

WO 02/096923

PCT/US02/17451

-1-

SEQUENCE LISTING

<110> CHROMOS MOLECULAR SYSTEMS, INC.

Perez, Carl
Fabijanski, Steven
Perkins, Edward<120> Plant Artificial Chromosomes, Uses thereof, and Methods of Preparing
Plant Artificial Chromosomes

<130> 24601-419PC

<140> Not Yet Assigned

<141> Herewith

<150> US 60/294,687

<151> 2001-05-30

<150> US 60/296,329

<151> 2001-06-04

<160> 51

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 11182

<212> DNA

<213> Artificial Sequence

<220>

<223> pAg1 plasmid

<400> 1

catgcccaacc	acagggttcc	cctcggggtc	aaagtacttt	gatccaaccc	ctccgctgct	60
atagtgcagt	cggcttctga	cggttcagtgc	agccgtottc	tgaaaacgac	atgtcgcaca	120
agtcctaagt	tacgcgacag	gctgcccgc	tgcccttttc	ctggcggttt	cttgtcgct	180
gttttagtcg	cataaagtag	aatacttgcg	actagaaccg	gagacattac	gccatgaaca	240
agagcgccgc	cgctggcctg	ctgggctatg	cccgcgtcag	caccgacgac	caggacttga	300
ccaaccaacg	ggccgaactg	cacgcggccg	gctgcaccaa	gctgttttcc	gagaagatca	360
ccggcaccag	gcgcgaccgc	ccggagctgg	ccaggatgct	tgaccaccta	cgccctggcg	420
acgttgtgac	agtgaccagg	ctagaccgcc	tggccgcgac	caccgcgac	ctactggaca	480
ttgccgagcg	catccaggag	gccggcgccg	gcctgcgtag	cctggcagag	ccgtgggccc	540
acaccaccac	gccggccggc	cgcattggtg	tgaccgtggt	cgccggcatt	gccgagttcg	600
agcgttcctt	aatcatcgac	cgcaccgcga	gcgggcgcga	ggccgccaa	gcccaggcg	660
tgaagtttgg	cccccgccct	accctcacc	cgccacagat	cgcgacgccc	cgcgagctga	720
tcgaccagga	aggccgcacc	gtgaaagagg	cggtgcact	gcttggcgtg	catcgctcga	780
ccctgtaccg	cgcacttgag	cgcagcgagg	aagtgaagcc	caccgaggcc	aggcgccgcg	840
gtgccttcgg	tgaggacgca	ttgaccgagg	ccgacgcctt	ggcgcccgcc	gagaatgaac	900
gccaagagga	acaagcatga	aaccgcacca	ggacggccag	gacgaaccgt	ttttcattac	960
cgaagagatc	gaggcggaga	tgatcgcgcc	cggttacgtg	ttcgagccgc	ccgcgcacgt	1020
ctcaaccgtg	cggctgcatg	aaatcctggc	cggtttgtct	gatgccaaag	tgccggcctg	1080
gcccggccagc	ttggccgctg	aagaaaccga	gcgcgcgcgt	ctaaaaaggt	gatgtgtatt	1140
tgagtaaaac	agcttgcgtc	atgcggtcgc	tgcgatatatg	atgcgatgag	taaataaaca	1200
aatacgcaag	gggaacgcac	gaaggttatc	gctgtactta	accagaaagg	cgggtcaggc	1260
aagacgacca	tcgcaaccca	tctagcccg	gccttgcaac	tcgcccgggc	cgatgttctg	1320
ttagtcgatt	ccgatcccc	gggcagtgcc	cgcgattggg	cggccgtgcg	ggaagatcaa	1380
ccgctaaccg	ttgtoggcat	cgaccgccc	acgattgacc	gcgacgtgaa	ggccatcgcc	1440
cggcgcgact	tcgtagtgat	cgacggagcg	ccccaggcgg	cggacttggc	tgtgtccgcg	1500
atcaaggcag	ccgacttcgt	gctgattccg	gtgcagccaa	gcccttacga	catatgggccc	1560
accgcccagc	tggtggagct	ggttaagcag	cgcattgagg	tcacggatgg	aaggctacaa	1620
gcccgcctttg	tcgtgtcgcg	ggcgatcaaa	ggcacgcgca	tcggcggtga	ggttgccgag	1680
gcgctggccg	ggtacgagct	gcccattctt	gagtcccgt	tcacgcagcg	cgtgagctac	1740
ccaggcactg	ccgcccgcgg	cacaaccggt	cttgaatcag	aaccgcaggg	cgacgctgcc	1800
cgcgaggtcc	aggcgctggc	cgctgaaatt	aaatcaaaac	tcatttgagt	taatgaggta	1860
aagagaaaat	gagcaaaagc	acaaacacgc	taagtgcgg	ccgtccgagc	gcacgcagca	1920
gcaaggctgc	aacgttggcc	agcctggcag	acacgccagc	catgaagcgg	gtcaactttc	1980

