

SEQUENCE LISTING

<110> Rheinisch-Westfaelische Technische Hochschule Aachen
University of Texas, Southwestern Medical Center
Yildiz, Yildiz
Matern, Heidrun
Matern, Siegfried
Russell, David W.

<120> THERAPEUTIC USE OF GBA2

<130> 072130wo

<150> US 60/855,524

<151> 2006-10-31

<160> 18

<170> PatentIn version 3.3

<210> 1

<211> 2784

<212> DNA

<213> homo sapiens

<400> 1

atggggaccc aggatccagg gaacatggga accggcggtcc cagcctcgga gcagataagc	60
tgtgccaaag aggatccaca agtttattgc cctgaagaga ctggcggcac caaggatgtg	120
caggttacag actgtaagag tcccgaagac agccgacccc caaaagagac ggactgctgc	180
aatccggagg actctgggca gctgatgggt tcctatgagg gtaaagctat gggctaccag	240
gtgcctccct ttggctggcg catctgtctg gctcatgagt ttacagagaa gaggaacccc	300
tttcaagcta acaacgtctc cctaagcaac atgataaagc atataggcat gggcttgagg	360
tacctgcagt ggtggtaccg gaagacccat gtggaaaaga agacaccttt catcgacatg	420
atcaattctg taccocctaag acagatttat gggtgtccct tgggtggcat cgggggaggc	480
actattaccc gtggctggag aggccagttc tgtcgttggc agcttaaccc tggaatgtat	540
cagcaccgga cagtcatcgc tgaccaattc acagtgtgcc tgcgtcggga agggcagact	600
gtgtaccagc aagtccctgc cctggagcgc ccaagtgtcc tccgcagctg gaactggggc	660
ctgtgtgggt actttgcttt ctaccatgcc ctctatcccc gagcctggac tgtctatcag	720
cttcttgccc agaatgtcac cctcacctgc cgtcagatca caccatctt gccccatgac	780
taccaggaca gcagcctgcc tgtaggagtc tttgtgtggg atgtggaaaa tgaaggggac	840
gaagctctag atgtgtccat catgtttccc atgcggaatg gactgggtgg tggagacgat	900
gccccagggg gtttgtggaa tgagcccttc tgtctggagc gtagcgggga aactgtccgg	960
gggctgctcc tgcacatccc aacccttcca aaccctaca cgatggctgt ggctgcacga	1020
gtcacggcag ctaccacggt aaccacatc acagcctttg accctgacag cacggggcag	1080
caggtgtggc aggatctact tcaggatgga cagctggact ctcccactgg ccaaagcacc	1140

cctacgcaga aaggagtagg cattgctgga gctgtgtgtg tttccagcaa gttgcgacct	1200
cgaggccagt gccgcctgga gttttcactg gcttgggaca tgcccaggat catgtttgga	1260
gctaaaggcc aagtccacta caggcgttat acaaggttct ttggccagga tggagatgca	1320
gcacctgccc tcagccacta tgcactgtgc cgatacgag agtgggaaga gaggatctca	1380
gcttggcaga gcccggtatt ggatgacaga tcaactgcctg cctggtacaa atctgcgctg	1440
ttcaatgaac tatacttcct ggctgatgga ggcacagtgt ggctggaagt tcttgaggac	1500
tccctaccag aggagctggg cagaaacatg tgtcacctcc gccccaccct acgggactac	1560
ggtcgatttg gctaccttga gggccaggag taccgcatgt acaacacata tgatgtccac	1620
ttttatgctt cctttgccct catcatgctc tggcccaaac ttgagctcag cctacagtat	1680
gacatggctc tggccactct cagggaggac ctgacacggc gacggtacct gatgagtggg	1740
gtgatggcac ctgtgaaaag gaggaacgtc atccccatg atattgggga cccagatgat	1800
gaaccatggc tccgctcaa tgcataattta atccatgata ctgctgattg gaaggacctg	1860
aacctgaagt ttgtgctgca ggtttatcgg gactattacc tcacgggtga tcaaaacttc	1920
ctgaaggaca tgtggcctgt gtgtctagct gtgatggaat ctgaaatgaa gtttgacaag	1980
gaccatgatg gactcattga aaatggaggc tatgcagacc agacctatga tggatgggtg	2040
accacaggcc ccagtgttta ctgtggaggg ctgtggctgg cagctgtggc tgtgatggtc	2100
cagatggctg ctctgtgtgg ggcacaggac atccaggata agttttcttc taccctcagc	2160
cggggccaaag aagcctatga gagactgctg tggaatggcc gctattacaa ctatgacagc	2220
agctctcggc ctcagtctcg tagtgttatg tctgaccagt gtgctggaca gtggttcctg	2280
aaggcctgtg gcctaggaga aggagacact gaggtgtttc ctaccaaca tgtggtccgt	2340
gctctccaaa ctatctttga gctgaacgtc caggcctttg caggaggggc catgggggct	2400
gtgaatggga tgcagcccca tgggtgtccct gataaatcca gtgtgcagtc tgatgaagtc	2460
tgggtgggtg tgggtctacgg gctggcagct accatgatcc aagagggcct gacttgggag	2520
ggcttccaga cagctgaagg ctgctaccgt accgtgtggg agcgccctggg tctggccttc	2580
cagaccccag aggcatactg ccagcagcga gtgttccgct cactggccta catgcggccca	2640
ctgagcatat gggccatgca gctagccctg caacagcagc agcacaaaaa ggcctcctgg	2700
ccaaaagtca aacagggcac aggactaagg acagggccta tgtttggacc aaaggaagcc	2760
atggcaaacc tgagcccaga gtga	2784

<210> 2
 <211> 927
 <212> PRT
 <213> homo sapiens

<400> 2

Met Gly Thr Gln Asp Pro Gly Asn Met Gly Thr Gly Val Pro Ala Ser
1 5 10 15

Glu Gln Ile Ser Cys Ala Lys Glu Asp Pro Gln Val Tyr Cys Pro Glu
20 25 30

Glu Thr Gly Gly Thr Lys Asp Val Gln Val Thr Asp Cys Lys Ser Pro
35 40 45

Glu Asp Ser Arg Pro Pro Lys Glu Thr Asp Cys Cys Asn Pro Glu Asp
50 55 60

Ser Gly Gln Leu Met Val Ser Tyr Glu Gly Lys Ala Met Gly Tyr Gln
65 70 75 80

Val Pro Pro Phe Gly Trp Arg Ile Cys Leu Ala His Glu Phe Thr Glu
85 90 95

Lys Arg Lys Pro Phe Gln Ala Asn Asn Val Ser Leu Ser Asn Met Ile
100 105 110

Lys His Ile Gly Met Gly Leu Arg Tyr Leu Gln Trp Trp Tyr Arg Lys
115 120 125

Thr His Val Glu Lys Lys Thr Pro Phe Ile Asp Met Ile Asn Ser Val
130 135 140

Pro Leu Arg Gln Ile Tyr Gly Cys Pro Leu Gly Gly Ile Gly Gly Gly
145 150 155 160

Thr Ile Thr Arg Gly Trp Arg Gly Gln Phe Cys Arg Trp Gln Leu Asn
165 170 175

Pro Gly Met Tyr Gln His Arg Thr Val Ile Ala Asp Gln Phe Thr Val
180 185 190

Cys Leu Arg Arg Glu Gly Gln Thr Val Tyr Gln Gln Val Leu Ser Leu
195 200 205

Glu Arg Pro Ser Val Leu Arg Ser Trp Asn Trp Gly Leu Cys Gly Tyr
210 215 220

Phe Ala Phe Tyr His Ala Leu Tyr Pro Arg Ala Trp Thr Val Tyr Gln
225 230 235 240

Leu Pro Gly Gln Asn Val Thr Leu Thr Cys Arg Gln Ile Thr Pro Ile

245								250					255				
Leu	Pro	His	Asp 260	Tyr	Gln	Asp	Ser	Ser 265	Leu	Pro	Val	Gly	Val 270	Phe	Val		
Trp	Asp	Val 275	Glu	Asn	Glu	Gly	Asp 280	Glu	Ala	Leu	Asp	Val 285	Ser	Ile	Met		
Phe	Ser 290	Met	Arg	Asn	Gly	Leu 295	Gly	Gly	Gly	Asp	Asp 300	Ala	Pro	Gly	Gly		
Leu 305	Trp	Asn	Glu	Pro	Phe 310	Cys	Leu	Glu	Arg	Ser 315	Gly	Glu	Thr	Val	Arg 320		
Gly	Leu	Leu	Leu	His 325	His	Pro	Thr	Leu	Pro 330	Asn	Pro	Tyr	Thr	Met 335	Ala		
Val	Ala	Ala	Arg 340	Val	Thr	Ala	Ala	Thr 345	Thr	Val	Thr	His	Ile 350	Thr	Ala		
Phe	Asp	Pro 355	Asp	Ser	Thr	Gly	Gln 360	Gln	Val	Trp	Gln	Asp 365	Leu	Leu	Gln		
Asp	Gly 370	Gln	Leu	Asp	Ser	Pro 375	Thr	Gly	Gln	Ser	Thr 380	Pro	Thr	Gln	Lys		
Gly 385	Val	Gly	Ile	Ala	Gly 390	Ala	Val	Cys	Val	Ser 395	Ser	Lys	Leu	Arg	Pro 400		
Arg	Gly	Gln	Cys	Arg 405	Leu	Glu	Phe	Ser	Leu 410	Ala	Trp	Asp	Met	Pro 415	Arg		
Ile	Met	Phe	Gly 420	Ala	Lys	Gly	Gln	Val 425	His	Tyr	Arg	Arg	Tyr 430	Thr	Arg		
Phe	Phe	Gly 435	Gln	Asp	Gly	Asp	Ala 440	Ala	Pro	Ala	Leu	Ser 445	His	Tyr	Ala		
Leu	Cys 450	Arg	Tyr	Ala	Glu	Trp 455	Glu	Glu	Arg	Ile	Ser 460	Ala	Trp	Gln	Ser		
Pro 465	Val	Leu	Asp	Asp	Arg 470	Ser	Leu	Pro	Ala	Trp 475	Tyr	Lys	Ser	Ala	Leu 480		
Phe	Asn	Glu	Leu	Tyr 485	Phe	Leu	Ala	Asp	Gly 490	Gly	Thr	Val	Trp	Leu 495	Glu		

