacacgtg ccagaggccg tgaccagagt | 2700 |
| gttcccccaa gtgaacgtga ccaagatggg cagctggggc cacttcaact gcagctactc | 2760 |
| ctgcagcttc ctgctggccc ccgaggaccc catcttccct attatcgga gcctgttcct  | 2820 |
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| ccagccccag ttctggggcc ctgcccagat tagagcagtg ctgggcgctg tgcccagagg | 3060 |
| caggctgctg gtgctggatc tgttcgccga gagccagccc gtgtacacca gaaccgctag | 3120 |
| cttcaggga cagcccttca tctggtgcat gctgcacaac ttcggcggca accacggcct  | 3180 |
| gttcggcgct ctggaagcag tgaatggcgg ccctgaggcc gccagactgt tccctaacag | 3240 |
| cacaatggtg ggaaccggca tggcccctga gggcatctct cagaacgagg tggtgtacag | 3300 |
| cctgatggcc gagctgggct ggcggaagga tcctgtgcct gatctggccg cctgggtcac | 3360 |
| aagcttcgcc gctagaagat acggcgtgtc ccaccctgat gctggcgccg cttggagact | 3420 |
| gctgctgaga agcgtgtaca actgctccgg cgaggcctgc aggggccaca acagatctcc | 3480 |
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| cgaggaagcc agaagcgccct acctgagcaa agagctggcc tccctgctga gagcaggggg | 3720 |
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| tctgtctgggc tcctggctgg aacaggccag agctgccgca gtgtctgagg ccgaggccga | 3840 |
| tttctacgag cagaacagca gataccagct gaccctgtgg ggcccagagg gcaacatcct  | 3900 |
| ggactacgcc aacaaacagc tggccggcct ggtggccaac tactacacac ctagatggcg  | 3960 |
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| gttcgacaag aacgtgttcc agctggaaca ggctttcgtg ctgagcaagc agagataccc  | 4080 |
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| cagatgggtg gccggctctt ggtgagaatt cgagctcggc acccggaat caattcactc   | 4200 |
| ctcaggtgca ggctgcctat cagaaggtgg tggctggtgt ggccaatgcc ctggctcaca  | 4260 |
| aataccactg agatcttttt ccctctgcc aaaaattatgg ggacatcatg aagccccttg  | 4320 |
| agcatctgac ttctggctaa taaaggaaat ttattttcat tgcaatagtg tgttggaatt  | 4380 |
| ttttgtgtct ctactcggga aggacatatg ggagggcaaa tcatttaaaa catcagaatg  | 4440 |
| agtatttggc ttagagtttg gcaacatatg cccatatgct ggctgccatg aacaaaggtt  | 4500 |
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| gaaaagcctt gacttgaggt tagatTTTTT ttatatTTTg ttttTgtTta ttttttTctt  | 4620 |
| taacatccct aaaaTTTTcc ttacatgttt tactagccag atttttTctc ctctcctgac  | 4680 |
| tactcccagt catagctgtc cctcttctct tatggagatc cctcgacctg cagcccaagc  | 4740 |
| tgtagataag tagcatggcg ggttaatcat taactacaag gaacccttag tgatggagtt  | 4800 |
| ggccactccc tctctgcgcg ctgcctcgct cactgaggcc gcccgggctt tgcccgggcg  | 4860 |
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<210> 11

<211> 4891

<212> DNA

<213> Artificial Sequence

<220>

<223> AAV9-CAG-comNaGlu Nucleotide sequence

<400> 11

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| ctccatcact aggggttcct tgtagttaat gattaacccg ccatgctact tatctactcg | 180  |
| acattgatta ttgactagtt attaatagta atcaattacg gggtcattag ttcatagccc | 240  |
| atatatggag ttccgcgtta cataacttac ggtaaatggc cgcctggct gaccgccc    | 300  |
| cgacccccgc ccattgacgt caataatgac gtatgttccc atagtaacgc caatagggac | 360  |
| tttccattga cgtcaatggg tggagtatth acggtaaact gccacttg cagtacatca   | 420  |
| agtgtatcat atgccaagta cggcccctat tgacgtcaat gacggtaa              | 480  |
| gcattatgcc cagtacatga cttatggga ctttctact tggcagtaca tctacgtatt   | 540  |
| agtcacgct attaccatgg tcgaggtgag cccacgttc tgcttcactc tccccatctc   | 600  |
| ccccccctcc ccacccccaa ttttgtatth atthattth taattattth gtgcagcgat  | 660  |
| gggggcgggg gggggggggg ggcgcgcgcc aggcggggcg gggcggggcg aggggcgggg | 720  |
| cggggcgagg cggagagggt cggcggcagc caatcagagc ggcgcgctcc gaaagtttcc | 780  |
| ttttatggcg aggcggcggc ggcggcggcc ctataaaaag cgaagcgcg             | 840  |
| agtcgctgcg ttgccttcgc cccgtgcccc gctccgccgc cgctcgcgc cggccgcccc  | 900  |
| ggctctgact gaccgcgtta ctccacagg tgagcgggcg ggacggccct tctcctccgg  | 960  |
| gctgtaatta gcgcttggtt taatgacggc ttgtttctth tctgtggctg cgtgaaagcc | 1020 |
| ttgaggggct ccgggagggc cttttgtgcg gggggagcgg ctcggggggt gcgtgcgtgt | 1080 |
| gtgtgtgcgt ggggagcgcc gcgtgcggct ccgcgctgcc cggcggctgt gagcgtgcg  | 1140 |
| ggcgcggcg ggggctttgt gcgctccga gtgtgcgcga ggggagcgcg gccgggggcg   | 1200 |
| gtgccccgcg gtgcgggggg ggctgcgagg ggaacaaagg ctgcgtgcg ggtgtgtgcg  | 1260 |
| tgggggggtg agcagggggt gtgggcgcgt cggtcgggct gcaaccccc ctgcaccccc  | 1320 |
| ctccccgagt tgctgagcac ggcccggctt cgggtgcggg gctccgtacg gggcgtggcg | 1380 |
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| gtcgaggcg ggcgagccgc agccattgcc ttttatggta atcgtgcgag agggcgagg   | 1560 |