WO 02/096923

PCT/US02/17451

-2-

agttgccggc	ggaggatcac	accaagctga	agatgtacgc	ggtacgcca	ggcaagacca	2040
ttaccgagct	gctatctgaa	tacatcgcg	agctaccaga	gtaaatgagc	aaatgaataa	2100
atgagtagat	gaatttttagc	ggctaaagga	ggcggcatgg	aaaatcaaga	acaaccaggc	2160
accgacgccg	tggaaatgcc	catgtgtgga	ggaacgggcg	gttggccagg	cgtaagcggc	2220
tgggttgtct	gcgggccctg	caatggcact	ggaaccccc	agcccgagg	atcggcggtg	2280
cgggtcgcaa	ccatccggcc	cggtaaaaat	cggcgccggc	ctgggtgatg	acctgggtgga	2340
gaagttgaag	gcccgcagg	ccgcccagcg	gcaacgcac	gaggcagaag	cacgcccccg	2400
tgaatcgtgg	caagcgcccg	ctgatcgaat	ccgcaaagaa	tcccggcaac	cgccggcgag	2460
cgggtgcgcg	tcgattagga	agccgccc	gggcgacgag	caaccagatt	ttttcgttcc	2520
gatgctctat	gacgtgggca	cccgcgtag	tcgcagcatc	atggacgtgg	ccgttttccg	2580
tctgtcgaag	cgtgaccgac	gagctggcga	ggtgatccgc	tacgagcttc	cagacgggca	2640
cgtagagggt	tccgcagggc	cggccggcat	ggccagtggt	tgggattacg	acctgggtact	2700
gatggcggtt	tcccatctaa	ccgaatccat	gaaccgatac	cgggaaggga	agggagacaa	2760
gcccggccgc	gtgttcgcgt	cacacgttgc	ggacgtactc	aagttctgcc	ggcgagccga	2820
tggcggaagc	cagaaagacg	acctggtaga	aacctgcatt	cggtaaaaca	ccacgcacgt	2880
tgccatgcag	cgtacgaaga	aggccaagaa	cggccgcctg	gtgacgggat	ccgaggggtga	2940
agccttgatt	agccgctaca	agatcgtaaa	gagcgaaacc	gggcgccggg	agtagatcga	3000
gatcgagcta	gctgattgga	tgtaccgcga	gatcacagaa	ggcaagaacc	cggacgtgct	3060
gacggttcac	cccgtattact	ttttgatcga	tcccggcatc	ggccggtttc	tctaccgctc	3120
ggcacgccgc	gcgcgaggca	aggcagaagc	cagatgggtg	ttcaagacga	tctacgaacg	3180
cagtgccagc	gcccggagagt	tcaagaagtt	ctgtttcacc	gtgcgcaagc	tgatcgggtc	3240
aaatgacctg	ccggagtacg	atttgaagga	ggaggcgggg	caggctggcc	cgatccctagt	3300
catgcgctac	cgcaacctga	tcgaggcgga	agcatccgcc	ggttccta	gtacggagca	3360
gatgctaggg	caaattgccc	tagcagggga	aaaaggctga	aaaggtctct	ttcctgtgga	3420
tagcacgtac	attgggaacc	caaagccgta	cattgggaac	cgaacccgtg	acattgggaa	3480
cccaaagccg	tacattggga	accggtcaca	catgtaagtg	actgatataa	aagagaaaaa	3540
aggcgatttt	tccgcctaaa	actctttaaa	acttattaaa	actcttaaaa	cccgcctggc	3600
ctgtgcataa	ctgtctggcc	agcgacagc	cgaagagctg	caaaaagcgc	ctacccttcg	3660
gtcgctgcgc	tccctacgcc	ccgcgccttc	gcgtcggcct	atcgccggcc	ctggccgctc	3720
aaaaatggct	ggcctacggc	caggcaatct	accagggcgc	ggacaagccg	cgccgtcgcc	3780
actcgaccgc	ggcgccccac	atcaaggcac	cctgcctcgc	gcgtttcggt	gatgacgggt	3840
aaaacctctg	acacatgcag	ctcccggaga	cggtcacagc	ttgtctgtaa	gcggatgcgc	3900
ggagcagaca	agcccgctcag	ggcgcgctcag	cgggtgttgg	cgggtgtcgg	ggcgagacca	3960
tgaccacgtc	acgtagcgat	agcggaggtg	atactggctt	aactatgcgg	catcagagca	4020
gattgtactg	agagtgccac	atatgcggtg	tgaataaccg	cacagatgcg	taaggagaaa	4080
ataccgcac	aggtgcctct	ccgcttcttc	tcgctcgctg	tcgctcgctg	cggtcgctcg	4140
gctggcgcca	ggcggtatcag	ctcactcaaa	ggcggttaata	cgggttatcca	cagaatcagg	4200
ggataacgca	ggaaagaaca	tgtgagcaaa	aggccagcaa	aaggccagga	accgtaaaaa	4260
ggcgcggttg	ctggcggtttt	tccatagggt	ccgccccctt	gacgagcatc	acaaaaatcg	4320
acgctcaagt	cagaggtggc	gaaacccgac	aggactataa	agataaccagg	cgtttcccc	4380
tggaaagctc	ctgctgttcc	cgccgttccg	gacctgcgc	cttaccggat	acctgtccgc	4440
ctttctccct	tcgggaagcg	tggcgctttc	tcctagctca	cgtgtaggt	atctcagttc	4500
ggtgtagggt	gttcgctcca	agctgggctg	tgtgcacgaa	cccccgcttc	agcccgaccg	4560
ctgcgcctta	tccggtaact	atcgtcttga	gtccaaccgc	gtaagacacg	acttatcgcc	4620
actggcagca	gcccactggt	acaggattag	cagagcgagg	tatgtaggcg	gtgctacaga	4680
gttcttgaa	tggtggccta	actacggcta	cactagaagg	acagtatttg	gtatctgcgc	4740
tctgttgaag	ccagttacct	tcggaacaa	agttggtagc	tcttgatccg	gcaaaacaa	4800
caccgctggg	agcgggtggt	tttttgtttg	caagcagcag	attacgcgca	gaaaaaaagg	4860
atctcaagaa	gatcctttga	tcttttctac	ggggtctgac	gctcagtgga	acgaaaactc	4920
acgttaaggg	attttgggtca	tgcattctag	gtactaaaac	aattcatcca	gtaaaaatata	4980
atattttatt	ttctcccaat	caggcttgat	cccagtaag	tcaaaaaata	gctcgacata	5040
ctgttcttcc	ccgatatcct	ccctgatcga	ccggacgcag	aaggcaatgt	cataccactt	5100
gtccgccttg	ccgcttctcc	caagatcaat	aaagccactt	actttgccat	ctttcacaaa	5160
gatgttgctg	tctcccaggt	cgcgctggga	aaagacaagt	tctcttcggg	gcttttccgt	5220
ctttaaaaaa	tcatacagct	cgcgcggatc	tttaaatgga	gtgtcttctt	cccagttttc	5280
gcaatccaca	tcggccagat	cgttattcag	taagtaatcc	aattcggcta	agcggctgtc	5340
taagctattc	gtatagggac	aatccgatat	gtcgatggag	tgaagagacc	tgatgcactc	5400
cgcatacagc	tcgataatct	tttcagggtc	ttgttcattc	tcataactct	ccgagcaaa	5460
gacgccatcg	gctcactca	tgagcagatt	gctccagcca	tcattgccgt	caaagtgcag	5520
gacotttgga	acaggcagct	ttccttccag	ccatagcatc	atgtcctttt	cccgttccac	5580
atcatagggt	gtccctttat	acgggctgtc	cgtcattttt	aaatataggt	tttcatattc	5640
tcccaccagc	ttatatacct	tagcaggaga	cattccttcc	gtatctttta	cgcagcggta	5700
tttttccatc	agttttttca	attccgggtga	tattctcatt	ttagccattt	attatttcc	5760
tctctttttc	tacagtattt	aaagataccc	caagaagcta	attataacaa	gacgaactcc	5820
aattoactgt	tccttgcat	ctaaaacctt	aaataccaga	aaacagcttt	ttcaaagttg	5880
ttttcaaagt	tggcgataaa	catagtatcg	acggagccga	ttttgaaacc	gcgggtgatca	5940
caggcagcaa	cgctctgtca	tcgttacaat	caacatgcta	cctccgcga	gatcatccgt	6000