Val Leu Glu Asp Ser Leu Pro Glu Glu Leu Gly Arg Asn Met Cys His
500 505 510

Leu Arg Pro Thr Leu Arg Asp Tyr Gly Arg Phe Gly Tyr Leu Glu Gly
515 520 525

Gln Glu Tyr Arg Met Tyr Asn Thr Tyr Asp Val His Phe Tyr Ala Ser
530 535 540

Phe Ala Leu Ile Met Leu Trp Pro Lys Leu Glu Leu Ser Leu Gln Tyr
545 550 555 560

Asp Met Ala Leu Ala Thr Leu Arg Glu Asp Leu Thr Arg Arg Arg Tyr
565 570 575

Leu Met Ser Gly Val Met Ala Pro Val Lys Arg Arg Asn Val Ile Pro
580 585 590

His Asp Ile Gly Asp Pro Asp Asp Glu Pro Trp Leu Arg Val Asn Ala
595 600 605

Tyr Leu Ile His Asp Thr Ala Asp Trp Lys Asp Leu Asn Leu Lys Phe
610 615 620

Val Leu Gln Val Tyr Arg Asp Tyr Tyr Leu Thr Gly Asp Gln Asn Phe
625 630 635 640

Leu Lys Asp Met Trp Pro Val Cys Leu Ala Val Met Glu Ser Glu Met
645 650 655

Lys Phe Asp Lys Asp His Asp Gly Leu Ile Glu Asn Gly Gly Tyr Ala
660 665 670

Asp Gln Thr Tyr Asp Gly Trp Val Thr Thr Gly Pro Ser Ala Tyr Cys
675 680 685

Gly Gly Leu Trp Leu Ala Ala Val Ala Val Met Val Gln Met Ala Ala
690 695 700

Leu Cys Gly Ala Gln Asp Ile Gln Asp Lys Phe Ser Ser Ile Leu Ser
705 710 715 720

Arg Gly Gln Glu Ala Tyr Glu Arg Leu Leu Trp Asn Gly Arg Tyr Tyr
725 730 735

Asn Tyr Asp Ser Ser Ser Arg Pro Gln Ser Arg Ser Val Met Ser Asp
740 745 750

Gln Cys Ala Gly Gln Trp Phe Leu Lys Ala Cys Gly Leu Gly Glu Gly
755 760 765

Asp Thr Glu Val Phe Pro Thr Gln His Val Val Arg Ala Leu Gln Thr
770 775 780

Ile Phe Glu Leu Asn Val Gln Ala Phe Ala Gly Gly Ala Met Gly Ala
785 790 795 800

Val Asn Gly Met Gln Pro His Gly Val Pro Asp Lys Ser Ser Val Gln
805 810 815

Ser Asp Glu Val Trp Val Gly Val Val Tyr Gly Leu Ala Ala Thr Met
820 825 830

Ile Gln Glu Gly Leu Thr Trp Glu Gly Phe Gln Thr Ala Glu Gly Cys
835 840 845

Tyr Arg Thr Val Trp Glu Arg Leu Gly Leu Ala Phe Gln Thr Pro Glu
850 855 860

Ala Tyr Cys Gln Gln Arg Val Phe Arg Ser Leu Ala Tyr Met Arg Pro
865 870 875 880

Leu Ser Ile Trp Ala Met Gln Leu Ala Leu Gln Gln Gln Gln His Lys
885 890 895

Lys Ala Ser Trp Pro Lys Val Lys Gln Gly Thr Gly Leu Arg Thr Gly
900 905 910

Pro Met Phe Gly Pro Lys Glu Ala Met Ala Asn Leu Ser Pro Glu
915 920 925

<210> 3

<211> 2757

<212> DNA

<213> mus musculus

<400> 3

atggtaacct gcgtcccggc ctcagagcag gtcggctgtg ccgaaagaga ttcccaagtt 60

tattgtgaag atactggcgg cactgaggct gtgcgggtta cagactgcgg gagccccgag 120

gatagtggac cccaggatga accaagctac tgcaattcag aggactctgg gcagctgatg 180

gcctcctacg agggtaaagc taggggctac caggtgcctc cttttggctg gcggatctgc 240

ttggctcacg agtttgcaga gaagaggaga ccttttcaag ctaacaacat ctctctcagt 300

aatttggtaa agcacctcgg tatgggcttg aggtacttga agtggtggta ccgaaagacc 360

cacgtggaaa	agaagacccc	tttcatcgac	atgctcaatt	ctctaccct	gagacagatc	420
tatggttgtc	ccctgggtgg	cattggagga	ggcactatca	cccggggctg	gagaggccag	480
ttctgtcgtt	ggcagctcaa	ccctggaatg	taccagcacc	agacagtcac	tgcagaccaa	540
tttatagtat	gcttgcgctg	agatgggcgg	actgtgtacc	agcaagttct	gtccttggag	600
cttccaaatg	tcctgogcag	ctggaactgg	ggcctgtgtg	gttactttgc	tttctaccac	660
gccctctatc	cccagacctg	gacggtctat	cagcttcctg	gccagaatgt	caccctcacc	720
tgctgccagg	tcacacctat	cttgccctcat	gactaccagg	acagcagttc	ccctgtagga	780
gtctttgtgt	gggatgtaga	aaacgaagga	gatgagactc	tggacgtttc	catcacgttc	840
tccatgcgga	atggactagg	aggcgaagat	gatgcggccg	ggagtttgtg	gaatgagccc	900
ttccgcctgg	aacagggcgg	gacgactggt	caggggctcc	tcttgcatca	tccaaccct	960
ccgaaccct	acaccatggc	tgtggctgca	cgatgcacgg	cagataccac	ggtaaccac	1020
accacagcct	ttgaccccaa	tggcactgga	cagcaggtgt	ggcaggacct	acttcaggat	1080
ggacagctgg	actccctgc	tggccaaagc	acccaacac	agaaaggaga	gggtatcgct	1140
ggggctgtat	gcatctctag	caagctgtta	cctcgaagcc	ggtgctgctt	ggagttctca	1200
ctggcttggg	atatgcctaa	gatcatgttt	ggagctaaaa	gccaagtcca	ctacaggcgg	1260
tatacacggt	tctttggttc	agatggtgat	gtggcgccctg	ccctgagcca	ctatgcactg	1320
tgccactatg	cagactggga	ggacagaatc	tcagcctggc	agaaccaggt	actggatgac	1380
agaaccttgc	ctgcctggta	caaactctgca	ctgttcaatg	aactgtactt	cctggccgat	1440
ggaggcacag	tgtggctgga	agttcccgca	gactccctac	cagaggggct	gggagggagt	1500
atgcgtcagc	ttcgctctac	tctgcaggac	tatgggcgat	ttggctatct	tgaaggccag	1560
gagtaccgca	tgtacaacac	atacgatgtc	cacttttatg	cgtcctttgc	cctcgtcatg	1620
ctgtggccca	aacttgagct	cagtcttcag	tatgatatgg	ctctggcaac	tttgaaggag	1680
gacctgacct	ggcgacggta	cctgatgagt	ggagtgggtg	cacctgtgaa	aaggaggaac	1740
gtcatccctc	atgacattgg	ggatccggat	gatgagccat	ggctccgggt	caacgcatac	1800
ttgattcatg	atactgctga	ctggaaggac	ctgaacctga	agtttgtatt	gcaaatttat	1860
cgggactatt	acctgacggg	tgatcaaggc	ttcctggagg	acatgtggcc	tgtgtgtctg	1920
gctgtgatgg	agtccgaaat	gaagtttgac	aaggaccaag	atggactcat	tgagaatgga	1980
ggctacgcag	accagacctc	tgatgcatgg	gtcaccacag	gccccagtgc	ttactgcgga	2040
gggctgtggc	tggcggcagt	ggctgtaatg	gttcagatgg	ctgttctgtg	tggggcccaa	2100
gatgtccagg	agaggtttgc	ttcattcttc	tgccgaggcc	gagaagctta	tgagagactg	2160
ctgtggaacg	gacgtatta	caactacgac	agcagctccc	atcctcagtc	tcggagcatc	2220
atgtctgacc	agtgtgctgg	gcagtggttc	ctgagggcct	gcggcctggg	agaaggagac	2280

actgaagtat ttccctaccct gcatgtgggc cgtgctctcc aaaccatctt tgaactcaac 2340
gtccaagcct ttgcaggagg agccatgggg gccgtgaacg ggatgcaccc tcatgggtgc 2400
cctgatagat ccagtgtgca gtctgatgaa gtctgggtgg gtgtgggtcta tgggctggca 2460
gccaccatga tccaagaggg cctgacttgg gaaggtttcc ggacagctga aggctgttac 2520
cgcactgtat gggaacgcct gggcctggct ttccagaccc cagaggcata ctgccagcaa 2580
caagtgttcc gctccctggc ctacatgcgg ccactgagca tctgggccat gcagctggcc 2640
ctgcaacagc agcagcataa aaagagccgc aggccatcag tcacacaagg cacgggacta 2700
agcacacagc ctgaatgtgg accaaagaga tcgctggcaa acctcaattc agagtga 2757

<210> 4
<211> 918
<212> PRT
<213> mus musculus

<400> 4

Met Val Thr Cys Val Pro Ala Ser Glu Gln Val Gly Cys Ala Glu Arg
1 5 10 15

Asp Ser Gln Val Tyr Cys Glu Asp Thr Gly Gly Thr Glu Ala Val Arg
20 25 30

Val Thr Asp Cys Gly Ser Pro Glu Asp Ser Gly Pro Gln Asp Glu Pro
35 40 45

Ser Tyr Cys Asn Ser Glu Asp Ser Gly Gln Leu Met Ala Ser Tyr Glu
50 55 60

Gly Lys Ala Arg Gly Tyr Gln Val Pro Pro Phe Gly Trp Arg Ile Cys
65 70 75 80

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

Ile Ser Leu Ser Asn Leu Val Lys His Leu Gly Met Gly Leu Arg Tyr
100 105 110

Leu Lys Trp Trp Tyr Arg Lys Thr His Val Glu Lys Lys Thr Pro Phe
115 120 125

Ile Asp Met Leu Asn Ser Leu Pro Leu Arg Gln Ile Tyr Gly Cys Pro
130 135 140

Leu Gly Gly Ile Gly Gly Gly Thr Ile Thr Arg Gly Trp Arg Gly Gln
145 150 155 160

Phe Cys Arg Trp Gln Leu Asn Pro Gly Met Tyr Gln His Gln Thr Val
165 170 175

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

Tyr Gln Gln Val Leu Ser Leu Glu Leu Pro Asn Val Leu Arg Ser Trp
195 200 205

Asn Trp Gly Leu Cys Gly Tyr Phe Ala Phe Tyr His Ala Leu Tyr Pro
210 215 220

Arg Ala Trp Thr Val Tyr Gln Leu Pro Gly Gln Asn Val Thr Leu Thr
225 230 235 240

Cys Arg Gln Val Thr Pro Ile Leu Pro His Asp Tyr Gln Asp Ser Ser
245 250 255

Leu Pro Val Gly Val Phe Val Trp Asp Val Glu Asn Glu Gly Asp Glu
260 265 270

Thr Leu Asp Val Ser Ile Thr Phe Ser Met Arg Asn Gly Leu Gly Gly
275 280 285

Glu Asp Asp Ala Ala Gly Ser Leu Trp Asn Glu Pro Phe Arg Leu Glu
290 295 300

Gln Gly Gly Thr Thr Val Gln Gly Leu Leu Leu His His Pro Thr Pro
305 310 315 320

Pro Asn Pro Tyr Thr Met Ala Val Ala Ala Arg Cys Thr Ala Asp Thr
325 330 335

Thr Val Thr His Thr Thr Ala Phe Asp Pro Asn Gly Thr Gly Gln Gln
340 345 350

Val Trp Gln Asp Leu Leu Gln Asp Gly Gln Leu Asp Ser Pro Ala Gly
355 360 365

Gln Ser Thr Pro Thr Gln Lys Gly Glu Gly Ile Ala Gly Ala Val Cys
370 375 380

Ile Ser Ser Lys Leu Leu Pro Arg Ser Arg Cys Cys Leu Glu Phe Ser
385 390 395 400

Leu Ala Trp Asp Met Pro Lys Ile Met Phe Gly Ala Lys Ser Gln Val

				405				410				415					
His	Tyr	Arg	Arg	Tyr	Thr	Arg	Phe	Phe	Gly	Ser	Asp	Gly	Asp	Val	Ala		
				420					425					430			
Pro	Ala	Leu	Ser	His	Tyr	Ala	Leu	Cys	His	Tyr	Ala	Asp	Trp	Glu	Asp		
				435					440					445			
Arg	Ile	Ser	Ala	Trp	Gln	Asn	Pro	Val	Leu	Asp	Asp	Arg	Thr	Leu	Pro		
				450					455					460			
Ala	Trp	Tyr	Lys	Ser	Ala	Leu	Phe	Asn	Glu	Leu	Tyr	Phe	Leu	Ala	Asp		
465					470					475					480		
Gly	Gly	Thr	Val	Trp	Leu	Glu	Val	Pro	Ala	Asp	Ser	Leu	Pro	Glu	Gly		
				485					490					495			
Leu	Gly	Gly	Ser	Met	Arg	Gln	Leu	Arg	Ser	Thr	Leu	Gln	Asp	Tyr	Gly		
				500					505					510			
Arg	Phe	Gly	Tyr	Leu	Glu	Gly	Gln	Glu	Tyr	Arg	Met	Tyr	Asn	Thr	Tyr		
				515					520					525			
Asp	Val	His	Phe	Tyr	Ala	Ser	Phe	Ala	Leu	Val	Met	Leu	Trp	Pro	Lys		
				530					535					540			
Leu	Glu	Leu	Ser	Leu	Gln	Tyr	Asp	Met	Ala	Leu	Ala	Thr	Leu	Lys	Glu		
545					550					555					560		
Asp	Leu	Thr	Arg	Arg	Arg	Tyr	Leu	Met	Ser	Gly	Val	Val	Ala	Pro	Val		
				565					570					575			
Lys	Arg	Arg	Asn	Val	Ile	Pro	His	Asp	Ile	Gly	Asp	Pro	Asp	Asp	Glu		
				580					585					590			
Pro	Trp	Leu	Arg	Val	Asn	Ala	Tyr	Leu	Ile	His	Asp	Thr	Ala	Asp	Trp		
				595					600					605			
Lys	Asp	Leu	Asn	Leu	Lys	Phe	Val	Leu	Gln	Ile	Tyr	Arg	Asp	Tyr	Tyr		
				610					615					620			
Leu	Thr	Gly	Asp	Gln	Gly	Phe	Leu	Glu	Asp	Met	Trp	Pro	Val	Cys	Leu		
625					630					635					640		
Ala	Val	Met	Glu	Ser	Glu	Met	Lys	Phe	Asp	Lys	Asp	Gln	Asp	Gly	Leu		
				645					650					655			