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| gcggctctag agcctctgct aacctatgtt atgccttctt ctttttccta cagctcctgg  | 1860 |
| gcaacgtgct ggttattgtg ctgtctcatc attttggcaa agaattgatt aattcgagcg  | 1920 |
| aacgcgtgct agcgccacca tggaagctgc cggcctggcc gtgatcctgg gctttctgct  | 1980 |
| gctggctggc ggctctgtgg gcgacgaggc cagagaagcc aaggctgtgc gcgagctggt  | 2040 |
| cgtgcgcctg ctgggacctg gccctgccgc caacttcctg gtgtccgtgg aaagagccct  | 2100 |
| ggccgacgag agcggcctgg acacatacag cctgtctggc ggcgaggcg tgccagttct   | 2160 |
| ggtgcgcgga tctacaggcg tggccgctgc cgctggcctg cacagatacc tgagagactt  | 2220 |
| ctgcggctgc caggtggcct ggtccagcgc tcagctgcat ctgccttggc ccctgcctgc  | 2280 |
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| ctgcagcttc ctgctggccc ctggcgacct catgttcccc ctgatcggca acctgttcct  | 2820 |
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| gatgcagccc cccttcagcg acccctctta cctggccgcc accacagccg ccgtgtacga  | 2940 |
| ggccatggtg acagtggacc ccgacgccgt gtggctgctg cagggtggc tgttcagca    | 3000 |
| ccagccccag ttctggggac ctagccagat cagagccgtg ctggaagccg tgcccagagg  | 3060 |
| cagactgctg gtgctggacc tgttcgccga gagccacccc gtgtacatgc acaccgccag  | 3120 |
| ctccacggc cagcccttca tctggtgcat gctgcacaac ttcggcggca accacggcct   | 3180 |

|                                                                    |      |
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| cctgatggcc gagctgggct ggcggaagga ccctgtgcct gacctgatgg cctgggtgtc  | 3360 |
| cagcttcgcc atcagacgct acggcgtgtc ccagcctgat gccgtggccg cttggaagct  | 3420 |
| gctgctgaga agcgtgtaca actgcagcgg cgaggcctgc agcggccaca acagatcccc  | 3480 |
| cctggtgaaa agaccagcc tgcagatgag caccgccgtg tggtacaacc gcagcgacgt   | 3540 |
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| ccatagaaaa gccttgactt gaggttagat tttttttata ttttgttttg tgttatTTTT  | 4620 |
| ttctttaaca tccctaaaat tttccttaca tgttttacta gccagatttt tcctcctctc  | 4680 |
| ctgactactc ccagtcatag ctgtccctct tctcttatgg agatccctcg acctgcagcc  | 4740 |
| caagctgtag ataagtagca tggcgggtta atcattaact acaaggaacc ctagtgatg   | 4800 |

|                                                                   |      |
|-------------------------------------------------------------------|------|
| gagttggcca ctccctctct gcgcgctcgc tcgctcactg aggccgcccg ggctttgccc | 4860 |
| gggcggcctc agtgagcgag cgagcgcgca g                                | 4891 |

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 <211> 4898  
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 <213> Artificial Sequence