WO 02/096923

PCT/US02/17451

-3-

gtttcaaac	cgccagctta	gttgccgttc	ttccgaatag	catcggtaac	atgagcaaac	6060
tctgccgcct	tacaacgggt	ctcccgcgtga	cgccgtcccg	gactgatggg	ctgcctgtat	6120
cgagtgggtga	ttttgtgccg	agctgccgggt	cggggagctg	ttggctggct	ggtaggcagga	6180
tatattgtgg	tgtaaacaaa	ttgacgctta	gacaacttaa	taacacattg	cggacgtttt	6240
taatgtactg	aattaacgcc	gaattaattc	gggggatctg	gatttttagta	ctggattttg	6300
gttttaggaa	ttagaaat	tattgataga	agtattttac	aaatacaaat	acatactaag	6360
ggtttcttat	atgctcaaca	catgagcgaa	accctatagg	aaccctaatt	cccttatctg	6420
ggaactactc	acacattatt	atggagaaac	togagtcaaa	tctcggtgac	gggcaggacc	6480
ggacggggcg	gtaccggcag	gctgaagtcc	agctgccaga	aaccacgctc	atgccagttc	6540
ccgtgcttga	agccggccgc	ccgcagcatg	cccggggggg	catatccgag	cgccctcgtgc	6600
atgcccacgc	tccggctcgtt	gggcagcccg	atgacagcga	ccacgctctt	gaagccctgt	6660
gcctccaggg	acttcagcag	gtgggtgtag	agcgtggagc	ccagtcccg	ccgctgggtg	6720
cggggggaga	cgtacacggg	cgactcggcc	gtccagtcgt	aggcgttgcg	tgccttccag	6780
gggcccgcgt	aggcgatgcc	ggcgacctcg	ccgtccacct	cggcgacgag	ccagggatag	6840
cgctcccgc	gacggacgag	gtcgtccgtc	cactcctgcg	gttcctgctg	ctcggtagcg	6900
aagttgacgc	tgcttgtctc	gatgtagtgg	ttgacgatgg	tgacagccgc	cggcatgtcc	6960
gcctcgggtg	cacggcggat	gtcggccggg	cgctcgttctg	ggctcatggt	agactcgaga	7020
gagatagatt	tgtagagaga	gactgggtgat	ttcagcgtgt	cctctccaaa	tgaaatgaac	7080
ttccttatat	agaggaagg	cttgccgaagg	atagtgggat	tgtgcgtcat	cccttacgtc	7140
agtggagata	tcacatcaat	ccacttgctt	tgaagacgtg	gttggaacgt	cttctttttt	7200
cacgatgctc	ctcgtgggtg	gggggtccatc	tttgggacca	ctgtcggcag	aggcatcttg	7260
aacgatagcc	tttcttttat	cgcaatgatg	gcattttgtag	gtgccacctt	ccctttctac	7320
tgctcttttg	atgaagtgc	agatagctgg	gcaatggaat	ccgaggaggt	ttcccgatat	7380
taccctttgt	tgaaaagtct	caatagccct	ttggtcttct	gagactgtat	ctttgatatt	7440
cttgagtag	acgagagtg	cgtgctccac	catgttatca	catcaatcca	cttgctttga	7500
agacgtggtt	ggaacgtctt	ctttttccac	gatgctcctc	gtgggtgggg	gtccatcttt	7560
gggaccactg	tccggcagagg	catcttgaac	gatagccctt	cttttatcgc	aatgatggca	7620
ttttaggtg	ccaccttctt	tttctactgt	ccctttgatg	aagtgcagca	tagctgggca	7680
atggaatccg	aggaggtttc	ccgatattac	ccctttgttg	aaagtctcaa	tagccctttg	7740
gtcttctgag	actgtatctt	tgatattctt	ggagtagacg	agagtgtcgt	gctccaccat	7800
gttggaagc	tgctctagcc	aatacgcaaa	ccgcctctcc	ccgcgcgttg	gcccattcat	7860
taattgcagc	ggcagcagca	gtttcccgc	tggaaagcgg	gcagtgcgca	caacgcattt	7920
aatgtgagtt	agctcactca	ttaggcacc	caggctttac	actttatgct	tccggctcgt	7980
atgttgtgtg	gaattgtgag	cggataacaa	tttcacacag	gaaacagcta	tgaccatgat	8040
tacgaattcg	agccttgact	agagggtcga	cggatatacag	acatgataag	atacattgat	8100
gagtttgag	aaaccacaac	tagaatgcag	tgaaaaaaat	gctttatttg	tgaaatttgt	8160
gatgctattg	ctttatttgt	aaccattata	agctgcaata	aacaagttgg	ggtagggcga	8220
gaactccagg	atgagatccc	cgcgctggag	gatcatccag	ccggcgtccc	ggaaaaagct	8280
tccgaagccc	aacctttcat	agaaggcgcc	ggtagaatcg	aaatctcgta	gcacgtgtca	8340
gtcctgctcc	tccggccacga	agtgcacgca	gttgccggcc	gggtcgcgca	gggcgaactc	8400
ccgcccccc	ggctgctcgc	cgatctcgg	catggccggc	ccggaggcgt	cccggaagtt	8460
cgtggacacg	acctccgacc	actcggcgta	cagctcgtcc	aggccgcgca	cccacacca	8520
ggccagggtg	ttgtccggca	ccacctggct	ctggaccgcg	ctgatgaaca	gggtcacgtc	8580
gtcccggacc	acacccggca	agtcgtctc	cacgaagtcc	cgggagaacc	cgagccggtc	8640
gggtccagaac	tgcaccgctc	cggcgacgtc	gcgcgcgggtg	agcacccgaa	cggcactggg	8700
caacttggtc	atggatccag	atttcgctca	agttagtata	aaaaagcagg	cttcaatcct	8760
gcaggaattc	gatcgacact	ctcgtctact	ccaagaatat	caaagataca	gtctcagaag	8820
accaaaaggg	tattgagact	tttcaacaaa	gggtaatatc	gggaaacctc	ctcggatttc	8880
attgccagc	tatctgtcac	ttcatcaaaa	ggcagtaga	aaaggaaggt	ggcacctaca	8940
aatgccatca	ttgcgataaa	ggaaaggcta	tcgttcaaga	tgctctgccc	gacagtggtc	9000
ccaaagatgg	acccccaccc	acgaggagca	tctgtgaaaa	agaagacgtt	ccaaccacgt	9060
cttcaaagca	agtgattga	tgtgataaca	tggtggagca	cgacactctc	gtctactcca	9120
agaatatcaa	agatacagtc	tcagaagacc	aaagggtat	tgagactttt	caacaaagg	9180
taatatcggg	aaacctctc	ggattccatt	gccagctat	ctgtcaactt	atcaaaagga	9240
cagtagaaaa	ggaaggtggc	acctacaaat	gccatcattg	cgataaagga	aaggctatcg	9300
ttcaagatgc	ctctgccgac	agtgggtccc	aagatggacc	cccacccacg	aggagcatcg	9360
tggaaaaaga	agacgttcca	accacgtctt	caaagcaagt	ggattgatgt	gatattctca	9420
ctgacgtaag	ggatgacgca	caatcccact	atccttcgca	agacctctct	ctatataagg	9480
aagttcattt	catttgagag	ggacacgctg	aaatcaccag	tctctctcta	caaatctctc	9540
tctctcgagc	tttcgcagag	ccgggggggg	aatgagatat	gaaaaagcct	gaactcaccg	9600
cgacgtctgt	cgagaagttt	ctgatcgaaa	agttcgacag	cgtctccgac	ctgatgcagc	9660
tctcggaggg	cgaagaatct	cgtgctttca	gcttcgatgt	aggaggcggt	ggatattgtc	9720
tgccgggttaa	tagctgcgct	gatgggttct	acaaagatcg	ttatgtttat	cggcactttg	9780
catcgccgc	gctcccgc	ccggaagtgc	ttgacattgg	ggagtttagc	gagagcctga	9840
cctattgcat	ctcccgcgt	gcacagggtg	tcacgttgca	agacctgcct	gaaaccgaac	9900
tgcccgctgt	tctacaaccg	gtcgcggagg	ctatggatgc	gatcgctgcg	gcccattctta	9960
gccagacgag	cgggttcggc	ccattcggac	cgcaaggaa	cgggtcaatac	actacatggc	10020

WO 02/096923

PCT/US02/17451

-4-

```

gtgatttcat atgcgcgatt gctgatcccc atgtgtatca ctggcaaaact gtgatggacg 10080
acaccgtcag tgcgtccgtc ggcgaggctc tccgatgagct gatgcttttg gccgaggact 10140
gccccgaagt ccggcacctc gtgcacgcgg atttcggctc caacaatgtc ctgacggaca 10200
atggccgcat aacagcggtc attgactgga gcgaggcgat gttcggggat tcccaatacg 10260
aggctgcgca catcttcttc tggaggccgt ggttggcttg tatggagcag cagacgcgct 10320
acttcgagcg gaggcatccg gagcttgca gacgccacg actccggcg tatatgctcc 10380
gcattggtct tgaccaactc tatcagagct tggttgacgg caatttcgat gatgcagctt 10440
gggcgccagg tccgatgcgac gcaatcgtcc gatccggagc cgggactgtc gggcgctacac 10500
aaatcgcccc cagaagcgcg gccgtctgga ccgatggctg tgtagaagta ctccgccgata 10560
gtggaaaccg acgccccagc actcgtccga gggcaaagaa atagagtaga tgcgcaccgg 10620
atctgtcgat cgacaagctc gagtttctcc ataataatgt gtgagtagtt cccagataag 10680
ggaattaggg ttcttatagg gtttcgctca tgtgttgagc atataagaaa cccttagtat 10740
gtatttgtat ttgtaaaata cttctatcaa taaaatttct aattcctaaa accaaaatcc 10800
agtactaaaa tccagatccc ccgaattaat tccggcgtaa ttcagatcaa gcttggcact 10860
ggcgcgtcgt ttacaacgct gtgactggga aaaccctggc gttacccaac ttaatcgctt 10920
tgcagcacat ccccttttcg ccagctggcg taatagcgaa gaggcccgca cccgatcgcc 10980
ttccaacag ttgcgcagcc tgaatggcga atgctagagc agcttgagct tggatcagat 11040
tgtcgtttcc cgccttcagt ttaactatc agtgtttgac aggatatatt ggcgggtaaa 11100
cctaagagaa aagagcgttt attagaataa ccgatattta aaaggcgctg aaaagggtta 11160
tccgttcgct catttgtatg tg 11182