Ile Glu Asn Gly Gly Tyr Ala Asp Gln Thr Tyr Asp Ala Trp Val Thr
660 665 670

Thr Gly Pro Ser Ala Tyr Cys Gly Gly Leu Trp Leu Ala Ala Val Ala
675 680 685

Val Met Val Gln Met Ala Val Leu Cys Gly Ala Gln Asp Val Gln Glu
690 695 700

Arg Phe Ala Ser Ile Leu Cys Arg Gly Arg Glu Ala Tyr Glu Arg Leu
705 710 715 720

Leu Trp Asn Gly Arg Tyr Tyr Asn Tyr Asp Ser Ser Ser His Pro Gln
725 730 735

Ser Arg Ser Ile Met Ser Asp Gln Cys Ala Gly Gln Trp Phe Leu Arg
740 745 750

Ala Cys Gly Leu Gly Glu Gly Asp Thr Glu Val Phe Pro Thr Leu His
755 760 765

Val Val Arg Ala Leu Gln Thr Ile Phe Glu Leu Asn Val Gln Ala Phe
770 775 780

Ala Gly Gly Ala Met Gly Ala Val Asn Gly Met His Pro His Gly Val
785 790 795 800

Pro Asp Arg Ser Ser Val Gln Ser Asp Glu Val Trp Val Gly Val Val
805 810 815

Tyr Gly Leu Ala Ala Thr Met Ile Gln Glu Gly Leu Thr Trp Glu Gly
820 825 830

Phe Arg Thr Ala Glu Gly Cys Tyr Arg Thr Val Trp Glu Arg Leu Gly
835 840 845

Leu Ala Phe Gln Thr Pro Glu Ala Tyr Cys Gln Gln Gln Val Phe Arg
850 855 860

Ser Leu Ala Tyr Met Arg Pro Leu Ser Ile Trp Ala Met Gln Leu Ala
865 870 875 880

Leu Gln Gln Gln Gln His Lys Lys Ser Arg Arg Pro Ser Val Thr Gln
885 890 895

Gly Thr Gly Leu Ser Thr Gln Pro Glu Cys Gly Pro Lys Arg Ser Leu
900 905 910

Ala Asn Leu Asn Ser Glu
915

<210> 5
<211> 19
<212> DNA
<213> artificial

<220>
<223> long arm sense primer

<400> 5
caggagcaga gagcaatga 19

<210> 6
<211> 25
<212> DNA
<213> artificial

<220>
<223> long arm antisense primer

<400> 6
gcatggaatg aagcaaacag gagga 25

<210> 7
<211> 21
<212> DNA
<213> artificial

<220>
<223> short arm sense primer

<400> 7
catctggctc cttagttctc t 21

<210> 8
<211> 20
<212> DNA
<213> artificial

<220>
<223> short arm antisense primer

<400> 8
gcgattgtcc tattggctca 20

<210> 9
<211> 1799
<212> DNA
<213> herpes simplex virus

<400> 9
cagctgcttc atccccgtgg cccgttgctc gcgtttgctg gcggtgtccc cggaagaaat 60

atatttgcac	gtcttttagtt	ctatgatgac	acaaaccccg	cccagcgtct	tgtcattggc	120
gaattcgaac	acgcagatgc	agtcggggcg	gcgcggtccg	aggtccactt	cgcatattaa	180
ggtgacgcgt	gtggcctcga	acaccgagcg	accctgcagc	gacccgctta	acagcgtcaa	240
cagcgtgccg	cagatottgg	tggcgtgaaa	ctcccgacc	tcttcggcca	gcgcttgta	300
gaagcgcgta	tggcttcgta	ccccggccat	caacacgcgt	ctgcgttcga	ccaggctgcg	360
cgttctcgcg	gcatagcaa	ccgacgtacg	gcgttgcgcc	ctcgccggca	gcaagaagcc	420
acggaagtcc	gcccggagca	gaaaatgcc	acgtactgc	gggtttatat	agacggtccc	480
cacgggatgg	ggaaaaccac	caccacgcaa	ctgctgggtg	ccctgggttc	gcgcgacgat	540
atcgtctacg	taccogagcc	gatgacttac	tggcgggtgc	tgggggcttc	cgagacaatc	600
gcgaacatct	acaccacaca	acaccgcctc	gaccaggtg	agatatcggc	cggggacgcg	660
gcggtggtaa	tgacaagcgc	ccagataaca	atgggcatgc	cttatgccgt	gaccgacgcc	720
gttctggctc	ctcatatcgg	gggggaggct	gggagctcac	atgccccgcc	cccggccctc	780
accctcatct	tcgaccgcca	tcccatcgcc	gccctcctgt	gctaccgggc	cgcgcggtac	840
cttatgggca	gcatgacccc	ccaggccgtg	ctggcgttcg	tggccctcat	cccgccgacc	900
ttgcccggca	ccaacatcgt	gcttggggcc	cttcggagg	acagacacat	cgaccgcctg	960
gccaaacgcc	agcgcgccgg	cgagcggtcg	gacctggcta	tgctggctgc	gattcgccgc	1020
gtttacgggc	tacttgccaa	tacggtgcgg	tatctgcagt	gcggcgggtc	gtggcgggag	1080
gactggggac	agctttcggg	gacggccgtg	ccgccccagg	gtgccgagcc	ccagagcaac	1140
gcggggccac	gaccccatat	cggggacacg	ttattttacc	tgtttcgggc	ccccgagttg	1200
ctggccccca	acggcgacct	gtataacgtg	tttgccctggg	ccttggacgt	cttggccaaa	1260
cgcctccgtt	ccatgcacgt	ctttatcctg	gattacgacc	aatcgccgcg	cggctgccgg	1320
gacgcctgc	tgcaacttac	ctccgggatg	gtccagaccc	acgtcaccac	ccccggctcc	1380
ataccgacga	tatgcgacct	ggcgcgacg	tttgcccggg	agatggggga	ggctaactga	1440
aacacggaag	gagacaatac	cggaaggaac	ccgcgctatg	acggcaataa	aaagacagaa	1500
taaaacgcac	gggtgttggg	tcgtttgttc	ataaacgcgg	ggttcgggtc	cagggctggc	1560
actctgtcga	tacccaccg	agacccatt	ggggccaata	cggccgcgtt	tcttcctttt	1620
ccccaccca	cccccaagt	tcgggtgaag	gccagggct	cgagccaac	gtcggggcgg	1680
cagggcctgc	catagccact	ggccccgtgg	gttagggacg	gggtcccca	tggggaatgg	1740
tttatggttc	gtgggggtta	ttattttggg	cgttgctggg	ggtctggtgg	acgaccag	1799

<210> 10
 <211> 6652
 <212> DNA

<213> artificial

<220>

<223> plasmid containing ACN cassette

<400> 10

cacctaaatt gtaagcggtta atatTTTgtt aaaattcgcg ttaaattttt gttaaatacag	60
ctcatttttt aaccaatagg ccgaaatcgg caaaatccct tataaatcaa aagaatagac	120
cgagataggg ttgagtgttg ttccagtttg gaacaagagt ccactattaa agaacgtgga	180
ctccaacgtc aaagggcgaa aaaccgtcta tcagggcgat ggcccactac gtgaaccatc	240
accctaataca agTTTTTTgg ggtcgaggtg ccgtaaagca ctaaatacga accctaagag	300
gagccccga tttagagctt gacggggaaa gccggcgaaac gtggcgagaa aggaaggga	360
gaaagcgaaa ggagcggggc ctaggcgct ggcaagtgtg gcggtcacgc tgcgcgtaac	420
caccacaccc gccgcgtta atgcgccgt acagggcgcg tccattcgc cattcaggct	480
gcgcaactgt tgggaagggc gatcgggtcg ggcctcttcg ctattacgcc agctggcgaa	540
agggggatgt gctgcaaggc gattaagttg ggtaacgcca gggTTTTccc agtcacgacg	600
ttgtaaaacg acggccagtg aattgtaata cgactcacta tagggcgaat tggagctcga	660
gatctagata tcgatgaatt cataacttcg tataatgtat gctatacgaa gttatggatc	720
tgtcgatcga cggatcgatc cgaacaaacg acccaacacc cgtgcgTTTT attctgtctt	780
tttattgccg atccccctcag aagaactcgt caagaaggcg atagaaggcg atgcgctgcg	840
aatcgggagc ggcgataccg taaagcacga ggaagcggtc agcccattcg ccgccaagct	900
cttcagcaat atcacgggta gccaacgcta tgtcctgata gcggtccgcc acaccagcc	960
ggccacagtc gatgaatcca gaaaagcggc cattttccac catgatattc ggcaagcagg	1020
catcgccatg ggtcacgacg agatcctcgc cgtcgggcat gcgcgccttg agcctggcga	1080
acagttcggc tggcgcgagc ccctgatgct cttcgtccag atcatcctga tcgacaagac	1140
cggcttccat ccgagtacgt gctcgctcga tgcgatgttt cgcttggtgg tcgaatgggc	1200
aggtagccgg atcaagcgta tgcagccgcc gcattgcata agccatgatg gatactttct	1260
cggcaggagc aaggtgagat gacaggagat cctgccccgg cacttcgccc aatagcagcc	1320
agtcccttcc cgcttcagtg acaacgtcga gcacagctgc gcaaggaacg cccgtcgtgg	1380
ccagccacga tagccgcgct gcctcgtcct gcagttcatt cagggcaccg gacaggtcgg	1440
tcttgacaaa aagaaccggg cggccctcgc ctgacagccg gaacacggcg gcatcagagc	1500
agccgattgt ctgttgtgcc cagtcatagc cgaatagcct ctccacccaa gcggccggag	1560
aacctgcgtg caatccatct tgttcaatgg ccgatcccat attggctgca cggatcctga	1620
acggcagagg ttacggcagt ttgtctctcc cccttcggg agccaccttc ttctccaacc	1680
gtcccggtcg cgctctcggc gcttctgagg agagaactgg ctgagtgacg ccctttatag	1740

attcgccctt	gtgtcccgcc	ccttcctttc	cgcacctccc	ttgcgctaag	gggcccggcg	1800
caccggccta	cacggagcgc	gcgcggcgga	gttggttgacg	ctagggctcc	ggctccctgg	1860
ttgggtgttc	tttctgacgc	gacaggagga	ggagaatgtc	ctggtcctgt	cgtcctcctt	1920
tcgggtttcc	cgtgcactca	aaccgaggac	ttacagaacg	gaggataaag	ttaggccatt	1980
tttactcagc	ttcggagttc	aggctcattt	ttcagctaaa	gtctctcatt	agtatcccc	2040
cacacacatc	gggaaaatgg	tttgtcctac	gcatcggtaa	tgaaggcggg	gcccttcggg	2100
tcctccggag	cgggttccgg	gggtgggggg	aaggaggag	ggacgggacg	ggcctcgttc	2160
atgaatattc	agttcaccgc	tgaatatgca	taaggcaggc	aagatggcgc	gtccaatcaa	2220
ttggaagtag	ccgttattag	tggagaggcc	ccaggacgtt	ggggcacccg	ctgtgctcta	2280
gtagctttac	ggagccctgg	cgctcgatgt	tcaagcccaa	gctttcgga	gctcgaccga	2340
acaaacgacc	caacacccgt	gcgttttatt	ctgtcttttt	attgccgctc	agctttacag	2400
tgacaatgac	ggctggcgac	tgaatattag	tgcttacaga	cagcactaca	tattttccgt	2460
cgatgttgaa	atcctttctc	atatgtcacc	ataaatatca	aataattata	gcaatcattt	2520
acgcgttaat	ggctaatacg	catcttccag	caggcgcacc	attgcccctg	tttactatc	2580
caggttacgg	atatagttca	tgacaatatt	tacattggtc	cagccaccag	cttgcatgat	2640
ctccggtatt	gaaactccag	cgcgggccat	atctcgcgcg	gctccgacac	gggcactgtg	2700
tccagaccag	gccaggatat	tctgaccaga	gtcatcctaa	aatacacaaa	caattagaat	2760
cagtagttta	acacattata	cacttaaaaa	ttttatat	accttagcgc	cgtaaatacaa	2820
tcgatgagtt	gcttcaaaaa	tcccttccag	ggcgcgagtt	gatagctggc	tggtggcaga	2880
tggcgcggca	acaccatttt	ttctgaccgg	gcaaaacagg	tagttattcg	gatcatcagc	2940
tacaccagag	acggaaatcc	atcgctcgac	cagtttagtt	acccccaggc	taagtgcctt	3000
ctctacacct	gcggtgctaa	ccagcgtttt	cgttctgcca	atatggatta	acattctccc	3060
accgtcagta	cgtgagatat	ctttaacct	gatcctggca	atttcggcta	tacgtaacag	3120
gggtgttata	gcaatcccca	gaaatgccag	attacgtata	tcctggcagc	gatcgctatt	3180
ttccatgagt	gaacgaacct	ggtcgaaatc	agtgcgttcg	aacgctagag	cctgttttgc	3240
acgttcaccg	gcatcaacgt	tttcttttcg	gatccgccgc	ataaccagtg	aaacagcatt	3300
gctgtcactt	ggtcgtggca	gcccggaccg	acgatgaagc	atgttttagct	ggcccaaagt	3360
ttgctggata	gtttttactg	ccagaccggc	cgcctgaaga	tatagaagat	aatcgcgaa	3420
atcttcaggt	tctgcgggaa	accatttccg	gttattcaac	ttgcacatg	ccgccacga	3480
ccggcaaacg	gacagaagca	ttttccaggt	atgctcagaa	aacgcctggc	gatccctgaa	3540
catgtccatc	aggttcttgc	gaacctcatc	actcgttgca	tcgaccggta	atgcaggcaa	3600