<220>  
 <223> AAV9-CAG-cocNaGlu Nucleotide sequence

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| ctccatcact aggggttcct tgtagttaat gattaaccgc ccatgctact tatctactcg    | 180  |
| acattgatta ttgactagtt attaatagta atcaattacg gggtcattag ttcatagccc    | 240  |
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| cgacccccgc ccattgacgt caataatgac gtatgttccc atagtaacgc caatagggac    | 360  |
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| gcattatgcc cagtacatga ccttatggga ctttcctact tggcagtaca tctacgtatt    | 540  |
| agtcacgcgt attaccatgg tcgaggtgag cccacgttc tgcttcactc tccccatctc     | 600  |
| ccccccctcc ccacccccaa ttttgtattht atthtaththt taattaththt gtgcagcgat | 660  |
| ggggggcgggg ggggggggggg ggcgcgcgcc aggcggggcg gggcggggcg aggggcgggg  | 720  |
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| agtcgctgcg ttgccttcgc cccgtgcccc gctccgccc gcctcgcgc cgccgcccc       | 900  |
| ggctctgact gaccgcgtta ctcccacagg tgagcgggcg ggacggccct tctcctccgg    | 960  |
| gctgtaatta gcgcttggtt taatgacggc ttgtthcttht tctgtggctg cgtgaaagcc   | 1020 |
| ttgaggggct ccgggagggc cththtgtcg ggggagcgg ctcggggggt gcgtgcgtgt     | 1080 |
| gtgtgtgcgt ggggagcgcc gcgtgcggct ccgcgctgcc cggcggctgt gagcgctgcg    | 1140 |
| ggcgcgcgcg ggggctthgt gcgctccgca gtgtgcgcga ggggagcgcg gccgggggcg    | 1200 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
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| tgggggggtg agcaggggggt gtggg'gcgct cggtcgggct gcaaccccc ctgcaccccc | 1320 |
| ctccccgagt tgctgagcac ggcccggctt cgggtgcggg gctccgtacg gggcgtggcg  | 1380 |
| cggggctcgc cgtgccgggc ggggggtggc ggcaggtggg ggtgccgggc ggggcggggc  | 1440 |
| cgcctcgggc cggggagggc tcgggggagg ggcgcggcgg cccccggagc gccggcggct  | 1500 |
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| ctagcgggcg cggggcgaag cggtgccggc ccggcaggaa ggaaatgggc ggggagggcc  | 1680 |
| ttcgtgcgtc gccgcgccgc cgtccccttc tccctctcca gcctcggggc tgtccgcggg  | 1740 |
| gggacggctg ccttcggggg ggacggggca gggcgggggt cggcttctgg cgtgtgaccg  | 1800 |
| gcggctctag agcctctgct aacctgttc atgccttctt ctttttccta cagctcctgg   | 1860 |
| gcaacgtgct ggttattgtg ctgtctcatc attttgcaa agaattgatt aattcgagcg   | 1920 |
| aacgcgtgcc accatgggag ctgccgctgc tgctgctgtc ctgggcctcc tgctcctggg  | 1980 |
| agctgctggc ggagccgccg ctgatgaagc cagagaagcc gctgccgtgc gggctctgct  | 2040 |
| cgtcagactg ctgggacctg gacccgcagc tgccttcagc gtgtccgtga aaagagccct  | 2100 |
| ggccgccgag agcggcctgg acacctatag actgtctggc ggcggagccg gcaccagggt  | 2160 |
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| ctggatggcc ctgaacggca tcaacctggc tctcgcttgg agtggccagg aagccatctg  | 2460 |
| gcagagggtg tacctggccc tgggcctgac ccagagcgag atcgacgagt acttcaccgg  | 2520 |
| ccctgccttt ctggcctggg gcaggatggg caacctgcac acctggggcg gacccctgcc  | 2580 |
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| cttcggcatg atccccgtgc tgccgcctt cagcggccac gtgccaaagg ccctgaccag   | 2700 |
| ggtgttcccc cagatcaaca tcacacagct cggaagttag ggccacttca actgcagcta  | 2760 |
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| ccaggccatg atcaccgtgg acagcgacgc cgtgtggctg ctgcagggtt ggctgttcca  | 3000 |
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| ctctaccatg ctgggcaccg gaatggcccc tgagggcacg gcccagaacg aggtggtgta  | 3300 |
| cgccctgatg gccgagctgg gctggcggaa ggatcccgtg gccgatctgg aagcctgggt  | 3360 |
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| actgtgctg agaagcgtgt acaactgcag cggcgaggcc tgctccggcc acaacagatc   | 3480 |
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| ctacgtggaa gccagaagcg cctacctgcg gaaagaactg gtgcccctgc tgagggccgc  | 3720 |
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| ccacctgtac gagcagaaca gcagatacca gctgaccctg tggggacccg agggcaacat  | 3900 |
| cctggactac gccacaagc agctggccgg cctggtggcc gactactaca ccccagatg    | 3960 |
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| ccccagccag cccgacggcg acaccgtgga cctggccaag aagctgttca tcaagtacta  | 4140 |
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| atcaattcac tcctcagggt caggctgcct atcagaaggt ggtggctggt gtggccaatg  | 4260 |
| ccctggctca caaataccac tgagatcttt ttccctctgc caaaaattat ggggacatca  | 4320 |
| tgaagcccct tgagcatctg acttctggct aataaaggaa atttattttc attgcaatag  | 4380 |
| tgtgttgga ttttttgtgt ctctcactcg gaaggacata tgggagggca aatcatttaa   | 4440 |

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| tatttttttc tttaacatcc ctaaaatttt cttacatgt ttactagcc agatttttcc    | 4680 |
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| tgcagcccaa gctgtagata agtagcatgg cgggttaatc attaactaca aggaaccctt  | 4800 |
| agtgatggag ttggccactc cctctctgcg cgctcgctcg ctactgagg ccgccgggc    | 4860 |
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 <213> Artificial Sequence

<220>  
 <223> Forward primer for genotyping

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<220>  
 <223> Reverse primer for genotyping

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|-----------------------|----|
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<220>  
 <223> Reverse primer mutation for genotyping

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|---------------------|----|
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<210> 16

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 tccggggaag caccgggggtg gccgccgcgg ccggcctgca ccggtacctt cgggactttt 300

|                                                                    |      |
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| tgcctggaga gctgaccgag gccactccga accggtacag atactatcag aacgtgtgca  | 420  |
| ctcagtccta ctccttcgtg tgggtgggact gggccagatg ggagcgggag attgactgga | 480  |
| tggccctgaa cggtatcaac ctcgccttgg cctgggtccgg ccaggaggcc atttggcaga | 540  |
| gggtgtacct tgcactggga ctgactcaag ccgagatcaa cgagtttttc accggccccg  | 600  |
| ctttccttgc ctggggggcgc atgggcaacc tccacacctg ggacgggcct ctgccgcct  | 660  |
| cctggcatat caagcagctg tacctccagc acagggtgct tgaccagatg cggagctttg  | 720  |
| gaatgacccc tgtgctgccc gcgttcgcgg gtcacgtgcc agaagcagtg actcgcgtgt  | 780  |
| tcccccaagt gaacgtcacc aaaatgggat cgtggggaca ctttaactgc tcttattcct  | 840  |
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| gggagctgat caaggagtgc ggaaccgacc acatctacgg cgctgacacc ttcaacgaga  | 960  |
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| ccatgaccgc agtggatacc gaagccgtct ggctgctgca aggggtggtg ttccagcacc  | 1080 |
| agccgcagtt ttggggaccc gccagattc gcgccgtgct gggcgccgtg cctaggggtc   | 1140 |
| gcctgctcgt gctggacctg ttcgccgagt cccagccagt gtacactagg accgcgtcgt  | 1200 |
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| ccatggtcgg aaccggaatg gcccctgaag gaatctcca gaacgaagtc gtgtactcgc   | 1380 |
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| ccttcgccgc tcgccgtat ggtgtctccc atccggatgc cggagccgca tggaggctgc   | 1500 |
| tgctgagatc cgtgtacaac tgctcgggag aagcgtgtcg gggacataac aggtccccac  | 1560 |
| tcgtgcgcag accgagcctg cagatgaaca cctccatctg gtacaaccgg tccgacgtgt  | 1620 |
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| gctacgatct cctggacctc acaagacagg cggccaaga actggtgtcc ctgtactacg   | 1740 |
| aagaggcccc ctccgcatac ctcagcaagg aactcgcata gttgctgagg gccggcggag  | 1800 |
| tgctggcata cgagctgctg ccggccctgg acgaagtgtg ggccagcgac agccggttcc  | 1860 |
| tgctgggctc ttggctggaa caggcccgcg ctgctgcggt gtccgaagcc gaagcggact  | 1920 |

|                                                                    |      |
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| actacgccaa caagcaactc gccggcctgg tcgcaaatta ctatactcct cgggtggaggc | 2040 |
| tggtcctgga agcgctggtc gattcagtgg ctgaggggat cccattccaa cagcaccaat  | 2100 |
| tcgacaagaa cgtgttccag cttgagcagg cttttgtgtt gtcgaagcag cgctacccca  | 2160 |
| gccagccacg gggagacacg gtggacctgg ccaagaagat cttcctgaaa tactacccaa  | 2220 |
| gatgggtggc cggctcgtgg tagg                                         | 2244 |