```

<210> 2

<211> 8428

<212> DNA

<213> Artificial Sequence

<220>

<223> pCambia3300 plasmid

<400> 2

```

catgccaaacc acaggggttc cctcgggatc aaagtacttt gatccaaacc ctccgctgct 60
atagtgcagt cggcttctga cgttcagtgc agccgtcttc tgaaaacgac atgtcgcaca 120
agtcctaagt tacgcgacag gctgccgccc tgccttttcc ctggcgtttt cttgtcgcgt 180
gttttagtcg cataaagtag aatacttgcg actagaaccg gagacattac gccatgaaca 240
agagcgccgc cgtggcctg ctgggctatg cccgcgtcag caccgacgac caggacttga 300
ccaaccaacg ggcggaactg cagcggcccg gctgcaccaa gctgttttcc gagaagatca 360
ccggcaccag gcgcgacccg ccggagctgg ccaggatgct tgaccaccta cgccttggcg 420
acgttgtgac agtgaccagg ctagaccgcc tggcccgcag caccgcgac ctactggaca 480
ttgcgagcg catccaggag gccggcgcg gctgcgtag cctggcagag ccgtgggccc 540
acaccaccac gccggccggc cgcattggtg tgaccgtgtt cgcggcatt gccgagttcg 600
agcgttccct aatcatcgac cgcaccgcga gccggcgcg ggcgccaaag gcccgaggcg 660
tgaagtgttg ccccgccctt accctcacc cggcacagat cgcgcacgcc cgcgagctga 720
tcgacagga aggcgcgacc gtgaaagagg ccgctgcact gcttggcggt catcgctga 780
ccctgtaccg cgcacttgag cgcagcgagg aagtgcgcgc caccgaggcc aggcggcgcg 840
gtgccttccg tgaggacgca ttgaccgagg ccgacgcctt ggcggccgcc gagaatgaac 900
gccaagagga acaagcatga aaccgcacca ggacggccag gacgaaccgt ttttcattac 960
cgaagagatc gaggcggaga tgatcgcgcc cgggtacgtg ttcgagccgc ccgcgcacgt 1020
ctcaaccgtg cggctgcagt aaatcctggc cggtttgtct gatgccaagc tggcgccgtg 1080
gccggccagc ttggccgctg aagaaaccga cgcgcgcgt ctaaaaaggt gatgtgtat 1140
tgagtaaaac agcttgctgc atgcggtcgc tgcgtatatg atcgatgag taaataaaca 1200
aatacgcaag ggaacgcat gaaggttatc gctgtactta accagaaagg cgggtcaggc 1260
aagacgacca tcgcaaccca tctagccgc gccctgcaac tcgccggggc cgtgttctg 1320
ttagtgcatt ccgatcccca gggcagtgcc cgcgattggg cggccgtgcg ggaagatcaa 1380
ccgctaaccg ttgtcggcat cgaccgcgg acgattgacc gcgacgtgaa ggccatcgcc 1440
cggcgcgact tcgtagtgat cgacggagcg cccaggcgcg cggacttggc tgtgtccgcg 1500
atcaaggcag ccgacttcgt gctgattccg gtgcagccaa gcccttacga catatgggcc 1560
accgcgcacc tgggtggagct ggttaagcag cgcattgagg tcacggatgg aaggctacaa 1620
gcgccctttg tcgtgtcgcg ggcgatcaaa ggcacgcgca tcggcggtga ggttgcogag 1680
gcgctggcgg ggtacgagct gccattctt gagtcccgt tcaagcagcg cgtgagctac 1740
ccaggcactg ccgcgcgcgg cacaaccgtt cttgaatcag aacccgaggg cgacgtgcc 1800
cgcgaggtcc aggcgctggc cgctgaaatt aaatcaaaac tcatttgagt taatgaggt 1860
aagagaaaat gagcaaaagc acaaacagc taagtccgg cctccgagc gcacgcagca 1920
gcaaggctgc aacgttggcg agcctggcag acacgccagc catgaagcgg gtcaacttcc 1980
agttgcggcg ggaggtacac accaagctga agatgtacgc ggtacgcca ggaagacca 2040
ttaccgagct gctatctgaa tacatcgcg agctaccaga gtaaatgagc aaatgaataa 2100
atgagtagat gaatttttag ggctaaagga ggcggcatgg aaaatcaaga acaaccaggc 2160
accgacgccc tggaatgccc catgtgtgga ggaacggcg gttggccagg cgtgaagcggc 2220