at tt t t g g t g t	a c g g t c a g t a	a a t t g g a c a c	c t t c c t c t t c	t t c t t g g g c a	t g g c c g c a g g	3660
a a a g c a g a g c	c c t g a a g c t c	c c a t c a c c g g	c c a a t a a g a g	c c a a g c c t g c	a g t g t g a c c t	3720
c a t a g a g c a a	t g t g c c a g c c	a g c c t g a c c c	c a a g g g c c c t	c a g g c t t g g g	c a c a c t g t c t	3780
c t a g g a c c c t	g a g a g a a a g a	c a t a c c c a t t	t c t g c t t a g g	g c c c t g a g g a	t g a g c c c a g g	3840
g g t g g c t t g g	c a c t g a a g c a	a a g g a c a c t g	g g g c t c a g c t	g g c a g c a a a g	t g a c c a g g a t	3900
g c t g a g g c t t	t g a c c c a g a a	g c c a g a g g c c	a g a g g c c a g g	a c t t c t c t t g	g t c c c a g t c c	3960
a c c c t c a c t c	a g a g c t t t a c	c a a t g c c c t c	t g g a t a g t t g	t c g g g t a a c g	g t g g a c g c c a	4020
c t g a t t c t c t	g g c c a g c c t a	g g a c t t c g c c	a t t c c g c t g a	t t c t g c t c t t	c c a g c c a c t g	4080
g c t g a c c g g t	t g g a a g t a c t	c c a g c a g t g c	c t t g g c a t c c	a g g g c a t c t g	a g c c t a c c a g	4140
g t c c t t c a g t	a c c t c c t g c c	a g g g c c t g g a	g c a g c c a g c c	t g c a a c a c c t	g c c t g c c a a g	4200
c a g a g t g a c c	a c t g t g g g c a	c a g g g g a c a c	a g g g t g g g g c	c c a c a a c a g c	a c c a t t g t c c	4260
a c t t g t c c c t	c a c t a g t a a a	a g a a c t c t a g	g g t t g c g g g g	g g t g g g g g a g	g t c t c t g t g a	4320
g g c t g g t a a g	g g a t a t t t g c	c t g g c c c a t g	g a g a t c c a t a	a c t t c g t a t a	a t g t a t g c t a	4380
t a c g a a g t t a	t a a g c t t t c g	c g a g c t c g a g	a t c t a g a t a t	c g a t a c c g t c	g a c c t c g a g g	4440
g g g g g c c c g g	t a c c c a g c t t	t t g t t c c c t t	t a g t g a g g g t	t a a t t t c g a g	c t t g g c g t a a	4500
t c a t g g t c a t	a g c t g t t t c c	t g t g t g a a a t	t g t t a t c c g c	t c a c a a t t c c	a c a c a a c a t a	4560
c g a g c c g g a a	g c a t a a a g t g	t a a a g c c t g g	g g t g c c t a a t	g a g t g a g c t a	a c t c a c a t t a	4620
a t t g c g t t g c	g c t c a c t g c c	c g c t t t c c a g	t c g g g a a a c c	t g t c g t g c c a	g c t g c a t t a a	4680
t g a a t c g g c c	a a c g c g c g g g	g a g a g c g g g t	t t g c g t a t t g	g g c g c t c t t c	c g c t t c c t c g	4740
c t c a c t g a c t	c g c t g c g c t c	g g t c g t t c g g	c t g c g g c g a g	c g g t a t c a g c	t c a c t c a a a g	4800
g c g g t a a t a c	g g t t a t c c a c	a g a a t c a g g g	g a t a a c g c a g	g a a a g a a c a t	g t g a g c a a a a	4860
g g c c a g c a a a	a g g c c a g g a a	c c g t a a a a a g	g c c g c g t t g c	t g g c g t t t t t	c c a t a g g c t c	4920
c g c c c c c c t g	a c g a g c a t c a	c a a a a a t c g a	c g c t c a a g t c	a g a g g t g g c g	a a a c c c g a c a	4980
g g a c t a t a a a	g a t a c c a g g c	g t t t c c c c c t	g g a a g c t c c c	t c g t g c g c t c	t c c t g t t c c g	5040
a c c c t g c c g c	t t a c c g g a t a	c c t g t c c g c c	t t t c t c c c t t	c g g g a a g c g t	g g c g c t t t c t	5100
c a t a g c t c a c	g c t g t a g g t a	t c t c a g t t c g	g t g t a g g t c g	t t c g c t c c a a	g c t g g g c t g t	5160
g t g c a c g a a c	c c c c c g t t c a	g c c c g a c c g c	t g c g c c t t a t	c c g g t a a c t a	t c g t c t t g a g	5220
t c c a a c c c g g	t a a g a c a c g a	c t t a t c g c c a	c t g g c a g c a g	c c a c t g g t a a	c a g g a t t a g c	5280
a g a g c g a g g t	a t g t a g g c g g	t g c t a c a g a g	t t c t t g a a g t	g g t g g c c t a a	c t a c g g c t a c	5340
a c t a g a a g g a	c a g t a t t t g g	t a t c t g c g c t	c t g c t g a a g c	c a g t t a c c t t	c g g a a a a a g a	5400
g t t g g t a g c t	c t t g a t c c g g	c a a c a a a a c c	a c c g c t g g t a	g c g g t g g t t t	t t t t g t t t g c	5460
a a g c a g c a g a	t t a c g c g c a g	a a a a a a a g g a	t c t c a a g a a g	a t c c t t t g a t	c t t t t c t a c g	5520


```

gggtctgacg ctcagtggaa cgaaaactca cgttaaggga ttttggcat gagattatca 5580
aaaaggatct tcacctagat ccttttaa ataaaaatgaa gttttaaatc aatctaaagt 5640
atatatgagt aaacttggtc tgacagttac caatgcttaa tcagtgaggc acctatctca 5700
gcatctgtc tatttcgttc atccatagtt gcctgactcc ccgtcgtgta gataactacg 5760
atacgggagg gcttaccatc tggccccagt gctgcaatga taccgcgaga cccacgctca 5820
ccggctccag atttatcagc aataaaccag ccagccggaa gggccgagcg cagaagtggg 5880
cctgcaactt tatccgctc catccagtct attaattgtt gccgggaagc tagagtaagt 5940
agttcgccag ttaatagttt gcgcaacgtt gttgccattg ctacaggcat cgtggtgtca 6000
cgctcgtcgt ttggtatggc ttcattcagc tccggttccc aacgatcaag gcgagttaca 6060
tgatccccc tggtgtgcaa aaaagcgggt agtccttcg gtcctccgat cgttgtcaga 6120
agtaagtgg ccgcagtgtt atcactcatg gttatggcag cactgcataa ttctcttact 6180
gtcatgccat ccgtaagatg cttttctgtg actggtgagt actcaaccaa gtcattctga 6240
gaatagtgtg tgcggcgacc gagttgctct tgcccggcgt caatacggga taataccgcg 6300
ccacatagca gaactttaaa agtgctcatc attggaaaac gttcttcggg gcgaaaactc 6360
tcaaggatct taccgctgtt gagatccagt tcgatgtaac cactcgtgc acccaactga 6420
tcttcagcat cttttacttt caccagcgtt tctgggtgag caaaaacagg aaggcaaaat 6480
gccgcaaaaa aggggaataag ggcgacacgg aaatgttgaa tactcatact cttccttttt 6540
caatattatt gaagcattta tcagggttat tgtctcatga gcggatacat atttgaatgt 6600
atthagaaaa ataaacaaat aggggttccg cgcacatttc cccgaaaagt gc 6652

```

<210> 11

<211> 2961

<212> DNA

<213> artificial

<220>

<223> pBluescript II KS(+)

<400> 11

```

ctaaattgta agcgttaata ttttgtaaa attcgcgtta aatttttgtt aaatcagctc 60
attttttaac caataggccg aaatcggcaa aatcccttat aaatcaaaag aatagaccga 120
gatagggttg agtggtgttc cagtttgtaa caagagtcca ctattaaaga acgtggactc 180
caacgtcaaa gggcgaaaaa ccgtctatca gggcgatggc cactacgtg aaccatcacc 240
ctaatcaagt tttttggggg cgaggtgccg taaagcacta aatcgaacc ctaaaggag 300
ccccgattt agagcttgac ggggaaagcc ggcgaacgtg gcgagaaagg aagggaagaa 360
agcgaaagga gcgggcgcta gggcgctggc aagtgtagcg gtcacgctgc gcgtaaccac 420

```

cacacccgcc gcgcttaatg cgccgctaca gggcgcgctcc cattcgccat tcaggctgcg	480
caactgttgga gaagggcgat cgggtcgggc ctcttcgcta ttacgccagc tggcgaaagg	540
gggatgtgct gcaaggcgat taagttgggt aacgccaggg ttttcccagt cacgacgttg	600
taaaacgacg gccagtgagc gcgcgtaata cgactcacta tagggcgaat tggagctcca	660
ccgcggtggc ggccgctcta gaactagtgg atccccggg ctgcaggaat tcgatatcaa	720
gcttatcgat accgtcgacc tcgagggggg gcccggtacc cagcttttgt tccctttagt	780
gaggggttaat tgcgcgcttg gcgtaatcat ggtcatagct gtttcctgtg tgaaattgtt	840
atccgctcac aattccacac aacatacgag ccggaagcat aaagtgtaaa gcctgggggtg	900
cctaattgagt gagctaactc acattaattg cgttgcgctc actgcccgct ttccagtcgg	960
gaaacctgtc gtgccagctg cattaatgaa tcggccaacg cgcggggaga ggcggtttgc	1020
gtattgggag ctcttcgctt tctcgtctca ctgactcgct gcgctcggtc gttcggctgc	1080
ggcgagcggg atcagctcac tcaaaggcgg taatacgggt atccacagaa tcaggggata	1140
acgcaggaaa gaacatgtga gcaaaaggcc agcaaaaggc caggaaccgt aaaaaggccg	1200
cgttgctggc gtttttccat aggtccgcc cccctgacga gcatcacaaa aatcgacgct	1260
caagtcagag gtggcgaaac ccgacaggac tataaagata ccaggcggtt cccctggaa	1320
gtccctcgt gcgctctctt gttccgacct tgcgcttac cggatacctg tccgcctttc	1380
tcccttcggg aagcgtggcg ctttctcata gctcacgctg taggtatctc agttcgggtg	1440
aggtcgttcg ctccaagctg ggctgtgtgc acgaaccccc cgttcagccc gaccgctgcg	1500
ccttatccgg taactatcgt cttgagtcca acccggttag acacgactta tcgccactgg	1560
cagcagccac tggtaacagg attagcagag cgaggatatgt aggcggtgct acagagttct	1620
tgaagtgggt gcctaactac ggctacacta gaaggacagt atttggtatc tgcgctctgc	1680
tgaagccagt taccttcgga aaaagagttg gtagctcttg atccggcaaa caaaccaccg	1740
ctggtagcgg tggttttttt gtttgcaagc agcagattac gcgcagaaaa aaaggatctc	1800
aagaagatcc tttgatcttt tctacggggg ctgacgctca gtggaacgaa aactcacgtt	1860
aagggatttt ggtcatgaga ttatcaaaaa ggatcttcac ctagatcctt ttaaattaaa	1920
aatgaagttt taaatcaatc taaagtatat atgagtaaac ttggtctgac agttaccaat	1980
gcttaatcag tgaggcacct atctcagcga tctgtctatt tcgttcatcc atagttgcct	2040
gactccccgt cgtgtagata actacgatac gggaggggctt accatctggc cccagtgtgt	2100
caatgatacc gcgagaccca cgctcaccgg ctccagattt atcagcaata aaccagccag	2160
ccggaagggc cgagcgcaga agtggtcctg caactttatc cgcctccatc cagtctatta	2220
attgttgccg ggaagctaga gtaagtagtt cgccagttaa tagtttgccg aacgttggtg	2280
ccattgctac aggcacgtg gtgtcacgct cgtcgtttgg tatggcttca ttcagctccg	2340

```

gttcccaacg atcaaggcga gttacatgat ccccatgtt gtgcaaaaaa gcggttagct 2400
ccttcggtcc tccgatcggt gtcagaagta agttggccgc agtgttatca ctcatggta 2460
tggcagcact gcataattct cttactgtca tgccatccgt aagatgcttt tctgtgactg 2520
gtgagtactc aaccaagtca ttctgagaat agtgatgagc gcgaccgagt tgctcttgcc 2580
cggcgtcaat acgggataat accgcgccac atagcagaac tttaaaagtg ctcatcattg 2640
gaaaacgttc ttcggggcga aaactctcaa ggatcttacc gctgttgaga tccagttcga 2700
tgtaaccac tcgtgcaccc aactgatctt cagcatcttt tactttcacc agcgtttctg 2760
ggtagacaaa aacaggaagg caaaatgccg caaaaaaggg aataaggcg acacggaaat 2820
gttgaatact catactcttc ctttttcaat attattgaag catttatcag ggttattgtc 2880
tcatgagcgg atacatatctt gaatgtatctt agaaaaataa acaaataagg gttccgcgca 2940
catttccccg aaaagtgcc a c 2961