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 <213> Artificial Sequence

<220>  
 <223> pAAV-CAG-cohNaglu-version2 sequence

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| cgagcgcgca gagagggagt ggccaactcc atcactaggg gttccttgta gttaatgatt | 180 |
| aacccgccat gctacttata tactcgacat tgattattga ctagttatta atagtaatca | 240 |
| attacggggc cattagttca tagcccatat atggagttcc gcgttacata acttacggta | 300 |
| aatggcccg ctaggtgacc gcccaacgac ccccgcccat tgacgtcaat aatgacgtat  | 360 |
| gttcccatag taacgccaat agggactttc cattgacgtc aatgggtgga gtatttacgg | 420 |
| taaactgccc acttggcagt acatcaagtg tatcatatgc caagtacgcc ccctattgac | 480 |
| gtcaatgacg gtaaatggcc cgcctggcat tatgcccagt acatgacctt atgggacttt | 540 |
| cctacttggc agtacatcta cgtattagtc atcgctatta ccatggtcga ggtgagcccc | 600 |
| acgttctgct tcactctccc catctcccc ccctccccac cccaatttt gtatttat     | 660 |
| attttttaat tattttgtgc agcgatgggg gcgggggggg gggggggggc gcgccaggc  | 720 |
| ggggcggggc ggggcgaggg gcggggcggg gcgaggcgga gaggtgcggc ggcagccaat | 780 |
| cagagcggcg cgctccgaaa gtttcctttt atggcgaggc ggcggcggcg gcggccctat | 840 |
| aaaaagcgaa gcgcgcggcg ggcgggagtc gctgcgttgc cttcgcccc tgccccgctc  | 900 |
| cgccgccgcc tcgcgccgcc cgccccggct ctgactgacc gcgttactcc cacaggtgag | 960 |

|                                                                     |      |
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| gagcggctcg gggggtgcgt gcgtgtgtgt gtgcgtgggg agcgccgcgt gcggctccgc   | 1140 |
| gctgcccggc ggctgtgagc gctgcgggcg cggcgcgggg ctttgtgcgc tccgcagtgt   | 1200 |
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| tatgctggct  | gccatgaaca | aaggttggct | ataaagaggt  | catcagtata  | tgaaacagcc | 4560 |
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| aggccagcaa  | aaggccagga | accgtaaaaa | ggccgcgttg  | ctggcgtttt  | tccataggct | 5160 |
| ccgccccctt  | gacgagcatc | acaaaaatcg | acgctcaagt  | cagaggtggc  | gaaacccgac | 5220 |
| aggactataa  | agataccagg | cgtttccccc | tggaagctcc  | ctcgtgcgct  | ctcctgttcc | 5280 |
| gaccctgccg  | cttaccggat | acctgtccgc | ctttctccct  | tcgggaagcg  | tggcgctttc | 5340 |
| tcatagctca  | cgctgtaggt | atctcagttc | ggtgtaggtc  | gttcgctcca  | agctgggctg | 5400 |
| tgtgcacgaa  | cccccgttc  | agcccgaccg | ctgcgcctta  | tccggttaact | atcgtcttga | 5460 |
| gtccaacccg  | gtaagacacg | acttatcgcc | actggcagca  | gccactggta  | acaggattag | 5520 |
| cagagcgagg  | tatgtaggcg | gtgctacaga | gttcttgaag  | tggtggccta  | actacggcta | 5580 |
| cactagaaga  | acagtatttg | gtatctgcgc | tctgctgaag  | ccagttacct  | tcggaaaaag | 5640 |
| agttggtagc  | tcttgatccg | gcaaacaaac | caccgctggg  | agcgggtggt  | tttttgtttg | 5700 |
| caagcagcag  | attacgcgca | gaaaaaaagg | atctcaagaa  | gatcctttga  | tcctttctac | 5760 |
| ggggtctgac  | gctcagtggg | acgaaaactc | acgttaaggg  | attttgggtc  | tgagattatc | 5820 |