```

WO 02/096923

PCT/US02/17451

-5-

tgggttgtct	gccggccctg	caatggcact	ggaaccccc	agcccgagga	atcggcggtga	2280
cgggtcgcaaa	ccatccggcc	cgggtacaaat	cggcgcgggcg	ctgggtgatg	acctgggtgga	2340
gaagttgaag	gccgcgcagg	ccgcccagcg	gcaacgcac	gaggcagaag	cacgcccccg	2400
tgaatcgtgg	caagcggccg	ctgatcgaa	ccgcaaagaa	tcccggcaac	cgcggcgagc	2460
cgggtgcgcg	tgcattagga	agccgccc	gggcgcagag	caaccagatt	ttttcgttcc	2520
gatgctctat	gacgtgggca	ccgcgcgatg	tgcgcacac	atggacgtgg	ccgttttccg	2580
tctgtcgaag	cgtgaccgac	gagctggcga	ggtgatccgc	tacgagcttc	cagacgggca	2640
cgtagagggt	tccgcagggc	cggccggcat	ggccagtggt	tgggattacg	acctgggtact	2700
gatggcggtt	tcccatctaa	ccgaatccat	gaaccgatac	cgggaaggga	agggagacaa	2760
gcccggccgc	gtgttcggtc	cacacgttgc	ggacgtactc	aagttctgcc	ggcgagccga	2820
tggcggaaag	cagaaagacg	acctggtaga	aacctgcatt	cggttaaaca	ccacgcacgt	2880
tgccatgcag	cgtacgaaga	aggccaagaa	cggccgcctg	gtgacggtat	ccgagggtga	2940
agccttgatt	agccgctaca	agatcgtaaa	gagcgaaacc	gggcggccgg	agtacatcga	3000
gatcgagcta	gctgattgga	tgtaccgcga	gatcacagaa	ggcaagaacc	cggacgtgct	3060
gacgggttcac	cccgattact	ttttgatcga	tcccggcatc	ggccgttttc	tctaccgcct	3120
ggcacgcgcg	gccgcaggca	aggcagaagc	cagatgggtg	ttcaagacga	tctacgaacg	3180
cagtggcagc	gccggagagt	tcaagaagtt	ctgtttcacc	gtgcgcaagc	tgatcgggtc	3240
aaatgacctg	ccggagtacg	atgtgaagga	ggaggcgggg	caggctggcc	cgatccctagt	3300
catgcgctac	cgcaacctga	tgcaggcgga	agcatccgcc	ggttcctaata	gtacggagca	3360
gatgtctagg	caaattgccc	tagcagggga	aaaagggtcga	aaaggtctct	ttcctgtgga	3420
tagcacgtac	attgggaacc	caaagccgta	cattgggaac	cggaaaccgt	acattgggaa	3480
cccaaagccg	tacattggga	accggtcaca	catgtaagt	actgatataa	aagagaaaaa	3540
aggcgatttt	tccgcctaaa	actctttaa	acttattaaa	actcttaaaa	cccgcctggc	3600
ctgtgcataa	ctgtctggcc	agcgcacagc	cgaagagctg	caaaaagcgc	ctacccttcg	3660
gtcgtgcgcg	tccctacgcc	ccgcgccttc	gcgtcgccct	atcgccggcc	ctggccgctc	3720
aaaaattggc	ggcctacggc	caggcaatct	accaggcgcc	ggacaagccg	cgcctgcgcc	3780
actcgaccgc	ggcgccccc	atcaaggcac	cctgcctcgc	gcgtttcggt	gatgacggtg	3840
aaaacctctg	acacatgcag	ctcccggaga	cggtcacagc	ttgtctgtaa	gcggtgccc	3900
ggagcagaca	agcccgtcag	ggcgcgctcag	cgggtggttg	cgggtgtcgg	ggcgagcca	3960
tgaccagctc	acgtagcgat	agcggagtgt	atactggctt	aactatgcgg	catcagagca	4020
gattgtactg	agagtgcacc	atatcggtgt	tgaataaccg	cacagatgcg	taaggagaaa	4080
ataccgcac	aggcgctctt	ccgttctctc	gtcactgac	tcgctgcgct	cggctcgttc	4140
gctgcggcga	gcggtatcag	ctcactcaaa	ggcggttaata	cggttatcca	cagaatcagg	4200
ggataacgca	ggaaagaaca	tgtgagcaaa	aggccagcaa	aaggccagga	accgtaaaaa	4260
ggcgcggttg	ctggcggttt	tccataggct	ccgccccctt	gacgagcacc	acaaaaatcg	4320
acgctcaagt	cagaggtggc	gaaaccgcag	aggactataa	agataaccag	cgtttccccc	4380
tggaaagctc	ctcgctgcct	ctcctgttcc	gaccctgcgc	cttaaccgat	acctgtccgc	4440
ctttctccct	tgggaagcgc	tggcgctttc	tcatagctca	cgtgttaggt	atctcagttc	4500
ggtgtaggtc	gttcgctcca	agctgggctg	tgtgcacgaa	ccccccgttc	agcccgaccg	4560
ctgcgcctta	tccggtaact	atcgtcttga	gtccaaccgc	gtaagacacg	acttatcgcc	4620
actggcagca	gccattggta	acaggattag	cagagcgagg	tatgtaggcg	gtgctacaga	4680
gttcttgaag	tgggtggccta	actacggcta	cactagaagg	acagtatttg	gtatctgcgc	4740
tctgtgaag	ccagttacct	tgggaaaaag	agttggtagc	tcttgatccg	gcaaacaaa	4800
caccgctggg	agcgggtggt	ttttgtttg	caagcagcag	attacgcgca	gaaaaaaagg	4860
atctcaagaa	gatcctttga	tcttttctac	ggggtctgac	gctcagtgga	acgaaaaactc	4920
acgttaaggg	attttggcta	tgcattctag	gtactaaaac	aattcatcca	gtaaaaatata	4980
atattttatt	tttctccaat	caggcttgat	ccccagtaag	tcaaaaaata	gctcgacata	5040
ctgttcttcc	cogatatcct	cctgatcga	ccggacgcag	aaggcaatgt	cataccactt	5100
gtccgcctcg	ccgcttctcc	caagatcaat	aaagccactt	actttgccat	ctttcacaaa	5160
gatgttgctg	tctcccaggt	cgcggtggga	aaagacaagt	tctcttccgg	gcttttccgt	5220
ctttaaaaaa	tcatacagct	cgcgcggatc	tttaaatgga	gtgtcttctt	cccagttttc	5280
gcaatccaca	tccggccagat	cgttattcag	taagtaatcc	aattcggcta	agcggctgtc	5340
taagctatcc	gtatagggac	aatccgatat	gtcgatggag	tgaaagagcc	tgatgcactc	5400
cgcatacagc	tgcataatct	tttcagggtc	ttgttcatct	tcatactctt	ccgagcaaa	5460
gacgccatcg	gcctcactca	tgagcagatt	gctccagcca	tcattgcggt	caaagtgcag	5520
gaaccttgga	acaggcagct	ttccttccag	ccatagcacc	atgtcctttt	cccgttccac	5580
atcattaggtg	gtccctttat	accggctgtc	cgtcattttt	aaatataggt	tttcattttt	5640
tcccaccagc	ttatatacct	tagcaggaga	cattccttcc	gtatctttta	cgcagcggta	5700
tttttgcgac	agttttttca	attccgggtga	tattctcatt	ttagccattt	attatttctt	5760
tctctttttc	tacagtattt	aaagataccc	caagaagcta	attataacaa	gacgaactcc	5820
aattcactgt	tccttgcat	ctaaaacctt	aaataaccaga	aaacagcttt	ttcaaagttg	5880
ttttcaaagt	tgccgtataa	catagtatcg	acggagccga	ttttgaaacc	gcggtgatca	5940
caggcagcaa	cgtttacaat	tcgttacaat	caacatgcta	ccctccgcga	gatcatccgt	6000
gtttcaaacc	cggcagctta	gttgccgttc	ttccgaatag	catcggtaac	atgagcaaa	6060
tctgcgcct	tacaacggct	ctcccgtgta	cgcgctcccg	gactgatggg	ctgcctgtat	6120
cgagtggtga	ttttgtgcgc	agctgcccgt	cggggagctg	ttggctggct	ggtggcagga	6180
tatattgtgg	tgtaaacaaa	ttgacgctta	gacaacttaa	taacacattg	cggacgtttt	6240

WO 02/096923

PCT/US02/17451

-6-

```

taatgtactg aattaacgcc gaattaattc gggggatctg gatttttagta ctggattttg 6300
gttttaggaa ttagaaatth tattgataga agtattttac aaatacaaat acataactaag 6360
ggtttcttat atgctcaaca catgagcgaa accctatagg aaccctaatt cccttatctg 6420
ggaactactc acacattatt atggagaaac tcgagtcaaa tctcgggtgac gggcaggacc 6480
ggacggggcg gtaccggcag gctgaagtcc agctgccaga aaccacgctc atgccagttc 6540
ccgtgcttga agccggccgc ccgcagcatg ccgcgggggg catatccgag cgcctcgtgc 6600
atgcgcacgc tcgggtcggt gggcagcccg atgacagcga ccacgctctt gaagccctgt 6660
gcctccaggg acttcagcag gtgggtgtag agcgtggagc ccagtcccggt ccgctgggtg 6720
cggggggaga cgtacacgggt cgaactcggcc gtccagtcgt aggcgttgcg tgccttccag 6780
gggcccgcgt aggcgatgcc ggcgacctcg ccgtccacct cggcgacgag ccagggatag 6840
cgctcccgca gacggacgag gtcgctccgtc cactcctgcg gttcctgctg ctcgggtacg 6900
aagttgaccg tgcttgtctc gatgtagtgg ttgacgatgg tgcagaccgc cggcatgtcc 6960
gcctcgggtg caccggcgat gtccggccggg cgtcggtctg ggctcatggt agactcgaga 7020
gagatagatt ttagagaga gactgggtgat ttcagcgtgt cctctccaaa tgaaatgaac 7080
ttccttatat acaggaaggt cttgcgaagg atagtgggat tgtgcgtcat cccttacgtc 7140
agtggagata tcacatcaat ccacttgctt tgaagacgtg gttggaacgt cttctttttc 7200
cacgatgctc ctgctgggtg ggggtccatc tttgggacca ctgtcggcag aggcattctt 7260
aacgatagcc tttcttttat cgcaatgatg gcattttagt gtgccacctt cctttttctac 7320
tgtccttttg atgaagtgc agatagctgg gcaatggaat ccgaggaggt tccccgatat 7380
taccctttgt tgaaaagtct caatagccct ttgggtcttct gagactgtat ctttgatatt 7440
cttgagtagt acgagagtgt cgtgctccac catgttatca catcaatcca cttgctttga 7500
agacgtggtt ggaacgtctt ctttttccac gatgctcctc gtgggtgggg gtccatcttt 7560
gggaccactg tcggcagagg catcttgaac gatagccttt cctttatcgc aatgatggca 7620
ttttaggtg ccaccttctt tttctactgt ccttttgatg aagtgcaga tagctgggca 7680
atggaatccg aggaggtttc ccgatattac ctttgttga aaagtctcaa tagccctttg 7740
gtcttctgag actgtatctt tgatattctt ggagtagacg agagtgtcgt gctccaccat 7800
gttggaagc tgctctagcc aatagcgaat ccgcctctcc ccgcgcgttg gccgattcat 7860
taatgcagct ggcacgacag gtttccgcac tggaaagcgg gcagtgcgcg caacgcgaatt 7920
aatgtgagtt agctcactca ttaggcaccc caggctttac actttatgct tccggctcgt 7980
atgttgtgtg gaattgtgag cggataacaa tttcacacag gaaacagcta tgaccatgat 8040
tacgaattgc agtcgggtac ccggggatcc tctagagtcg acctgcaggc atgcaagctt 8100
ggcactggcc gtctgtttac aacgtcgtga ctgggaaaac cctggcgtta cccaacttaa 8160
tcgccttgca gcacatcccc ctttcgccag ctggcgtaat agcgaagagg ccgcaccga 8220
tcgccttcc caacagttgc gcagcctgaa tggcgaaatgc tagagcagct tgagcttgga 8280
tcagattgtc gtttcccgcc ttcagtttaa actatcagtg tttgacagga tatattggcg 8340
ggtaaaccta agagaaaaga gcgtttatta gaataacgga tatttaaaag ggcgtgaaaa 8400
ggtttatccg ttcgtccatt tgtatgtg