```

```

<210> 12
<211> 21
<212> DNA
<213> artificial

```

```

<220>
<223> genotyping primer 1

```

```

<400> 12
gtgctggctc actgagctgg a 21

```

```

<210> 13
<211> 24
<212> DNA
<213> artificial

```

```

<220>
<223> genotyping primer 2

```

```

<400> 13
ccagtcagca gtatcatgaa tcaa 24

```

```

<210> 14
<211> 25
<212> DNA
<213> artificial

```

```

<220>
<223> genotyping primer 3

```

```

<400> 14
gcatgtacaa cacatacgat gtcca 25

```

```

<210> 15
<211> 25
<212> DNA

```

<213> artificial

<220>

<223> RT-PCR detection primer 1

<400> 15

ggagaccttt tcaagctaac aacat 25

<210> 16

<211> 25

<212> DNA

<213> artificial

<220>

<223> RT-PCR detection primer 2

<400> 16

ggtaccacca cttcaagtac ctcaa 25

<210> 17

<211> 11613

<212> DNA

<213> mus musculus

<400> 17

ggcgactttg ttgctgtagc cgctgctgca gcagcaggag ctctctgact ttaccagat 60

accaacgtcc caccggctttc cccagcatcg ggccctcccg gactgcacct aactgcaact 120

ggcatcagcg ttttgaaacg tcagaaacct gtcagaggga accgaggcca ccgggggtcgt 180

gaggaccag gatccagtga acatggtaac ctgcgtcccg gcctcagagc aggtcggctg 240

tgccgaaaga gattcccaag tttattgtga agatactggc ggactgagg ctgtgcgggt 300

tacagactgc gggagccccc aggatagtgg accccaggat gaaccaagct actgcaattc 360

agaggactct gggcagctga tggcctccta cgagggtaaa gctaggggct accaggtgcc 420

tccttttggc tggcggatct gcttggtcga cgagtttgca gagaagagga gaccttttca 480

agctaacaac atctctctca gtaatttggg aaagcacctc ggtatgggct tgaggtgagt 540

ggattccgtt gcctagaacg ccgtggttcc tatgatcca ttcaggctcc ctgcctaggt 600

tggaaggtg ggcaagctgc tgggctccta gttctattcc agccagggtat accatatccc 660

ctgcattctt tagccctgca gtttttgagg gtggaactga agaacatttt gtttttcctt 720

catccctctt ttcctagcat cttgtcttct cggagcattt agtctgaag tcagtctttc 780

ctatttaact gctggtcccc cttcccccca cccccacccc caccatgcac ttcctctttc 840

ccaggcgtcc ctttgagatt agctataatt tgtaacacgg taggagaacg ccagtctctg 900

ctgtgcttga tacagtgttt ttttttttgg aagaggaggt tctttaggct gcattaccct 960

ggcagctgac accttctgtg taccttattt aagcgcagtc ttcttcagtc ccagaattct 1020

tatgtctcta tcctcaagct ctgattcctg gaatagttga tcttggtgtg tgtcaaccct 1080

aaagagaggg	tgagaagttc	actctgttct	gtgacagatg	gcttccatac	caaaaataaa	1140
agcgaagttg	ggattgggca	gagtcctaga	gtgccaccta	cttgggagggc	tgagacagga	1200
ggataatttg	agcctaagag	ttcagggcat	acttgaacat	cacagtgaag	gcatcctccg	1260
gtaacaagtg	gggagagcta	gggatgaagc	cgggaagtag	agagcatgcc	ttctaccacg	1320
gagatgcctc	cccagacctc	ttcagatgac	tttagccagc	agtgccttgc	tggtcttcca	1380
gcgtttcctc	atatcccaga	ggttacaac	actgcagggc	aggttctaca	gaagcttctg	1440
gattccccac	tgagttcaag	gactagtgat	gaaggagcat	tccgatgaac	aggaacaggc	1500
agacagacag	acagagagca	tcattctgag	tcacttcaca	tataaacaca	gcactgggga	1560
gggaagcata	aaagtcacca	aactcagccc	ccaaagcttc	taaagtaagg	gtcccttctc	1620
tgccgcggtc	ggtgcogtgg	agctgtggtg	gggaggccac	ttacctaagc	ctagccctag	1680
gcagtgaaga	gggcctggca	ctgcctggac	atttggtctc	tgcggtggc	ccatctcaga	1740
gagtcgtccc	tccaagtaag	ttaggaagct	agtgggtcaa	gcagacaaaa	gtaacttcag	1800
gaagagtttg	tttgaaggta	cgaccgtct	gtctgtcatg	gcagagaagt	gatggtggca	1860
gtcacacggt	atcgcagcca	ggagcagaga	gcaatgaagg	ctagaactcg	accctctttc	1920
tcctttctat	catgactcca	ggacccaac	ccatggaatg	tagtcacca	cagttaaggc	1980
gcatcttccc	atttccatta	acctaaagta	ttcattcctc	acaggcacgt	ccataggctt	2040
ctctcttttg	tggttctaga	tctggccaag	ttgtcagtag	gaattaacaa	tcattgggctg	2100
gaaagatggc	ttagtgggta	agagcactga	ctgctcttcc	agaggtcctg	agttcaaadc	2160
tcagcaacca	catggtggct	cacaaccatc	tgtaatgaga	tctgatgtcc	tcttctgggtg	2220
tgtctggaga	tagcgactat	gttacattaa	ataaatagaa	cttaaaaaga	gagagagaga	2280
gaacaatcat	attgttccag	ccaaattcta	accccaaadc	ctttgtgtca	aaatgggatc	2340
caccgtactg	agataggcac	atgtggttag	gataagggtc	agaacaggta	tgcatctatc	2400
ctggcctctt	agcctgctaa	gtaggagctg	agttacagag	gcttcaagct	cttgctcagc	2460
cccttagacc	ttgtccacac	agagctttgg	gaatgggcta	aggctcctaca	cggaggagag	2520
agcagagggg	gtgattcaga	acggtcggtt	ttaagctgga	attgatacta	ttgaaaaaaa	2580
ctgaatatct	caggaatgac	cagcaaccaa	actaaaggag	ggaacccttc	agagttcaac	2640
tgaggggtag	cctcataggg	gtgctggcag	gatagttatt	agactttcaa	cttagagttc	2700
aattttgatt	gttcttcctt	ttgccagagt	cagctcactt	aataaatgtt	tactaccaga	2760
gcggcctttg	ttctgcccac	ttttgtatct	tgtaattcgt	ctctgatcct	tgctggcttc	2820
ccattgctgt	cctatttcct	gtaaactggc	agagggcctt	cagccttgct	cccaccccat	2880
ccttagtctc	ccatgccttt	tgccccaccc	caggacatgc	cagtcctatt	cttttttagtg	2940
tatttccctt	ctcaactccg	gatccactct	gtcttccatt	gctctttcta	tgtctactgt	3000

ttgtacatcc attcatatgt aaattcacca tcaagtatta tgggatgcag gccctgtact	3060
tagagctgtg gggaaacatcc acctagtctt ggtcattgtt ccttaaccca aggaacttaa	3120
aaatttgtca tgctcatgtg aggaacacac tggcataaca aggcagtatc taattaggag	3180
ctaagacact gtgtagcaat agtcatacct ggcacagata ttccacttta tggctttctt	3240
atctgttagg ttatttgatc tttccatgat tatatgaggt agctagggca gaagttatcc	3300
ctattccgca caggaggaaa caaaagcttg gctgacataa ctaattactt gtttagactg	3360
aatgttgagc atgaaatgat tggttaagga gaagagtgga agtgggaaag acgggtgggc	3420
gggactcgct tagtgacca tcctgaatga gagtgggtaa ggaataagat tagtaggcag	3480
gctgaggcag atgtcctagc cgtgagaata cagacatcta ctctatgtg accgacagcc	3540
ctgatcattt tcccgttggc tacagagcaa ggcaagaaca gggaaacact gagacttgtt	3600
agaaagcttt actattgtga gtattctgac tttgttttgt tgagaaaggt tctcactttg	3660
acgccccggt tgtctcgga ctcattacat agcccaggct agcctcaacc ccaagtgttg	3720
gtttgacaga tatgagccat catgaccaag ttaatttact gggatattttg gaagaacaaa	3780
atctggaaac tgaaaattaa atgctaaagt ggggatgaag cttaagagga aaaggtcccg	3840
aatatgtgca catcagttat cttcagctaa ggtggcttcc tttctacctg acatattttc	3900
caatttttca ccttccataa atgaaatcgt ttttaaaaga gggagtcttt ttggcagcct	3960
ctgcttgat gtgtggagga ggggtgtagct agcccgggaa ggcaactgac cttaacacag	4020
acaaaagctc ctgaggtttg agctaaagcg gtggtagtgg agttagaaga atcgcttctc	4080
tctcagaata gagaaataag ggcagcctac actggtacct gggcagctgg gaagataagg	4140
gaccttgaac tggagcagtc agaggaagat ggcttgggag atactagtga tgggtcggcc	4200
ctagggtgtt gtcttagaca gtctcaccat atagcccatg ctggcctcaa acttgtaatg	4260
cctctgcctc agctttcaga atgctaagat ttttaggaatg ttcatggaat ccagcatcct	4320
tgggacactg agttggagat cacacagagg tgacaaagga aaggacggtg agtgtagctt	4380
acaagaaaca agccactcac cttacactca cacagacact tgctcctcag gtacttgaag	4440
tgggtgtacc gaaagacca cgtggaaaag aagaccctt tcatcgacat gctcaattct	4500
ctaccctga gacagatcta tggtagtct cagctcagct gcccttttca aagagggtcc	4560
aacttctgtg cttcaggcaa aaaggctcct agtttatgca tggctccatt ccctaagttt	4620
ttaaagatgt gggcttgctt tcttcttcca gttctacacc agccatcctg actttctttc	4680
taggttgtcc cctgggtggc attggaggag gcactatcac ccggggctgg agaggccagt	4740
tctgtcgttg gcagctcaac cctggaatgt accagcacca gacagtcatt gcagaccaag	4800
taaggaaggg ggttgggcag gcagaggagt gactcttggc tagcatagga tgtggcagtt	4860

aggcatccac	atggtccagt	tcagtaaatg	ctttcagaat	gcgtgtgccc	cgctcagtac	4920
taggatggac	agttggttaa	agatgaacac	agaacccatg	ttccttgaaa	gaataaagaa	4980
acagcctgat	aaatctcatg	tactaatctt	ctgagcacta	gctcagtcag	taccacacaa	5040
agactagaaa	tttctggatc	atttaaactg	gctaaaagaa	catttcatcc	tgcatggagt	5100
ggtacatcct	tataatccta	atTTTTggga	ggcagatgca	aaagaatcag	gagttcaagg	5160
ctagcctggg	ctacttaaga	caaaacaaaa	tggtgggcag	taagatggct	caacaggtaa	5220
agccacacag	gtttgacaac	ctgcattcca	tccctggacc	tgcaaggcga	gaggaagaga	5280
accaggccct	acaaactgtc	tttgaagctt	catgcataac	tttactgttc	acggtggctt	5340
ctgcatgctg	tgggatcggg	gtaaagatca	gaagacagcc	tgtaggaagg	agtgggctct	5400
caccttctac	catgtgggct	tgggagatta	aactcagggt	gtgaggcttg	gtgacaagtg	5460
ccttcactgg	cttcagccat	cttggtctggc	cctcaatttt	ttttttttaa	agaatattcg	5520
aaaagactga	aagagaaaaa	gtgaaaccta	aaaagccatg	gtgggaaaag	gcgcacagtg	5580
ctaagtctcc	ttccctagat	tagtaacgct	ttagcctagg	ttagcgccct	tgccgcagac	5640
ctctgatggg	cttcccagga	ccccctttaa	ctcttctctc	tagccttctc	cgctcatatc	5700
tgggccttaa	ttgtcagtgt	atgccctgcc	cttcaccaag	gctctcaaag	gacctcccct	5760
tctgagttag	caagtcccc	tttcccgagc	ttccagctta	cctccaaagg	tgagataact	5820
ggcagatctc	aaactcacca	atgacagtat	ccttctcaat	tcaagtttac	tggctgtgct	5880
caatatccag	tctctaccct	aggcccatgt	ctcatctctt	ccgcattgca	agccaagttt	5940
agaaacatgg	gtctgaagta	actattgcct	gtgtactgtg	ttaatacaact	gtggaaggct	6000
ttggggatat	ttatatTTTT	aaaaatccta	caaagtatca	ttatcatcat	tttacagatg	6060
aggagacagg	atccaggggg	cattagtaac	ctgctcaaag	cagcatggta	gccagtgtct	6120
tctatgacaa	ttgttgggtg	tcctaaccat	tggtacttta	ccagcaacat	ggaaaattac	6180
tttatggcta	cgccacatc	tgtaatctcc	aggactgagg	cagaaggatc	gccagttcaa	6240
ggccagcctg	agctacaaag	caagatccta	tctcaaaaga	aatagaaggg	aaaggaaact	6300
ttatatcaat	aacaacacgg	agcgtagttt	ggagtaacgg	aggagattaa	gccctcagca	6360
tttctcctcc	ccggagccta	aggttatact	ggagaagtaa	gacttgggga	caatggagac	6420
tgccaccatg	aggtggggcc	acagtagact	gaagcagcag	accatactac	agagactttg	6480
cacacatgcc	cactctatga	ggtccacttc	agtaatctag	aaatgacccc	tgccctcaga	6540
gtgagcagtg	ggaaaattgg	agacacagga	gagcaaatga	aaacactaca	acaataattt	6600
accaaactct	gaagaggaat	aggatgtaac	agaaagggtc	ctgtggggaga	ggaggaggaa	6660
gaggaagtac	ctgacctagg	ccttgaagga	tgaagggatc	tggctggatg	gagatgggca	6720
gactcgtgac	gaggaagtga	ggggtgctca	cagactggag	agagtcttgt	atttgtgtga	6780

ccaggctaga	gttttagcatt	cagcctgaat	gctataggag	tcactaaaac	acgctaggca	6840
gggggttgga	catactgatt	tgttacatca	ttttctgcta	ccaagctaag	aggcagagat	6900
agcataagcc	tgattaatta	aggcactgag	atcaggcatg	aagggaggag	gtctaggagc	6960
tggtctgcacg	aggaggaagt	aggtcaggtg	ctggctcact	gagctggaag	gcaggcctgg	7020
agacaaccta	aggctggtgg	tggtgacagt	gacagggctg	caaaggagta	ctttgcggcc	7080
ggggaccaag	tgtgtgttgc	ctgtgggtta	cttattccag	cctgtctgct	ctcttgatca	7140
agtttatagt	atgcttgctg	cgagatgggc	ggactgtgta	ccagcaagtt	ctgtccttgg	7200
agcttccaaa	tgtcctgcgc	agctggaact	ggggcctgtg	tggttacttt	gctttctacc	7260
acgccctcta	tccccgagcc	tggacggtct	atcagcttcc	tggccagaat	gtcaccctca	7320
cctgtcgcca	ggtcacacct	atcttgacct	atgactacca	ggtgaggatt	cctcctgttt	7380
gcttcattcc	atgccctccc	ccagatccac	tgctgctaga	aattgtgtaa	cctatgaaag	7440
ggagaggctg	gagctgtgaa	catcacactg	cttccgagac	taagtcgtcc	tagctgtcta	7500
gacctcctgg	gaggccggtt	tcctgggaac	atggagatgc	acagaagaca	gaagggaatg	7560
tagtggggac	aatttgagga	ggtactctct	ggccactcct	aaggatacac	tgagactgag	7620
tcccatctcc	catcccagga	cagcagtctc	cctgtaggag	tctttgtgtg	ggatgtagaa	7680
aacgaaggag	atgagactct	ggacgtttcc	atcacgttct	ccatgcggaa	tggactagga	7740
ggcgaagatg	atgcggccgg	gagtttgtgg	aatgagccct	tccgcctgga	acagggcggg	7800
acgactgttc	aggggctcct	cttgcatcat	ccaacccctc	cgaaccccta	caccatggct	7860
gtggctgcac	gatgcacggt	gagggacaag	tctgctctgt	acctctcctc	gggagcccct	7920
gccctcatga	cctgaccoga	acctacttta	cctctaacgg	tcttccattt	cgtgaactcc	7980
catcctcatc	acagccctca	gcctctagaa	cttgagggtg	acagtgttta	aggagccgaa	8040
gagctagtca	gaatccagtg	tgcttggaact	tgcctttaca	gagtctctgg	cttcttaaca	8100
ggcagatacc	acggtaaccc	acaccacagc	ctttgacccc	aatggcactg	gacagcaggt	8160
gtggcaggac	ctacttcagg	atggacagct	ggactcccct	gctggtgatg	gggggtttga	8220
ctgttgggaa	gaaaggctct	gtcctgtctt	aggaccaggg	gtggaagacc	tgataatgaa	8280
tgggccttgt	cttcaaatta	gaagtccctg	gctttggggg	tcaagggggg	gcctgtgctg	8340
attcctctgt	gtccttagg	ccaaagcacc	ccaacacaga	aaggagaggg	tatcgctggg	8400
gctgtatgcg	tctctagcaa	gctgttacct	cgaagccggg	gctgcttgga	gttctcactg	8460
gcttgggata	tgccctaagat	catgtttgga	gctaaaagcc	aagtccacta	caggtaaagt	8520
cagggatcca	aagaccctgt	ggcaggggcg	tctagcctag	agcatctggt	cttatgcctt	8580
tctttccatc	ccaggcggta	tacacggttc	tttggttcag	atggtgatgt	ggcgctgcc	8640