|                                                                   |      |
|-------------------------------------------------------------------|------|
| aaaaaggatc ttcacctaga tcctttttaa ttaaaaatga agtttttaa caatctaaag  | 5880 |
| tatatatgag taaacttggt ctgacagtta ccaatgctta atcagtgagg cacctatctc | 5940 |
| agcgatctgt ctatttcgtt catccatagt tgcctgactc cccgtcgtgt agataactac | 6000 |
| gatacgggag ggcttaccat ctggccccag tgctgcaatg ataccgcgag acccacgctc | 6060 |
| accggctcca gatttatcag caataaacca gccagccgga agggccgagc gcagaagtgg | 6120 |
| tcctgcaact ttatccgcct ccatccagtc tattaattgt tgccgggaag ctagagtaag | 6180 |
| tagttcgcca gttaatagtt tgcgcaacgt tgttgccatt gctacaggca tcgtggtgtc | 6240 |
| acgctcgtcg tttggtatgg cttcattcag ctccggttcc caacgatcaa ggcgagttac | 6300 |
| atgatcccc atgttgtgca aaaaagcggg tagctccttc ggtcctccga tcgttgtcag  | 6360 |
| aagtaagttg gccgcagtgt tatcactcat ggttatggca gcactgcata attctcttac | 6420 |
| tgtcatgcca tccgtaagat gcttttctgt gactggtgag tactcaacca agtcattctg | 6480 |
| agaatagtgt atgcggcgac cgagttgctc ttgcccggcg tcaatacggg ataataccgc | 6540 |
| gccacatagc agaactttaa aagtgtcat cattggaaaa cgttcttcgg ggcgaaaact  | 6600 |
| ctcaaggatc ttaccgctgt tgagatccag ttcgatgtaa cccactcgtg caccactg   | 6660 |
| atcttcagca tcttttactt tcaccagcgt ttctgggtga gcaaaaacag gaaggcaaaa | 6720 |
| tgccgcaaaa aagggaataa gggcgacacg gaaatgttga atactcatac tcttcctttt | 6780 |
| tcaatattat tgaagcattt atcagggtta ttgtctcatg agcggataca tatttgaatg | 6840 |
| tatttagaaa aataaaciaa taggggttcc gcgcacattt ccccgaag tgccacctga   | 6900 |
| cgtctaagaa accattatta tcatgacatt aacctataaa aataggcgta tcacgaggcc | 6960 |
| ctttcgtctc gcgcgtttcg gtgatgacgg tgaaaacctc tgacacatgc agctcccgga | 7020 |
| gacggtcaca gcttgtctgt aagcggatgc cgggagcaga caagcccgtc agggcgctc  | 7080 |
| agcgggtgtt ggcgggtgtc ggggctggct taactatgcg gcatcagagc agattgtact | 7140 |
| gagagtgcac catatgcggt gtgaaatacc gcacagatgc gtaaggagaa aataccgcat | 7200 |
| caggcgattc caacatcaa taaatcatac aggcaaggca aagaattagc aaaattaagc  | 7260 |
| aataaagcct cagagcataa agctaaatcg gttgtaccaa aaacattatg accctgtaat | 7320 |
| acttttgagg gagaagcctt tatttcaacg caaggataaa aatttttaga accctcatat | 7380 |
| attttaaatg caatgcctga gtaatgtgta ggtaaagatt caaacgggtg agaaaggccg | 7440 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| gagacagtca aatcaccatc aatatgatat tcaaccgttc tagctgataa attcatgccg  | 7500 |
| gagagggtag ctatTTTTga gaggtctcta caaaggctat caggtcattg cctgagagtc  | 7560 |
| tggagcaaac aagagaatcg atgaacggta atcgtaaaac tagcatgtca atcatatgta  | 7620 |
| ccccggttga taatcagaaa agccccaaaa acaggaagat tgtataagca aatattttaa  | 7680 |
| ttgtaagcgt taatatTTTT ttaaaattcg cgttaaattt ttgttaaadc agctcatttt  | 7740 |
| ttaaccaata ggccgaaatc ggcaaaatcc cttataaatc aaaagaatag accgagatag  | 7800 |
| ggttgagtgt tgttccagtt tggaacaaga gtccactatt aaagaacgtg gactccaacg  | 7860 |
| tcaaagggcg aaaaaccgtc tatcagggcg atggcccact acgtgaacca tcacccta    | 7920 |
| caagTTTTTT ggggtcgagg tgccgtaaag cactaaatcg gaaccctaaa gggagcccc   | 7980 |
| gatttagagc ttgacgggga aagccggcga acgtggcgag aaaggaaggg aagaaagcga  | 8040 |
| aaggagcggg cgctagggcg ctggcaagt tagcggtcac gctgcgcgta accaccac     | 8100 |
| ccgccgcgct taatgcgccg ctacagggcg cgtactatgg ttgctttgac gagcacgtat  | 8160 |
| aacgtgcttt cctcgttaga atcagagcgg gagctaaaca ggaggccgat taaagggatt  | 8220 |
| ttagacagga acggtacgcc agaatacctga gaagtgtttt tataatcagt gaggccaccg | 8280 |
| agtaaaagag tctgtccatc acgcaaatta accgttgtcg caatacttct ttgattagta  | 8340 |
| ataacatcac ttgcctgagt agaagaactc aaactatcgg ccttgctggt aatatccaga  | 8400 |
| acaatattac cgccagccat tgcaacggaa tcgccattcg ccattcaggc tgcgcaactg  | 8460 |
| ttgggaa                                                            | 8467 |

<210> 21  
 <211> 4886  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> AAV9-CAG-cohNaglu-version2 sequence

|                                                                    |     |
|--------------------------------------------------------------------|-----|
| <400> 21                                                           |     |
| attacgccag ctgcgcgctc gtcgctcac tgaggccgcc cgggcaaagc ccgggcgtcg   | 60  |
| ggcgaccttt ggtcgcccgg cctcagttag cgagcgagcg cgagagagg gaggggccaa   | 120 |
| ctccatcact aggggttcct ttagttaaata gattaacccg ccatgctact tatctactcg | 180 |
| acattgatta ttgactagtt attaatagta atcaattacg gggtcattag ttcatagccc  | 240 |