```

<210> 3
 <211> 10549
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> pCambia1302 plasmid

<300>
 <308> Genbank #AF234298
 <309> 2000-04-24

```

<400> 3
catggtagat ctgactagta aaggagaaga acttttctact ggagttgtcc caattcttgt 60
tgaattagat ggtgatgtta atgggcacaa attttctgtc agtggagagg gtgaagggtga 120
tgcaacatac ggaaaactta cccttaaatt tatttgcact actggaaaac tacctgttcc 180
gtggccaaca cttgtcacta ctttctctta tgggtgttcaa tgcttttcaa gataccaga 240
tcatatgaag cggcagcact tcttcaagag cgcctatgctt gagggatagc tgcaggagag 300
gaccatcttc ttcaaggacg acgggaacta caagacacgt gctgaagtca agtttgaggg 360
agacaccctc gtcaacagga tcgagcttaa ggggaatcgat ttcaaggagg acggaacat 420
cctcggccac aagttggaat acaactacaa ctcccacac gtatacatca tggccgacaa 480
gcaaaagaac ggcattcaag ccaacttcaa gaccggccac aacatcgaag acggcggcgt 540
gcaactcgct gatcattatc aacaaaatac tocaattggc gatggccctg tccttttacc 600
agacaacctt taactgtcca cacaatctgc cctttcgaaa gatcccaacg aaaagagaga 660
ccacatggct cttcttgagt ttgtaacagc tgctgggatt acacatggca tggatgaact 720
atacaagcgt agccaccacc accaccacca cgtgtgaatt ggtgaccagc tcgaatttcc 780
ccgatcgttc aaacatttgg caataaagtt tcttaagatt gaatcctgtt gccggctctt 840
cgatgattat catataatth ctgttgaatt acgttaagca tgtaataatt aacatgtaat 900
gcatgacggt atttatgaga tgggttttta tgattagagt cccgcaatta tacatttaat 960