ctgagccact atgcaactgtg ccactatgca gactgggagg acagaatctc agcctggcag	8700
aaccagtagc tggatgacag gtgccctctt gtcgtttttt cgcaggcact cactccaaat	8760
atgacttgct ctgcttccct agcagtctgt cgggctgcmc tgggattcac agtgtcccta	8820
cttcaactcta gaatccccctc tatcctggga ggctcataaa gctctatccc ctctcttgg	8880
cttcccagaa ccttgctgc ctggtacaaa tctgcaactgt tcaatgaact gtacttctgt	8940
gccgatggag gcacagtgtg gctggaagtt cccgcagact ccctaccaga ggggctggga	9000
gggagtagtc gtcagcttcg ctctactctg caggactatg ggcgatttgg ctatcttgaa	9060
ggtatggcgt gccagtggac tggcatgggt cagagctagg tgtgtcctac ataatgcagg	9120
atgacagacg ttgcctgtcc tgagatactg acaggataag gggagaattg ggaaaacgga	9180
aagatgagtg ggcctacttc cagctttgaa gagctaccga gcagaagccg gcattctggc	9240
aacagtgtct ctctcttctc ccaggccagg agtaccgcat gtacaacaca tacgatgtcc	9300
acttttatgc gtcctttgcc ctctcatgc tgtggcccaa acttgagctc agtcttcagt	9360
atgatatggg taacgtctct gctttcccta ctctgagct ctattgtct ctcaataac	9420
atgtctccc ctctctctg agcatgcccg catctggctc cttagttctc tggggtcaca	9480
cacacagcac tggatccac cccaagcctg ccattccct gctttccctc acgtacttgt	9540
gtctccgctc cccagctct ggcaactttg aaggaggacc tgaccggcg acggtacctg	9600
atgagtggag tggtagcacc tgtgaaaagg aggaacgtca tccctcatga cattggggat	9660
ccgggtgaga ttccgtctgt cagtctctat acctgctatc ctgtccactg acacactgaa	9720
ccaggtcccc tccccccaa cagatgatga gccatggctc cgggtcaacg catatttgat	9780
tcatgatact gctgactgga aggacctgaa cctgaagttt gtattgcaaa tttatcgga	9840
ctattacctg acgggtgatc aaggcttct ggaggacatg tggcctgtgt gtctggtaag	9900
gaacgagaac tgtgtccagt ataccaggga tgtagctgga gtcttgggag aaccagact	9960
ttctttctta gaacctaggt ctctagtgtc ttgatccctc tctaggctgt gatggagtcc	10020
gaaatgaagt ttgacaagga ccaagatgga ctcatgaga atggaggcta cgcagaccag	10080
acctatgatg catgggtcac cacaggcccc aggtttggg gtagggattt ccaggtctga	10140
ggtgaagacc cgggcatgtg aggatgccgt gtagagcggc cggctctact ccagccactg	10200
ttcccacca gtgcttactg cggagggtg tggctggcgg cagtggctgt aatggttcag	10260
atggctgttc tgtgtggggc ccaagatgtc caggagaggt ttgcttccat tctctgccga	10320
ggccgagaag cttatgagag actgctgtgg aacggtagt aaaagcaacc tggggcagct	10380
taaaacccaa ctacgggata caagcaactt gactttgctc tttctctatt ccaggacgt	10440
attacaacta cgacagcagc tccatcctc agtctcggag catcatgtct gaccagtgtg	10500
ctgggcagtg gttcctgagg gcctgcggcc tgggagaagg agacactgaa gtgagaggct	10560

```

ggagaagcca gaagtctggg tttccctgga ggtgggaggc aagtctgaga ctccaccttt 10620
gctctccctc caggtatttc ctaccctgca tgtggtccgt gctctccaaa ccatctttga 10680
actcaacgtc caagcctttg caggaggagc catggggggc gtgaacggga tgcaccctca 10740
tggtgtccct gatagatcca gtgtgcagtc tgatgaagtc tgggtgggtg tggtctatgg 10800
gctggcagcc accatgatcc aagaggtaat gaattctctt cccagccctt caccatttgt 10860
actgaggtcc agaaaacttc ctcagccact aactttattc caagaacacc ctactgcctg 10920
ccatcttatc cgtccacaga gcgcccttct ccctaataag tgttccacct cttgccttta 10980
agttcttgcc tttagggcga acggcctcct gtcttctctg ctcagctaag gtaattgtgc 11040
caagagtcag ttattatgtg tgacttctac gtctcccccac agggcctgac ttgggaaggt 11100
ttccggacag ctgaaggctg ttaccgcaact gtatgggaac gcctgggcct ggctttccag 11160
accccagagg catactgcca gcaacaagtg ttccgctccc tggcctacat gcggccactg 11220
agcatctggg ccatgcagct ggccctgcaa cagcagcagc ataaaaagag ccgcaggcca 11280
tcagtcacac aaggcacggg actaagcaca cagcctgaat gtggaccaa gagatcgctg 11340
gcaaacctca attcagagtg atccctctga actgtggagg cccagcctcc aactggacc 11400
tcctccttcc tcccacaagt cctgcagccc tgagccaata ggacaatgc gccctcttc 11460
cttcccagct gtgccagtaa aaaggggctg aggaaccact tatttatctt ttaccctacc 11520
cagtccttcc atggatgaag tattcaaggc cagtaaagt ctccaaatct attcacgggg 11580
caacagatac atatgggtat aaataaaata ctc 11613

```

<210> 18

<211> 17790

<212> DNA

<213> Artificial

<220>

<223> Gba2 knock-out vector

<400> 18

```

gaattccagg agcagagagc aatgaaggct agaactcgac cctctttctc ctttctatca 60
tgactccagg accccaaccc atggaatgta gtcaccaca gttaaggcgc atcttcccat 120
ttccattaac ctaaagtatt cattcctcac aggcacgtcc ataggcttct ctctttggtg 180
gttctagatc tggccaagtt gtcagtagga attaacaatc atgggctgga aagatggctt 240
agtggttaag agcactgact gctcttccag aggtcctgag ttcaaattct agcaaccaca 300
tggtggctca caaccatctg taatgagatc tgatgtcctc ttctggtgtg tctggagata 360
gcgactatgt tacattaaat aaatagaact taaaaagaga gagagagaga acaatcatat 420
tgttccagcc aaattctaac cccaaatcct ttgtgtcaaa atgggatcca ccgtactgag 480

```

ataggcacat	gtgggttagga	taagggtcaag	aacagggtatg	cattcatcct	ggcctcttag	540
cctgctaagt	aggagctgag	ttacagaggc	ttcaagctct	tgctcagccc	cttagacctt	600
gtccacacag	agctttggga	atgggctaag	gtcctacacg	gaggagagag	cagagggggt	660
gattcagaac	ggtcgttttt	aagctggaat	tgatactatt	gaaaaaaact	gaatatctca	720
ggaatgacca	gcaaccaaac	taaaggaggg	aacccttcag	agttcaactg	aggggtagcc	780
tcataggggt	gctggcagga	tagttattag	actttcaact	tagagttcaa	ttttgattgt	840
tcttcctttt	gccagagtca	gctcacttaa	taaatgttta	ctaccagagc	ggcctttgtt	900
ctgcccattt	ttgtatcttg	taattcgtct	ctgatccttg	ctggcttccc	attgctgtcc	960
tatttcctgt	aaactggcag	agggccttca	gccttgctcc	caccccatcc	ttagtctccc	1020
atgccttttg	ccccacccca	ggacatgcca	gtcctattct	ttttagtgtg	tttcccttct	1080
caactccgga	tccactctgt	cttcatttgc	tctttctatg	tctactgttt	gtacatccat	1140
tcatatgtaa	attcaccatc	aagtattatg	ggatgcaggc	cctgtactta	gagctgtggg	1200
gaacatccac	ctagtcttgg	tcattgttcc	ttaacccaag	gaacttaaaa	atttgtcatg	1260
ctcatgtgag	gaacacactg	gcataacaag	gcagtatcta	attaggagct	aagacactgt	1320
gtagcaatag	tcatacctgg	cacagatatt	ccactttatg	gctttcttat	ctgttaggtt	1380
atttgatctt	tccatgatta	tatgaggtag	ctagggcaga	agttatccct	attccgcaca	1440
ggaggaaaca	aaagcttggc	tgacataact	aattacttgt	ttagactgaa	tgttgagcat	1500
gaaatgattg	gttaaggaga	agagtggaag	tgggaaagac	gggtgggcgg	gactcgctta	1560
gtgacccatc	ctgaatgaga	gtgggtaagg	aataagatta	gtaggcaggc	tgaggcagat	1620
gtcctagccg	tgagaataca	gacatctact	cctatgtgac	cgacagccct	gatcattttc	1680
ccgttggcta	cagagcaagg	caagaacagg	gaaacactga	gacttgtag	aaagctttac	1740
tattgtgagt	attctgactt	tgttttggtg	agaaagggtc	tcactttgac	gccccggttg	1800
tctcggaact	cattacatag	cccaggctag	cctcaacccc	aagtgttggt	ttgacagata	1860
tgagccatca	tgaccaagtt	aatttactgg	gtattttgga	agaacaaaat	ctggaaactg	1920
aaaattaaat	gctaaagtgg	ggatgaagct	taagaggaaa	aggtcccgaa	tatgtgcaca	1980
tcagttatct	tcagctaagg	tggcttcctt	tctacctgac	atattttcca	atttttcacc	2040
ttccataaat	gaaatcgttt	ttaaaagagg	gagtcttttt	ggcagcctct	gcttgatgt	2100
gtggaggagg	gtgtagctag	cccgggaagg	caactgacct	taacacagac	aaaagctcct	2160
gaggtttgag	ctaaagcggt	ggtagtggag	ttagaagaat	cgcttctctc	tcagaataga	2220
gaaataaggg	cagcctacac	tggtacctgg	gcagctggga	agataaggga	ccttgaactg	2280
gagcagtcag	aggaagatgg	cttgggagat	actagtgatg	ggtcggccct	aggggtgttg	2340
cttagacagt	ctcaccatat	agcccatgct	ggcctcaaac	ttgtaatgcc	tctgcctcag	2400