|                                                                   |      |
|-------------------------------------------------------------------|------|
| atatatggag ttccgcgtta cataacttac ggtaaatggc ccgcctggct gaccgccc   | 300  |
| cgacccccgc ccattgacgt caataatgac gtatgttccc atagtaacgc caatagggac | 360  |
| tttccattga cgtcaatggg tggagtattt acggtaaact gccacttgg cagtacatca  | 420  |
| agtgtatcat atgccaagta cgtcccctat tgacgtcaat gacggtaa              | 480  |
| gcattatgcc cagtacatga ctttatggga ctttcctact tggcagtaca tctacgtatt | 540  |
| agtcacgcgt attaccatgg tcgaggtgag cccacgttc tgcttcactc tccccatctc  | 600  |
| ccccccctcc ccacccccaa ttttgtattt atttattttt taattatttt gtgcagcgat | 660  |
| gggggcgggg gggggggggg ggcgcgcgcc aggcggggcg ggcggggcg aggggcgggg  | 720  |
| cggggcgagg cggagaggtg cggcggcagc caatcagagc ggcgcgctcc gaaagtttcc | 780  |
| ttttatggcg aggcggcggc ggcggcggcc ctataaaaag cgaagcgcgc ggcgggcggg | 840  |
| agtcgctgcg ttgccttcgc cccgtgcccc gctccgccgc cgcctcgcgc cgcccgcccc | 900  |
| ggctctgact gaccgcgtta ctcccacagg tgagcgggcg ggacggccct tctcctcgg  | 960  |
| gctgtaatta gcgcttggtt taatgacggc ttgtttcttt tctgtggctg cgtgaaagcc | 1020 |
| ttgaggggct ccgggagggc cttttgtgcg gggggagcgg ctcggggggt gcgtgcgtgt | 1080 |
| gtgtgtgcgt ggggagcgcc gcgtgcggct ccgcgctgcc cggcggctgt gagcgtgcg  | 1140 |
| ggcgcggcgc ggggctttgt gcgctccgca gtgtgcgcga ggggagcgcg gccgggggcg | 1200 |
| gtgccccgcg gtgcgggggg ggctgcgagg ggaacaaagg ctgcgtgcgg ggtgtgtgcg | 1260 |
| tgggggggtg agcaggggggt gtgggcgcgt cggtcgggct gcaaccccc ctgcaccccc | 1320 |
| ctccccgagt tgctgagcac ggcccggctt cgggtgcggg gctccgtacg gggcgtggcg | 1380 |
| cggggctcgc cgtgccgggc ggggggtggc ggcaggtggg ggtgccgggc ggggcggggc | 1440 |
| cgcctcgggc cggggagggc tcgggggagg ggcgcggcgg cccccggagc gccggcggct | 1500 |
| gtcgaggcgc ggcgagccgc agccattgcc ttttatggta atcgtgcgag agggcgcagg | 1560 |
| gacttccttt gtcccaa                                                | 1620 |
| ctagcgggcg cggggcgaag cgggtcggcg ccggcaggaa ggaaatgggc ggggagggcc | 1680 |
| ttcgtgcgtc gccgcgccgc cgtccccttc tccctctcca gcctcggggc tgtccgcggg | 1740 |
| gggacggctg ctttcggggg ggacggggca gggcgggggt cggcttcttg cgtgtgaccg | 1800 |
| gcggctctag agcctctgct aaccatgttc atgccttctt ctttttccta cagctcctgg | 1860 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| gcaacgtgct ggttattgtg ctgtctcatc attttggcaa agaattgatt aattcgagcg  | 1920 |
| aacgcgtgcc accatggaag cagtcgccgt cgccgcagca gtgggtgtcc tcctcctcgc  | 1980 |
| cgggtgctgga ggtgccgccg gggacgaggc ccgcgaggcc gcagctgtgc gggcccttgt | 2040 |
| ggcccggctt ctcggaaccg gccctgccgc cgacttcagc gtgtcagtgg aacgcgcact  | 2100 |
| ggctgcgaag cctgggctcg atacttactc cctgggcggg ggtgggtgccg ccagagtgcg | 2160 |
| ggtccgggga agcaccgggg tggccgccgc ggccggcctg caccggtacc ttcgggactt  | 2220 |
| ttgcggctgt catgtcgctt ggtccggatc ccagctgcgc ctccccgac cgctgcccg    | 2280 |
| cgtgcctgga gagctgaccg aggccactcc gaaccggtac agatactatc agaacgtgtg  | 2340 |
| cactcagtcc tactccttcg tgtggtggga ctgggccaga tgggagcggg agattgactg  | 2400 |
| gatggccctg aacggtatca acctgcctt ggcctggtcc ggccaggagg ccatttggca   | 2460 |
| gagggtgtac cttgactgg gactgactca agccgagatc aacgagtttt tcaccggccc   | 2520 |
| cgctttcctt gcctgggggc gcatgggcaa cctccacacc tgggacgggc ctctgccgcc  | 2580 |
| ctcctggcat atcaagcagc tgtacctcca gcacagggtg cttgaccaga tgcggagctt  | 2640 |
| tggaatgacc cctgtgctgc ccgcgttcgc gggtcacgtg ccagaagcag tgactcgcgt  | 2700 |
| gttccccaa gtgaacgtca ccaaaatggg atcgtgggga cactttaact gctcttattc   | 2760 |
| ctgctcctt ctcttggcgc cggaggacc gatcttccc attattggat cgctgttcct     | 2820 |
| gcgggagctg atcaaggagt tcggaaccga ccacatctac ggcgctgaca ctttaacga   | 2880 |
| gatgcagccg cttcctccg aaccatcgta cctcgcggcc gctactactg cggtgtacga   | 2940 |
| ggccatgacc gcagtggata ccgaagccgt ctggctgctg caagggtggg tgttccagca  | 3000 |
| ccagccgcag ttttggggac ccgccagat tcgcgccgtg ctgggcgccg tgcctagggg   | 3060 |
| tcgcctgctc gtgctggacc tgttcgccga gtcccagcca gtgtacacta ggaccgcgtc  | 3120 |
| gttccaagga cagcccttca tttggtgtat gcttcacaac ttcgggggca accacggtct  | 3180 |
| gttcggagcc ttggaagccg tgaatggcgg tcccaggga gcgcggcttt tccccactc    | 3240 |
| aaccatggtc ggaaccggaa tggcccctga aggaatctcc cagaacgaag tcgtgtactc  | 3300 |
| gctgatggca gagctgggct ggcggaagga tcctgtccct gatctcgccg cctgggtgac  | 3360 |
| atccttcgcc gctcgccgt atggtgtctc ccatccggat gccggagccg catggaggct   | 3420 |
| gctgctgaga tccgtgtaca actgctcggg agaagcgtgt cggggacata acaggtcccc  | 3480 |