```

WO 02/096923

PCT/US02/17451

-7-

acgcgataga	aaacaaaata	tagcgcgcaa	actaggataa	attatcgcg	gcggtgtcat	1020
ctatgttact	agatcgggaa	ttaaactatc	agtgtttgac	aggatatatt	ggcgggtaaa	1080
cctaagagaa	aagagcggtt	attagaataa	cggatattta	aaagggcggtg	aaaagggtta	1140
tccgttcgtc	catttgatg	tgcatgccaa	ccacagggtt	cccctcgga	tcaaagtact	1200
ttgatccaac	ccctccgctg	ctatagtga	gtcggcttct	gacgttcagt	gcagccgtct	1260
tctgaaaacg	acatgtcgca	caagtcctaa	gttacgcgac	aggctgcgc	cctgcccttt	1320
tccgtggcgtt	ttcttgtcgc	gtgttttagt	cgcataaagt	agaatacttg	cgactagaac	1380
cggagacatt	acgccatgaa	caagagcgcc	gccgctggcc	tgctgggcta	tgcccgcgtc	1440
agcaccgacg	accaggactt	gaccaaccaa	cgggcccgaac	tgacgcgcgc	cggctgcacc	1500
aagctgtttt	ccgagaagat	caccggcacc	aggcgcgacc	gcccggagct	ggccaggatg	1560
cttgaccacc	tacgccttg	cgacgttgtg	acagtgacca	ggctagaccg	cctggcccg	1620
agcaccgcgc	acctactgga	cattgcccag	cgcacccagg	aggccggcgc	gggcctgcgt	1680
agcctggcag	agccgtgggc	cgacaccacc	acgcggcgcc	gcccgcaggt	gttgaccgtg	1740
ttcgccggca	ttgcgagtt	cgagcgttcc	ctaatacatg	accgcaccgc	gagcgggcgc	1800
gaggccgcca	cccgcgaggt	cgtgaagttt	ggcccccgcc	ctaccctcac	cccggcagag	1860
atcgcgacg	cccgcgaggt	gatcgaccag	gaaggccgca	ccgtgaaaga	ggcggctgca	1920
ctgcttgccg	tgcatcgctc	gaccctgtac	cgcgcacttg	agcgcagcga	ggaagtgcag	1980
cccaccgagg	ccaggcgccg	cgggtgccttc	cgtgaggacg	cattgaccga	ggccgacgcc	2040
ctggcgccgc	ccgagaatga	acgccaagag	gaacaagcat	gaaaccgcac	caggacggcc	2100
aggacgaacc	gtttttcatt	accgaagaga	tcgaggcgga	gatgatcgcg	gcccgggtacg	2160
tggtccgacc	gcccgcgcac	gtctcaaccg	tgccggtgca	tgaaatcctg	gcccgtttgt	2220
ctgatgccaa	gctggcgcc	tgcccgccca	gcttgccgc	tgaagaaacc	gagcgcgcgc	2280
gtctaaaaag	gtgatgtgta	tttgagtaaa	acagcttgcg	tcatgcggtc	gctgcgtata	2340
tgatgcgatg	agtaataaaa	caaatacgca	aggggaacgc	atgaaggtta	tcgctgtact	2400
taaccagaaa	ggcgggtcag	gcaagacgac	catcgcaacc	catctagccc	gcgccttgca	2460
actccgccc	gcccgatgtt	tgtagtcga	ttccgatccc	cagggcagtg	cccgcagtg	2520
ggcggccggtg	cggaagatc	aaccgctaac	cgttgtcgcc	atcgaccgcc	cgacgattga	2580
ccgcgacgtg	aaggccatcg	gcccgcgcga	cttcgtagt	atcgacggag	cgccccaggc	2640
ggcggacttg	gctgtgtccg	cgatcaaggc	agccgacttc	gtgctgattc	cgggtgcagcc	2700
aagcccttac	gacatatggg	ccaccgcccga	cctggtggag	ctggttaagc	agcgcattga	2760
ggtcacggat	ggaaggctac	aagcggcctt	tgctgtgtcg	cgggcgatca	aaggcacgcg	2820
catcgccggt	gaggttgccg	aggcgtggc	cgggtacgag	ctgcccattc	ttgagtcg	2880
tatcacgcag	cgcgtgagct	accagggcac	tgccgcgcgc	ggcacaaccg	ttcttgaatc	2940
agaacccgag	ggcgacgctg	cccgcgaggt	ccaggcgctg	gcccgtgaaa	ttaaatcaaa	3000
actcatttga	gttaatgagg	taaagagaaa	atgagcaaaa	gcacaaacac	gctaagtgcc	3060
ggcgcctcga	gcgcacgcag	cagcaaggct	gcaacgttgg	ccagcctggc	agacacgcca	3120
gcccataagc	gggtcaactt	tcagttgccg	gcccaggatc	acaccaagct	gaagatgtac	3180
gcccgtacgc	aaggcaagac	cattaccgag	ctgctatctg	aatacatcgc	gcagctacca	3240
gagtaaatga	gcaaatgaat	aaatgagtag	atgaatttta	gcggctaaag	gaggcgccat	3300
ggaaaatcaa	gaacaaccag	gcaccgacgc	cgtggaatgc	cccatgtgtg	gaggaacggg	3360
cgggttgcca	ggcgtaagcg	gctgggttgt	ctgcggccgc	tgcaatggca	ctggaacccc	3420
caagcccgag	gaatcggcgt	gacggtcgca	aaccatccgc	cccgtacaa	atcggcgccg	3480
cgctgggtga	tgacctggtg	gagaagttga	aggccgcgca	ggccgcccag	cggcaacgca	3540
tcgaggcaga	agcacgcccc	ggtgaatcgt	ggcaagcgcc	cgctgatoga	atccgcaaag	3600
aatcccggca	accgcggcca	gcccgtgcgc	cgtcgattag	gaagccgccc	aaggcgacg	3660
agcaaccaga	ttttttcgtt	ccgatgctct	atgacgtggg	caccgcgcg	agtcgcagca	3720
tcattggacg	ggccgttttc	cgtctgtcga	agcgtgaccg	acgagctggc	gaggtgatcc	3780
gctacgagct	tcacgacggg	cacgtagagg	tttcgcgagg	gcccggccgc	atggccagtg	3840
tgtgggatta	cgacctggta	ctgatggcgg	tttcccatct	aaccgaatcc	atgaaccgat	3900
accgggaagg	gaagggagac	aagcccggcc	gcgtgttccg	tcacacagtt	gcggacgtac	3960
tcaagttctg	ccggcgagcc	gatggcgga	agcagaaaga	cgacctggta	gaaacctgca	4020
ttcggttaaa	caccacgcac	gttgccatgc	agcgtacgaa	gaaggccaag	aacggccgcc	4080
tggtgacggt	atccgagggg	gaagccttga	ttagccgcta	caagatcgta	aagagcgaaa	4140
ccgggcccgc	ggagtacatc	gagatcgagc	tagctgattg	gatgtaccgc	gagatcacag	4200
aaggcaagaa	cccggacgtg	ctgacggttc	accccgatta	ctttttgatc	gatcccggca	4260
tcggccggtt	tctctaccgc	ctggcacgcc	gcgcgcgagg	caaggcagaa	gccagatggg	4320
tggtcaagac	gatctacgaa	cgcagtggca	gcgcgggaga	gttcaagaag	ttctgtttca	4380
ccgtgcgcaa	gctgatccgg	tcaaatgacc	tgccggagta	cgatttgaag	gaggagcgcg	4440
ggcaggctgg	cccgatccca	gtcatgcgct	accgcaacct	gatcgagggc	gaagcatccg	4500
ccggttccta	atgtacggag	cagatgctag	ggcaaatgac	cctagcaggg	gaaaaaggtc	4560
gaaaaggctc	ctttcctgtg	gatagcacgt	acattgggaa	cccaaagccg	tacattggga	4620
accggaaccc	gtacattggg	aaaccaaagc	cgtacattgg	gaaccggtca	cacatgtaag	4680
tgactgatat	aaaagagaaa	aaaggcgatt	tttccgcta	aaactcttta	aaacttatta	4740
aaactcttaa	aaccgcctg	gcctgtgcac	aactgtctgg	ccagcgcaca	gccgaagagc	4800
tgcaaaaagc	gcctaccctt	cggctcgtgc	gctccctacg	cccgcgcgct	tcgcgtcgcc	4860
ctatcgccgc	cgtggccgc	tcaaaaatgg	ctggcctacg	gccaggcaat	ctaccagggc	4920
gcggacaagc	cgcgcgctg	ccactcgacc	gcccgcgcgc	acatcaaggc	accctgcctc	4980