ctttcagaat gctaagat	tttaggaatggt catggaatcc	agcatccttg ggacactgag	2460
ttggagatca cacagaggtg	acaaaggaaa ggacggtgag	tgtagcttac aagaaacaag	2520
ccactcacct tacactcaca	cagacacttg ctcctcaggt	acttgaagtg gtggtaccga	2580
aagaccacg tggaaaagaa	gaccctttc atcgacatgc	tcaattctct acccctgaga	2640
cagatctatg gtgagtctca	gctcagctgc ccttttcaaa	gaggggtccaa cttctgtgct	2700
tcaggcaaaa aggctcctag	tttatgcatg gctccattcc	ctaagttttt aaagatgtgg	2760
gcttgctttc ttcttccagt	tctacaccag ccacctgac	tttctttcta ggttgtcccc	2820
tgggtggcat tggaggaggc	actatcaccg ggggctggag	aggccagttc tgtcgttggc	2880
agctcaaccc tggaatgtac	cagcaccaga cagtcattgc	agaccaagta aggaaggggg	2940
ttgggcaggc agaggagtga	ctcttggtta gcataggatg	tggcagttag gcatccacat	3000
ggtccagttc agtaaagtct	ttcagaatgc gtgtgccccg	ctcagtacta ggatggacag	3060
ttggttaaa atgaacacag	aacccatggt ccttgaaaga	ataaagaaac agcctgataa	3120
atctcatgta ctaatcttct	gagcactagc tcagtcagta	cccaccaaag actagaaatt	3180
tctggatcat ttaaactggc	taaaagaaca tttcatcctg	catggagtgg tacatcctta	3240
taatccta attttggagg	cagatgcaaa agaatacagga	gttcaaggct agcctgggct	3300
acttaagaca aaacaaaatg	gtgggcagta agatgggtca	acaggtaaag ccacacaggt	3360
ttgacaacct gcattccatc	cctggacctg cagggcgaga	ggaagagaac caggccctac	3420
aaactgtctt tgaagcttca	tgcataactt tactgttcac	ggtggcttct gcatgctgtg	3480
ggatcgggtg aaagatcaga	agacagcctg taggaaggag	tgggctctca ccttctacca	3540
tgtgggcttg ggagattaaa	ctcaggttgt gaggcttggt	gacaagtgcc ttcactggct	3600
tcagccatct tggctggccc	tcaatttttt ttttttaaag	aatattcgaa aagactgaaa	3660
gagaaaaagt gaaacctaaa	aagccatggt gggaaaaggc	gcacagtgtc aagtctcctt	3720
ccctagatta gtaacgcttt	agcctaggtt agcgcccttg	ccgcagacct ctgatgtctc	3780
tcccaggacc ccctttaact	cttctctcta gccttcctcg	ctcatatctg ggccttaatt	3840
gtcagtgtat gccctgccct	tcaccaaggc tctcaaata	gacacacatg cctccccttc	3900
agtccccctt tcccagagctt	ccagcttacc tccaaagggt	agataactgg cagatctcaa	3960
actcaccaat gacagtatcc	ttctcaattc aagtttactg	gctgtgctca atatccagtc	4020
tctaccctag gcccatgtct	catctcttcc gcattgcaag	ccaagtttag aaacatgggt	4080
ctgaagtaac tattgcctgt	gtactgtgtt aatacactgt	ggaaggcttt ggggatattt	4140
atatttttaa aaatcctaca	aagtatcatt atcatcattt	tacagatgag gagacaggat	4200
ccagggggca ttagtaacct	gctcaaagca gcatggtagc	cagtgtcttc tatgacaatt	4260

gttgggtggtc ctaaccattg gtactttacc agcaacatgg aaaattactt tatggctacg	4320
cccacatctg taatctccag gactgaggca gaaggatcgc cagttcaagg ccagcctgag	4380
ctacaaagca agatcctatc tcaaaagaaa tagaagggaaggaa aggaaacttt atatcaataa	4440
caacacggag cgtagtttgg agtaacggag gagattaagc cctcagcatt tctcctcccc	4500
ggagcctaag gttatactgg agaagtaaga cttgggggaca atgggagactg ccaccatgag	4560
gtgggcccac agtagactga agcagcagac catactacag agactttgca cacatgcccc	4620
ctctatgagg tccacttcag taatctagaa atgaccctg ccctcagagt gagcagtggg	4680
aaaattggag acacaggaga gcaaataaaa aactacaac aataatttac caaatcctga	4740
agaggaatag gatgtaacag aaaggtccct gtgggagagg aggaggaaga ggaagtacct	4800
gacctaggcc ctgaaggatg aagggatctg gctggatgga gatgggcaga ctctgtacga	4860
ggaagtgagg ggtgctcaca gactggagag agtcttgtat ttgtgtgacc aggctagagt	4920
ttagcattca gcctgaatgc tataggagtc actaaaacac gctaggcagg ggttggcaca	4980
tactgatttg ttacatcatt ttctgtacc aagctaagag gcagagatag cataagcctg	5040
attaattaag gcactgagat caggcatgaa gggaggaggt ctaggagctg gctgcacgag	5100
gaggaagtag gtcagggtgct ggctcactga gctggaaggc aggcctggag acaacctaag	5160
gctggtggtg gtgacagtga cagggtgca aaggagtact ttgcggccgg ggaccaagtg	5220
tgtgttgccct gtgggttact tattccagcc tgtctgtctt cttgatcaag tttatagtat	5280
gcttgctgcg agatgggagg actgtgtacc agcaagttct gtccttggag cttccaaatg	5340
tcttgctgcg ctggaactgg ggctgtgtg gttactttgc tttctaccac gccctctatc	5400
cccagcctg gacggtctat cagcttcctg gccagaatgt caccctcacc tgtcgccagg	5460
tcacacctat cttgcctcat gactaccagg tgaggattcc tctgtttgc ttcattccat	5520
gcgaattcca cctaaattgt aagcgtaaat attttgtaaa aattcgcggt aaatttttgt	5580
taaatcagct cattttttta ccaataggcc gaaatcggca aaatccctta taaatcaaaa	5640
gaatagaccg agatagggtt gagtgtgtt ccagtttgga acaagagtcc actattaaag	5700
aacgtggact ccaacgtcaa agggcgaaaa accgtctatc agggcgatgg ccactacgt	5760
gaaccatcac cctaatacag ttttttggg tcgaggtgcc gtaaagcact aaatcggaac	5820
cctaaaggga gccccgatt tagagcttga cggggaaagc cggcgaacgt ggcgagaaag	5880
gaagggaaga aagcgaaagg agcgggcgct agggcgctgg caagtgtagc ggtcacgctg	5940
cgcgtaacca ccacaccgc cgcgcttaat gcgccgctac agggcgcgtc ccattcgcca	6000
ttcaggctgc gcaactgttg ggaagggcga tcggtgcggg cctcttcgct attacgccag	6060
ctggcgaaag ggggatgtgc tgcaaggcga ttaagttggg taacgccagg gttttccag	6120
tcacgacgtt gtaaaacgac ggccagtga ttgtaatac actcactata gggcgaattg	6180

gagctcgaga tctagatata gatgaattca taacttcgta taatgtatgc tatacgaagt	6240
tatggatctg tcgatcgacg gatcgatccg aacaaacgac ccaacacccg tgcgttttat	6300
tctgtctttt tattgccgat cccctcagaa gaactcgtca agaaggcgat agaaggcgat	6360
gcgctgcgaa tcgggagcgg cgataccgta aagcacgagg aagcggtcag cccattcgcc	6420
gccaaagctct tcagcaatat cacgggtagc caacgctatg tcctgatagc ggtccgccac	6480
accagccgg ccacagtcga tgaatccaga aaagcggcca ttttccacca tgatattcgg	6540
caagcaggca tcgccatggg tcacgacgag atcctcgccg tcgggcatgc gcgccttgag	6600
cctggcgaa agttcggctg gcgcgagccc ctgatgctct tcgtccagat catcctgatc	6660
gacaagaccg gcttccatcc gagtacgtgc tcgctcgatg cgatgtttcg cttggtggtc	6720
gaatgggcag gtagccggat caagcgtatg cagccgccgc attgcatcag ccatgatgga	6780
tactttctcg gcaggagcaa ggtgagatga caggagatcc tgccccggca cttcgcccaa	6840
tagcagccag tcccttccc cttcagtgc aacgtcgagc acagctgcgc aaggaacgcc	6900
cgctcgtggc agccacgata gccgcgctgc ctgcctctgc agttcattca gggcaccgga	6960
caggtcggtc ttgacaaaa gaaccgggcg cccctgcgct gacagccgga acacggcggc	7020
atcagagcag ccgattgtct gttgtgcca gtcatagccg aatagcctct ccaccaagc	7080
ggccggagaa cctgcgtgca atccatcttg ttcaatggcc gatcccata tggctgcacg	7140
gatcctgaac ggcagagggt acggcagttt gtctctcccc cttccgggag ccaccttctt	7200
ctccaaccgt cccggtcgcg ctctcgccgc ttctgaggag agaactggct gagtgcgcc	7260
ctttatagat tcgcccttgt gtcccgcccc ttcttttccc gccctccctt gcgctacggg	7320
gccgcccga ccggcctaca cgagcgcgc gcggcgagat tggtgacgct agggctccgg	7380
ctccctggtt ggggtgttctt tctgacgca caggaggagg agaatgtcct ggtcctgtcg	7440
tcctcctttc gggtttccc tgactcaaa ccgaggactt acagaacgga ggataaagtt	7500
aggccatttt tactcagctt cgaggttcag gctcattttt cagctaaagt ctctcattag	7560
tatccccca cacacatcgg gaaaatggtt tgtcctacgc atcggtaatg aaggcggggc	7620
ccttcgggtc ctccggagcg ggttccgggg gtggggggaa ggaggaggag acgggacggg	7680
cctcgttcat gaatattcag ttcaccgctg aatatgcata aggcaggcaa gatggcgcgt	7740
ccaatcaatt ggaagtagcc gttattagtg gagaggcccc aggacgttgg ggcaccgcct	7800
gtgctctagt agctttacgg agccctggcg ctcgatgttc aagcccaagc tttcgcgagc	7860
tcgaccgaac aaacgaccca acaccgtgc gttttattct gtctttttat tgccgctcag	7920
ctttacagtg acaatgacgg ctggcgactg aatattagt cttacagaca gcactacata	7980
ttttccgtcg atgttgaaat cttttctcat atgtcaccat aaatatcaaa taattatagc	8040

aatcatttac	gcgttaatgg	ctaatcgcca	tottccagca	ggcgcaccat	tgcccctggt	8100
tcactatcca	ggttacggat	atagttcatg	acaatattta	cattggtcca	gccaccagct	8160
tgcatgatct	ccggtattga	aactccagcg	cgggccatat	ctcgcgcggc	tccgacacgg	8220
gcactgtgtc	cagaccaggc	caggtatctc	tgaccagagt	catcctaaaa	tacacaaaca	8280
attagaatca	gtagtttaac	acattatata	cttaaaaatt	ttatatattac	cttagcgccg	8340
taaatcaatc	gatgagttgc	ttcaaaaatc	cottccaggg	cgcgagttga	tagctggctg	8400
gtggcagatg	gcgcggcaac	accatttttt	ctgacccggc	aaaacaggta	gttattcgga	8460
tcatcagcta	caccagagac	ggaaatccat	cgctcgacca	gtttagttac	cccaggcta	8520
agtgcccttc	ctacacctgc	ggtgctaacc	agcgttttcg	ttctgccaat	atggattaac	8580
attctcccac	cgtcagtagc	tgagatatct	ttaaccctga	tcctggcaat	ttcggctata	8640
cgtaacaggg	tgttataagc	aatccccaga	aatgccagat	tacgtatatc	ctggcagcga	8700
tcgctatttt	ccatgagtga	acgaacctgg	tcgaaatcag	tcggttcgaa	cgctagagcc	8760
tgttttgcac	gttcaccggc	atcaacgttt	tcttttcgga	tccgccgcat	aaccagtga	8820
acagcattgc	tgtcacttgg	tcgtggcagc	ccggaccgac	gatgaagcat	gtttagctgg	8880
cccaaagtgt	gctggatagt	ttttactgcc	agaccgcgcg	cctgaagata	tagaagataa	8940
tcgcgaacat	cttcaggttc	tgcgggaaac	cattttccgg	tattcaactt	gcaccatgcc	9000
gcccacgacc	ggcaaacgga	cagaagcatt	ttccaggat	gctcagaaaa	cgcttgccga	9060
tcctgaaca	tgtccatcag	gttcttgcca	acctcatcac	tcgttgcatc	gaccggtaat	9120
gcaggcaaat	tttgggtgtac	ggtcagtaaa	ttggacacct	tcctcttctt	cttgggcatg	9180
gccgcaggaa	agcagagccc	tgaagctccc	atcaccggcc	aataagagcc	aagcctgcag	9240
tgtgacctca	tagagcaatg	tgccagccag	cctgaccca	agggccctca	ggcttgggca	9300
cactgtctct	aggacctga	gagaaagaca	taccattttc	tgcttagggc	cctgaggatg	9360
agcccagggg	tggttgggca	ctgaagcaaa	ggacactggg	gctcagctgg	cagcaaagtg	9420
accaggatgc	tgaggctttg	accagaagc	cagaggccag	aggccaggac	ttctcttgg	9480
cccagtccac	cctcaactcag	agctttacca	atgccctctg	gatagttgtc	gggtaacggt	9540
ggacgccact	gattctctgg	ccagcctagg	acttcgccat	tccgctgatt	ctgctcttcc	9600
agccactggc	tgaccggttg	gaagtactcc	agcagtgcct	tggcatccag	ggcatctgag	9660
cctaccagg	ccttcagtac	ctcctgccag	ggcctggagc	agccagcctg	caacacctgc	9720
ctgccaaagca	gagtgaccac	tgtgggcaca	ggggacacag	ggtggggccc	acaacagcac	9780
cattgtccac	ttgtccctca	ctagtaaaag	aactctagg	ttgcgggggg	tgggggaggt	9840
ctctgtgagg	ctggtaagg	atatttgct	ggcccatgga	gatccataac	ttcgtataat	9900
gtatgctata	cgaagttata	agctttcgcg	agctcgagat	ctagatatcg	ataccgtcga	9960