|            |             |            |             |             |             |      |
|------------|-------------|------------|-------------|-------------|-------------|------|
| actcgtgcg  | agaccgagcc  | tcagatgaa  | cacctccatc  | tggtacaacc  | ggtccgacgt  | 3540 |
| gttcgaagcg | tggagactgc  | tgctgacttc | cgccccgagc  | ctcgcgacca  | gcccggcggtt | 3600 |
| ccgctacgat | ctcctggacc  | tcacaagaca | ggcgggtccaa | gaactgggtgt | ccctgtacta  | 3660 |
| cgaagaggcc | cgctccgcat  | acctcagcaa | ggaactcgca  | tcgttgctga  | gggccggcg   | 3720 |
| agtgtggca  | tacgagctgc  | tgccggccct | ggacgaagtg  | ctggccagcg  | acagccggtt  | 3780 |
| cctgtgggc  | tcttggtg    | aacaggcccc | cgctgctgcg  | gtgtccgaag  | ccgaagcgga  | 3840 |
| cttctacgag | cagaactcac  | ggtaccaact | gaccctctgg  | ggtccggagg  | gcaacattct  | 3900 |
| ggactacgcc | aacaagcaac  | tcgccggcct | ggtcgcaaat  | tactatactc  | ctcgggtggag | 3960 |
| gctgttcctg | gaagcgctgg  | tcgattcagt | ggctcagggg  | atcccattcc  | aacagcacca  | 4020 |
| attcgacaag | aacgtgttcc  | agcttgagca | ggcctttgtg  | ttgtcgaagc  | agcgctaccc  | 4080 |
| cagccagcca | cggggagaca  | cggtaggac  | ggccaagaag  | atcttcctga  | aatactaccc  | 4140 |
| aagatgggtg | gccggctcgt  | ggtaggaatt | cgagctcgg   | accgggaat   | caattcactc  | 4200 |
| ctcaggtgca | ggctgcctat  | cagaaggtgg | tggtggtgt   | ggccaatgcc  | ctggctcaca  | 4260 |
| aataccactg | agatcttttt  | ccctctgcca | aaaattatgg  | ggacatcatg  | aagccccttg  | 4320 |
| agcatctgac | ttctggctaa  | taaaggaaat | ttattttcat  | tgcaatagtg  | tggttgaatt  | 4380 |
| ttttgtgtct | ctcactcgga  | aggacatatg | ggagggcaaa  | tcatttaaaa  | catcagaatg  | 4440 |
| agtatttgg  | ttagagtttg  | gcaacatatg | cccatatgct  | ggctgcatg   | aacaaagggtt | 4500 |
| ggctataaag | aggatcatcag | tatatgaaac | agccccctgc  | tgtccattcc  | ttattccata  | 4560 |
| gaaaagcctt | gacttgaggt  | tagatttttt | ttatatatttg | ttttgtgtta  | tttttttctt  | 4620 |
| taacatccc  | aaaattttcc  | ttacatgttt | tactagccag  | atttttcctc  | ctctcctgac  | 4680 |
| tactcccagt | catagctgtc  | cctcttctct | tatggagatc  | cctcgacctg  | cagcccaagc  | 4740 |
| tgtagataag | tagcatggcg  | ggttaatcat | taactacaag  | gaacccttag  | tgatggagtt  | 4800 |
| ggccactccc | tctctgcgcg  | ctcgctcgct | cactgaggcc  | gcccgggctt  | tgcccgggcg  | 4860 |
| gcctcagtga | gcgagcgagc  | gcgcag     |             |             |             | 4886 |

<210> 22

<211> 2244

<212> DNA

<213> Artificial Sequence

<220>

<223> cohNaglu-version3 CDS sequence

<400> 22

|                                                                    |      |
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| gggctggagg ggctgctgga gatgaggcta gggaagctgc agctgtgcgc gcactggtcg  | 120  |
| cacgactgct gggacctggg ccagcagccg acttctctgt gagtgtcgag cgagcactgg  | 180  |
| ctgcaaagcc tggcctggat acctacagtc tgggaggagg aggagcagct cgagtggagg  | 240  |
| tcagagggtc aacaggagtg gcagcagctg caggactgca ccgatatctg cgagactttt  | 300  |
| gcggctgtca tgtggcctgg tcaggaagcc agctgaggct gccagacct ctgccagcag   | 360  |
| tgccaggcga gctgacagaa gccactcca accggtaccg ctactatcag aatgtgtgca   | 420  |
| cccagtccta ttctttcgtc tgggtgggact gggctcgatg ggagcgcgaa atcgattgga | 480  |
| tggcactgaa cggaattaat ctggcactgg catggagcgg acaggaggca atctggcaga  | 540  |
| gagtgtacct ggcactggga ctgactcagg ccgagattaa cgagttcttc accgggccag  | 600  |
| cttttctggc atggggacgg atggggaatc tgcacacatg ggacggacca ctgccacctt  | 660  |
| cttggcacat caagcagctg tatctgcagc atagggtgct ggatcagatg agaagttttg  | 720  |
| gcatgactcc agtgtgtccc gctttcgcag gacacgtccc tgaggccgtg accagggtgt  | 780  |
| tcccacaggt gaacgtcact aagatgggca gctggggaca ttttaattgc agttactcat  | 840  |
| gtagcttcct gctggcccct gaagaccaa tttttcccat cattggcagc ctgttcctgc   | 900  |
| gggagctgat caaagaattt ggaaccgacc acatctacgg ggccgataca ttcaacgaga  | 960  |
| tgcagccacc cagctccgaa ccttcctacc tggccgtgc aaccacagca gtgtatgagg   | 1020 |
| ccatgaccgc tgtggacaca gaagccgtct ggctgctgca ggggtggctg tttcagcatc  | 1080 |
| agccacagtt ctggggacct gcacagatcc gagctgtgct gggagcagtc ccacaggaa   | 1140 |
| ggctgctggg gctggatctg tttgccgagt ccagcccgt ctacactagg accgcttctt   | 1200 |
| tccagggcca gccttttatt tgggtgtatgc tgcacaactt tggagggaat catgggctgt | 1260 |
| tcggagcact ggaggcagtg aacggaggac cagaagcagc tagactgttt cctaattcta  | 1320 |
| ctatgggtggg caccggaatg gctcccagg gcatctcaca gaatgaagtg gtctacagcc  | 1380 |
| tgatggcaga gctgggatgg cgaaaggacc cagtgcctga tctggcagcc tgggtcacta  | 1440 |
| gtttcgtgc aaggagatac ggggtgtcac accctgacgc tggagcagct tggcgactgc   | 1500 |

|                                                                   |      |
|-------------------------------------------------------------------|------|
| tgctgaggtc tgtgtataac tgcagtgggg aggcctgtag aggccataat cgatccccac | 1560 |
| tggtgcggcg accatcactg cagatgaaca ccagcatttg gtacaatcga tccgatgtgt | 1620 |
| ttgaagcttg gaggctgctg ctgacaagtg ccccttcact ggctacttct ccagcattca | 1680 |
| gatatgacct gctggatctg acacggcagg cagtgcagga gctggtcagc ctgtactatg | 1740 |
| aggaagctcg cagcgcatac ctgtccaaag aactggcatc cctgctgagg gcaggaggag | 1800 |
| tgctggctta tgagctgctg ccagctctgg acgaagtcct ggcatccgat tctcgctttc | 1860 |
| tgctgggaag ctggctggag caggcccgag cagccgctgt gtccgaggcc gaagctgact | 1920 |
| tctacgagca gaactctagg tatcagctga ctctgtgggg acccgaaggg aacatcctgg | 1980 |
| attacgcaa taagcagctg gccggactgg tggctaatta ctatacccct agatggcggc  | 2040 |
| tgttcctgga ggcactggtg gacagcgtcg ctgaggggat tccattccag cagcaccagt | 2100 |
| ttgataagaa cgtgttcag ctggaacagg cttttgtcct gtctaaacag cggtacccta  | 2160 |
| gtcagccacg cggggacaca gtggatctgg ctaagaaaat cttcctgaaa tactatccta | 2220 |
| gatgggtcgc cggcagctgg tgag                                        | 2244 |

<210> 23  
 <211> 8467  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> pAAV-CAG-cohNaglu-version3 sequence

|                                                                    |     |
|--------------------------------------------------------------------|-----|
| <400> 23                                                           |     |
| gggcatcgg tgcgggcctc ttcgctatta cgccagctgc gcgctcgctc gctcactgag   | 60  |
| gccgcccggg caaagcccgg gcgtcgggcg acctttggtc gcccggcctc agtgagcgag  | 120 |
| cgagcgcgca gagagggagt ggccaactcc atcactaggg gttccttgta gttaatgatt  | 180 |
| aacccgcat gctacttatc tactcgacat tgattattga ctagttatta atagtaatca   | 240 |
| attacggggt cattagttca tagcccatat atggagttcc gcgttacata acttacggta  | 300 |
| aatggcccg cctggctgacc gcccaacgac ccccgcccat tgacgtcaat aatgacgtat  | 360 |
| gttcccatag taacgccaat agggactttc cattgacgtc aatgggtgga gtattttacgg | 420 |
| taaactgccc acttggcagt acatcaagtg tatcatatgc caagtacgcc ccctattgac  | 480 |
| gtcaatgacg gtaaatggcc cgcctggcat tatgcccagt acatgacctt atgggacttt  | 540 |

|                                                                    |      |
|--------------------------------------------------------------------|------|
| cctacttggc agtacatcta cgtattagtc atcgc tatta ccatggtcga ggtgagcccc | 600  |
| acgttctgct tcactctccc catctcccc ccctccccac cccaatttt gtattttattt   | 660  |
| attttttaat tattttgtgc agcgatgggg gcgggggggg ggggggggcg cgcgccaggc  | 720  |
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| ggattacgcc aataagcagc tggccggact ggtggctaata tactataccc ctagatggcg | 3960 |
| gctgttcctg gaggcactgg tggacagcgt cgctcagggg attccattcc agcagcacca  | 4020 |
| gtttgataag aacgtgttcc agctggaaca ggcctttgtc ctgtctaaac agcggtaccc  | 4080 |
| tagtcagcca cgcggggaca cagtggatct ggctaagaaa atcttcctga aatactatcc  | 4140 |
| tagatgggtc gccggcagct ggtgagaatt cgagctcggc acccggaat caattcactc   | 4200 |
| ctcaggtgca ggctgcctat cagaaggtgg tggctggtgt ggccaatgcc ctggctcaca  | 4260 |
| aataccactg agatcttttt ccctctgcc aaaaattatgg ggacatcatg aagccccttg  | 4320 |
| agcatctgac ttctggctaa taaaggaaat ttattttcat tgcaatagtg tgttggaatt  | 4380 |
| ttttgtgtct ctactcgga aggacatatg ggagggcaaa tcatttaaaa catcagaatg   | 4440 |
| agtatttggg ttagagtttg gcaacatatg cccatatgct ggctgccatg aacaaagggt  | 4500 |
| ggctataaag aggtcatcag tatatgaaac agccccctgc tgtccattcc ttattccata  | 4560 |
| gaaaagcctt gacttgaggt tagatTTTTT ttatatTTTg ttttTgtTta ttttttctt   | 4620 |
| taacatccct aaaaTTTTcc ttacatgttt tactagccag atttttctc ctctcctgac   | 4680 |

|                                                                   |      |
|-------------------------------------------------------------------|------|
| tactcccagt catagctgtc cctcttctct tatggagatc cctcgacctg cagcccaagc | 4740 |
| tgtagataag tagcatggcg ggttaatcat taactacaag gaacccttag tgatggagtt | 4800 |
| ggccactccc tctctgcgcg ctcgctcgct cactgaggcc gcccgggctt tgcccgggcg | 4860 |
| gcctcagtga gcgagcgagc gcgcag                                      | 4886 |