cctcgagggg gggcccggtg cccagctttt gttcccttta gtgagggtta atttcgagct 10020
tggcgtaatc atggtcatag ctgtttcctg tgtgaaattg ttatccgctc acaattccac 10080
acaacatacg agccggaagc ataaagtgtg aagcctgggg tgcctaataga gtgagctaac 10140
tcacattaat tgcgttgccg tcaactgccg ctttccagtc gggaaacctg tcgtgccagc 10200
tgcattaatg aatcggccaa cgcgcgggga gaggcgggtt gcgtattggg cgctcttccg 10260
cttcctcgct cactgactcg ctgcgctcgg tcgttcggct gcgcgagcg gtatcagctc 10320
actcaaaggc ggtaatacgg ttatccacag aatcagggga taacgcagga aagaacatgt 10380
gagcaaaagg ccagcaaaag gccaggaacc gtaaaaaggc cgcgttgctg gcgtttttcc 10440
ataggctccg ccccccctgac gagcatcaca aaaatcgacg ctcaagtcag aggtggcgaa 10500
acccgacagg actataaaga taccaggcgt tccccctgg aagctccctc gtgcgctctc 10560
ctgttccgac cctgcgcgtt accggatacc tgtccgcctt tctcccttcg ggaagcgtgg 10620
cgcttttctca tagctcacgc tgtaggtatc tcagttcggg ttaggtcggt cgctccaagc 10680
tgggctgtgt gcacgaacct cccgttcagc ccgaccgctg cgccttatcc ggtaactatc 10740
gtcttgagtc caaccggta agacacgact tatcgccact ggcagcagcc actggttaaca 10800
ggattagcag agcgaggatg ttaggcggtg ctacagagtt cttgaagtgg tggcctaact 10860
acggctacac tagaaggaca gtatttggtg tctgcgctct gctgaagcca gttaccttcg 10920
gaaaaagagt tggtagctct tgatccggca aacaaaccac cgctggtagc ggtgggtttt 10980
ttgtttgcaa gcagcagatt acgcgcagaa aaaaaggatc tcaagaagat cctttgatct 11040
tttctacggg gtctgacgct cagtggaacg aaaactcacg ttaagggtt ttggtcatga 11100
gattatcaaa aaggatcttc acctagatcc ttttaaatta aaaatgaagt tttaaatcaa 11160
tctaaagtat atatgagtaa acttggtctg acagttacca atgcttaatc agtgaggcac 11220
ctatctcagc gatctgtcta tttcgttcat ccatagttgc ctgactcccc gtcgtgtaga 11280
taactacgat acgggagggc ttaccatctg gccccagtgc tgcaatgata ccgcgagacc 11340
cacgctcacc ggctccagat ttatcagcaa taaaccagcc agccggaagg gccgagcgca 11400
gaagtgggcc tgcaacttta tccgcctcca tccagtctat taattgttgc cgggaagcta 11460
gagtaagtag ttccgcagtt aatagtttgc gcaacgttgt tgccattgct acaggcatcg 11520
tgggtgcacg ctcgctggtt ggtatggctt cattcagctc cggttcccaa cgatcaaggc 11580
gagttacatg atccccatg ttgtgcaaaa aagcgggttag ctcccttcggt cctccgatcg 11640
ttgtcagaag taagttggcc gcagtgttat cactcatggt tatggcagca ctgcataatt 11700
ctcttactgt catgccatcc gtaagatgct tttctgtgac tggtgagtac tcaaccaagt 11760
cattctgaga atagtgtatg cggcgaccga gttgctcttg cccggcgtca atacgggata 11820

ataccgcgcc acatagcaga actttaaaag tgctcatcat tggaaaacgt tcttcggggc 11880
gaaaactctc aaggatctta ccgctgttga gatccagttc gatgtaacct actcgtgcac 11940
ccaactgatc ttcagcatct tttactttca ccagcgtttc tgggtgagca aaaacaggaa 12000
ggcaaaatgc cgcaaaaaag ggaataaggg cgacacggaa atgttgaata ctcatactct 12060
tcctttttca atattattga agcatttatc agggttattg tctcatgagc ggatacatat 12120
ttgaatgtat ttagaaaaat aaacaaatag ggggtccgcg cacatttccc cgaaaagtgc 12180
ctcgagcatc tggctcctta gttctctggg gtcacacaca cagcactgga tcccacccca 12240
agcctgccc a ttccctgctt tccctcacgt acttgtgtct ccgctcccc agctctggca 12300
actttgaagg aggacctgac ccggcgacgg tacctgatga gtggagtggg ggcacctgtg 12360
aaaaggagga acgtcatccc tcatgacatt ggggatccgg gtgagattcc gtctgtcagt 12420
ctctatacct gctatcctgt ccactgacac actgaaccag gtccccctcc ctccaacaga 12480
tgatgagcca tggctccggg tcaacgcata tttgattcat gatactgctg actggaagga 12540
cctgaacctg aagtttgtat tgcaaattha tgggactat tacctgacgg gtgatcaagg 12600
cttcttgagg gacatgtggc ctgtgtgtct ggtaaggaac gagaactgtg tccagtatac 12660
cagggatgta gctggagtct tgggagaacc cagactttct ttcttagaac ctaggctctc 12720
agtgtcttga tccctctcta ggctgtgatg gagtccgaaa tgaagtttga caaggaccaa 12780
gatggactca ttgagaatgg aggctacgca gaccagacct atgatgcatg ggtcaccaca 12840
ggccccaggt ttgggggtag ggatttccag gtctgaggtg aagaccggg catgtgagga 12900
tgccgtgtag agcggcgagg ctactccag ccactgttcc caccagtgcc ttactgcgga 12960
gggctgtggc tggcggcagt ggctgtaatg gttcagatgg ctgttctgtg tggggcccaa 13020
gatgtccagg agaggtttgc ttccattctc tgccgaggcc gagaagctta tgagagactg 13080
ctgtggaacg gtgagtaaaa gcaacctggg gcagcttaaa acccaactac gggatacaag 13140
caacttgact ttgctctttc tctattccag gacgctatta caactacgac agcagctccc 13200
atcctcagtc tcggagcatc atgtctgacc agtgtgctgg gcagtgggtc ctgagggcct 13260
gcggcctggg agaaggagac actgaagtga gaggctggag aagccagaag tctgggtttc 13320
cctggaggtg ggaggcaagt ctgagactcc acctttgctc tccctccagg tatttcctac 13380
cctgcatgtg gtccgtgctc tccaaacat ctttgaactc aacgtccaag cttttgcagg 13440
aggagccatg ggggcogtga acgggatgca cctcatggg gtccctgata gatccagtgt 13500
gcagtctgat gaagtctggg tgggtgtggg ctatgggctg gcagccacca tgatccaaga 13560
ggtaatgaat tctcttccca gcccttcacc atttgtactg aggtccagaa aacttcctca 13620
gccactaact ttattccaag aacaccctac tgccctgcat cttatccgtc cacagagcgc 13680
ccttctccct aataagtgtt ccacctcttg cctttaagtt cttgccttta gggcgaacgg 13740

cctcctgtct tctctgtca gctaaggtaa ttgtgccaag agtcagttat tatgtgtgac 13800
ttctacgtct cccacaggg cctgacttgg gaaggtttcc ggacagctga aggctgttac 13860
cgactgtat ggaacgcct gggcctggct ttccagaccc cagaggcata ctgccagcaa 13920
caagtgttcc gctccctggc ctacatgcgg cactgagca tctgggccat gcagctggcc 13980
ctgcaacagc agcagcataa aaagagccgc aggccatcag tcacacaagg cacgggacta 14040
agcacacagc ctgaatgtgg accaaagaga tcgctggcaa acctcaattc agagtgatcc 14100
ctctgaactg tggaggccca gcctccacac tggacctcct ccttcctccc acaagtctg 14160
cagccctgag ccaataggac aatcgcgctc accagctgct tcatccccgt ggcccgttg 14220
tcgcgtttg tggcgggtgc cccggaagaa atatatgtgc atgtctttag ttctatgatg 14280
acacaaaccc cgccagcgt cttgtcattg ggaattcga acacgcagat gcagtcgggg 14340
cgcgcggtc cgaggtccac ttcgcatatt aaggtgacgc gtgtggcctc gaacaccgag 14400
cgaccctgca gcgaccgct taacagcgtc aacagcgtgc cgcagatctt ggtggcgtga 14460
aactcccga cctcttcggc cagcgccttg tagaagcgcg tatggcttcg taccgccggc 14520
atcaacacgc gtctgcgttc gaccaggctg cgcgttctcg cggccatagc aaccgacgta 14580
cggcgttgcg ccctcgccgg cagcaagaag ccacggaagt ccgcccggag cagaaaatgc 14640
ccacgctact gcgggtttat atagacggtc cccacgggat ggggaaaacc accaccacgc 14700
aactgctggt ggccttgggt tcgcgcgacg atatcgtcta cgtacccgag ccgatgactt 14760
actggcgggt gctgggggct tccgagacaa tcggaacat ctacaccaca caacaccgcc 14820
tcgaccaggg tgagatatcg gccggggacg cggcgggtgt aatgacaagc gccagataa 14880
caatgggcat gccttatgcc gtgaccgacg ccgttctggc tcctcatatc gggggggagg 14940
ctgggagctc acatgccccg ccccgggccc tcacctcat cttcgaccgc catcccatcg 15000
ccgccctcct gtgctacccg gccgcgcggt accttatggg cagcatgacc cccagggccg 15060
tgctggcggt cgtggccctc atcccgccga ccttgcccgg caccaacatc gtgcttgggg 15120
cccttcgga ggacagacac atcgaccgcc tggccaaacg ccagcgcccc ggcgagcggc 15180
tggacctggc tatgtgtggt gcgattcgcc gcgtttacgg gctacttgcc aatacgggtc 15240
ggtatctgca gtgcggcggg tcgtggcggg aggactgggg acagctttcg gggacggccg 15300
tgccgcccc aagggtccgag cccagagca acgcgggccc acgaccccat atcggggaca 15360
cgttatttac cctgtttcgg gccccgagt tgctggcccc caacggcgac ctgtataacg 15420
tgtttgctg ggccttggac gtcttggcca aacgcctccg ttccatgcac gtctttatcc 15480
tggattacga ccaatcgccc gccggtgcc gggacgcctt gctgcaactt acctccggga 15540
tggtccagac ccacgtcacc acccccggct ccataccgac gatatgcgac ctggcgcgca 15600

cgtttgcccc ggagatgggg gaggctaact gaaacacgga aggagacaat accggaagga 15660
acccgcgcta tgacggcaat aaaaagacag aataaaacgc acgggtgttg ggtcgtttgt 15720
tcataaacgc ggggttcggt ccagggctg gcactctgtc gataccccac cgagacccca 15780
ttggggccaa tacgcccgcg tttcttcctt ttccccaccc cccccccaa gttcgggtga 15840
aggcccaggg ctgcagcca acgtcggggc ggcaggccct gccatagcca ctggccccgt 15900
gggttaggga cggggtcccc catggggaat ggtttatggt tcgtgggggt tattattttg 15960
ggcgttgcgt ggggtctggt ggacgaccca gcagctgctt catccccgtg gcccgttgct 16020
cgcgtttgct ggcggtgtcc ccggaagaaa tataattgca tgtctttagt tctatgatga 16080
cacaaacccc gccagcgtc ttgtcattgg cgaattcgaa cacgcagatg cagtcggggc 16140
ggcgcggtcc gaggtocact tcgcatatta aggtgacgcg tgtggcctcg aacaccgagc 16200
gaccctgcag cgaccgcctt aacagcgta acagcgtgcc gcagatcttg gtggcgtaaa 16260
actcccgac ctcttcggcc agcgccttgt agaagcgcgt atggcttcgt accccggcca 16320
tcaacacgcg tctgcgttcg accaggctgc gcgttctcgc ggccatagca accgacgtac 16380
ggcgttgcgc cctcgccggc agcaagaagc cacggaagtc cgcccgagc agaaaatgcc 16440
cacgctactg cgggtttata tagacggtcc ccacgggatg gggaaaacca ccaccacgca 16500
actgctggtg gccctgggtt cgcgcgacga tatcgtctac gtacccgagc cgatgactta 16560
ctggcgggtg ctgggggctt ccgagacaat cgcgaacatc tacaccacac aacaccgcct 16620
cgaccagggt gagatatcgg ccggggacgc ggcggtggtg atgacaagcg ccagataac 16680
aatgggcatg ctttatgccg tgaccgacgc cgttctggct cctcatatcg ggggggaggc 16740
tgggagctca catgccccgc ccccgccct caccctcatc ttcgaccgcc atcccatcgc 16800
cgccctcctg tgctaccggc ccgcgcggtg cttatgggc agcatgacct ccaggccgt 16860
gctggcggtc gtggccctca tcccgcgac cttgcccggc accaaccatg tgcttggggc 16920
ccttcggag gacagacaca tcgaccgcct ggccaaacgc cagcgccccg gcgagcggct 16980
ggacctggct atgctggctg cgattcgccg cgtttacggg ctacttgcca atacggtgcg 17040
gtatctgcag tgcggcgggt cgtggcggga ggactgggga cagctttcgg ggacggccgt 17100
gccgccccag ggtgccgagc ccagagcaa cgcgggcca cgacccata tcggggacac 17160
gttatttacc ctgtttcggg cccccagtt gctggcccc aacggcgacc tgtataacgt 17220
gtttgcctgg gccttgagc tcttgccaa acgcctcgt tccatgcaag tctttatcct 17280
ggattacgac caatcgcccc cggctgccg ggacgcctg ctgcaactta cctccgggat 17340
ggtcagacc cacgtacca cccccgctc cataccgacg atatgcgacc tggcgcgac 17400
gtttgccccg gagatggggg aggctaactg aaacacggaa ggagacaata ccggaaggaa 17460
cccgcgctat gacggcaata aaaagacaga ataaaacgca cgggtgttgg gtcgtttgtt 17520

cataaacgcg	gggttcggtc	ccagggctgg	cactctgtcg	ataccccacc	gagaccccat	17580
tggggccaat	acgccgcgt	ttcttccttt	tccccacccc	accccccaag	ttcgggtgaa	17640
ggcccagggc	tcgcagccaa	cgtcggggcg	gcaggccctg	ccatagccac	tggccccgtg	17700
ggttagggac	ggggtccccc	atggggaatg	gtttatggtt	cgtggggggtt	attattttgg	17760
gcgttgcg	gggtctggtg	gacgaccag				17790