WO 02/096923

PCT/US02/17451

-8-

gcgcgtttcg	gtgatgacgg	tgaaaacctc	tgacacatgc	agctcccgga	gacgggtcaca	5040
gcttgtctgt	aagcggatgc	cgaggagcaga	caagcccgtc	agggcgcgctc	agcgggtgtt	5100
ggcggtgtgc	ggggcgcgagc	catgacccag	tcacgtagcg	atagcggagt	gtatactggc	5160
ttactatgc	ggcatcagag	cagattgtac	tgagagtgc	ccatatgogg	tgtgaaatac	5220
cgacacagatg	cgtaaggaga	aaataccgca	tcaggcgctc	ttccgcttcc	tcgctcaactg	5280
actcgctgcg	ctcggtcggtt	cggtcgcggc	gagcgggtatc	agctcactca	aaggcggtaa	5340
tacggttatc	cacagaatca	ggggataacg	caggaaagaa	catgtgagca	aaaggccagc	5400
aaaaggccag	gaaccgtaaa	aaggccgcgt	tgctggcggtt	tttccatagg	ctccgcccc	5460
ctgacgagca	tcacaaaaat	cgacgctcaa	gtcagagggtg	gcgaaacccg	acaggactat	5520
aaagatacca	ggcgtttccc	cctggaagct	ccctcgctgcg	ctctcctgtt	ccgaccctgc	5580
cgcttacogg	atacctgtcc	gcctttctcc	cttcgggaag	cgtggcgctt	tctcatagct	5640
cacgctgtag	gtatctcagt	tcgggtgtagg	tcgttcgctc	caagctgggc	tgtgtgcacg	5700
aaccccccg	tcagcccgac	cgctgcgct	tatccggtaa	ctatcgtctt	gagtccaacc	5760
cggtaaagaca	cgacttatcg	ccactggcag	cagccactgg	taacaggatt	agcagagcga	5820
ggatgttagg	cggtgtctaca	gagttcttga	agtgggtggcc	taactacggc	tacactagaa	5880
ggacagtatt	tggtatctgc	gctctgtcta	agccagttac	cttcggaaaa	agagttggta	5940
gctcttgatc	cggaacaa	accaccgctg	gtagcgggtg	ttttttgtt	tgcaagcagc	6000
agattacgcg	cagaaaaaaa	ggatctcaag	aagatccctt	gatcttttct	acggggtctg	6060
acgctcagtg	gaacgaaaa	tcacgttaag	ggattttggt	catgcattct	aggtactaaa	6120
acaattcatc	cagtaaaata	taatatatta	ttttctccca	atcaggcttg	atccccagta	6180
agtcaaaaa	tagctcgaca	tactgttctt	ccccgatatc	ctccctgac	gaccggagcc	6240
agaaggcaat	gtcataccac	ttgtccgccc	tgccgcttct	cccaagatca	ataaagccac	6300
ttactttgcc	atctttcaca	aagatgttgc	tgtctcccag	gtcgcctggg	gaaaagacaa	6360
gttccctcttc	gggcttttcc	gtctttaaaa	aatcatacag	ctcgcgcgga	tctttaaatg	6420
gagtgctctc	ttcccagttt	tcgcaatcca	catcggccag	atcgttattc	agtaagtaat	6480
ccaattcggc	taagcggctg	tctaagctat	tcgtataggg	acaatccgat	atgtcgtatg	6540
agtgaaagag	ctcgatgcac	tcgcataca	gctcgataat	cttttcaggg	ctttgttcat	6600
cttcatactc	ttccgagcaa	aggacgccat	cggcctcact	catgagcaga	ttgctccagc	6660
catcatgccc	ttcaaagtgc	aggacctttg	gaacaggcag	ctttccttcc	agccatagca	6720
tcatgtcctt	ttcccgttcc	acatcatagg	tggtcccttt	ataccggctg	tccgtcattt	6780
ttaaatatag	gttttcattt	tctcccacca	gcttatatac	cttagcagga	gacattcctt	6840
ccgtatcttt	tacgcagcgg	tatttttcga	tcagtttttt	caattccggt	gatattctca	6900
ttttagccat	ttattatttc	cttccctctt	tctacagtat	ttaaagatac	cccaagaagc	6960
taattataac	aagacgaact	ccaattcact	gttccttgca	ttctaaaacc	ttaaatacca	7020
gaaaacagct	ttttcaaagt	tgttttcaaa	gttggcgtat	aacatagtat	cgacggagcc	7080
gattttgaaa	ccgcgggtgt	cacaggcagc	aacgctctgt	catcggtaca	atcaacatgc	7140
tacctccgc	gagatcatcc	gtgtttcaaa	ccggcagct	tagttgcccgt	tcttccgaat	7200
agcatccgta	acatgagcaa	agtctgcgc	gttacaacgg	ctctcccgt	gacgccgtcc	7260
cggactgatg	ggctgcctgt	atcgagtgg	gattttgtgc	cgagctgccg	gtcggggagc	7320
tggtggctgg	ctggtggcag	gatataattg	ggtgtaaa	aattgacgct	tagacaactt	7380
aataacacat	tgccggacgtt	tttaattgtac	tgaattaacg	cogaattaat	tcgggggatc	7440
tggatttttag	tactggattt	tggttttagg	aattagaaat	tttattgata	gaagtatttt	7500
acaaatacaa	atacatacta	agggtttctt	atatgctcaa	cacatgagcg	aaaccctata	7560
ggaaccctaa	ttcccttctc	tggaactac	tcacacatta	ttatggagaa	actcgagctt	7620
gtcgatcgac	agatccggtc	ggcatctact	ctatttcttt	gccctcggac	gagtgtctggg	7680
gcgtcgggtt	ccactatcgg	cgagtacttc	tacacagcca	tcgggtccaga	cggccgcgct	7740
tctgcggggc	atttgtgtac	gcccgcagat	ccggctccg	gatcggacga	ttgctcgcga	7800
tcgacctctg	gcccgaagctg	catcatcgaa	attgcccgtca	accaagctct	gatagatttg	7860
gtcaagacca	atgcccagagc	tatacggccg	gagtcgtggc	gatcctgcaa	gctccggatg	7920
cctccgctcg	aagtagcgcg	tctgctgctc	catacaagcc	aaccacggcc	tccagaagaa	7980
gatgttggcg	acctcgtatt	gggaatcccc	gaacatcgcc	tcgctccagt	caatgaccgc	8040
tgttatgogg	ccattgtccg	tcaggacatt	gttggagccg	aaatccgcgt	gcacgaggtg	8100
ccggacttcg	gggcagtcct	cggcccaaag	catcagctca	tcgagagcct	gcgcgacgga	8160
cgcactgacg	gtgtcggtcca	tcacagtttg	ccagtgtatc	acatggggat	cagcaatcgc	8220
gcatatgaaa	tcacgcccag	tagtgtattg	accgattcct	tgcggtccga	atgggcccga	8280
cccgtcgtgc	tggttaagat	cggccgcagc	gatcgcaccc	atagcctccg	cgaccggttg	8340
tagaacagcg	ggcagttcgg	tttcaggcag	gtcttgcaac	gtgacaccc	gtgcacggcg	8400
ggagatgcaa	taggtcaggc	tctcgctaaa	ctccccaatg	tcaagcaott	ccggaatcgg	8460
gagcgcggcc	tggtcaaaagt	gcccataaac	ataacgatct	ttgtagaaac	catcggcgca	8520
gctattttacc	cgcaggacat	atccacgccc	tcctacatcg	aagctgaaag	cacgagattc	8580
ttcgccctcc	gagagctgca	tcaggtcgga	gacgctgtcg	aacttttctga	tcagaaactt	8640
ctcgacagac	gtcgcgggtga	gttcaggctt	tttcatatct	cattgcccc	cgggatctgc	8700
gaaagctcga	gagagataga	ttttagagaa	gagactgggtg	atttcagcgt	gtcctctcca	8760
aatgaaatga	acttccttat	atagagggaag	gtcttgcgaa	ggatagtggtg	attgtgcgtc	8820
atcccttacg	tcagtggaga	tatcacatca	atccacttgc	tttgaagacg	tggttggaa	8880
gtcttctttt	tccacgatgc	tcctcgtggg	tgggggtcca	tctttgggac	cactgtcggc	8940
agaggcatct	tgaacgatag	cctttccttt	atcgcaatga	tggcatttgt	aggtgccacc	9000

WO 02/096923

PCT/US02/17451

-9-

```

ttccttttct actgtccttt tgatgaagt acagatagct gggcaatgga atccgaggag 9060
gtttcccgat attacccttt gttgaaaagt ctcaatagcc ctttgggtctt ctgagactgt 9120
atcttttgata ttcttgaggat agacgagagt gtogtggtcc accatgttat cacatcaatc 9180
cacttgcttt gaagacgtgg ttggaacgtc ttctttttcc acgatgctcc tcgtgggtgg 9240
gggtccatct ttgggaccac tgcgcgcaga ggcacottga acgatagcct ttcctttatc 9300
gcaatgatgg catttgtagg tgccaccttc cttttctact gtccttttga tgaagtgaac 9360
gatagctggg caatggaatc cgaggaggtt tcccgatatt accctttgtt gaaaagtctc 9420
aatagccctt tggctctctg agactgtatc tttgatattc ttggagtaga cgagagtgtc 9480
gtgctccacc atgttggaac gctgctctag ccaatacgca aaccgcctct ccccgcgct 9540
tggccgattc attaatgcag ctggcacgac aggtttcccg actggaagc gggcagtga 9600
cgcaacgcaa ttaatgtgag ttagctcact cattaggcac ccaggcttt acactttatg 9660
cttcgggtc gtatgttggtg tggaaattgt agcggataac aatttcacac aggaaacagc 9720
tatgaccatg attacgaatt cgagctcgtt acccggggat cctctagagt cgacctgcag 9780
gcatgcaagc ttggcactgg ccgtcgtttt acaacgtcgt gactgggaaa accctggcgt 9840
tacccaactt aatcgccctt cagcacatcc ccttttcgcc agctggcgta atagcgaaga 9900
ggcccgacc gatcgccctt cccaacagtt ggcagcctg aatggcgaat gctagagcag 9960
cttgagcttg gatcagattg tcgtttcccg ccttcagttt agcttcatgg agtcaaagat 10020
tcaaatagag gacctaacag aactcgccgt aaagactggc gaacagttca tacagagtct 10080
cttacgactc aatgacaaga agaaaatctt cgtcaacatg gtggagcacg acacacttgt 10140
ctactccaaa aatatcaaaag atacagtctc agaagaccaa agggcaattg agacttttca 10200
acaaaggta atatccggaa acctcctcgg attccattgc ccagctatct gtcactttat 10260
tgtgaagata gtggaaaagg aaggtggctc ctacaaatgc catcattgag ataaaggaaa 10320
ggccatcgtt gaagatgcct ctgccgacag tgggtccaaa gatggacccc caccacagag 10380
gagcatcgtg gaaaaagaag acgttccaac cactgtctca aagcaagtgg attgatgtga 10440
tatctccact gacgtaaggg atgacgcaca atcccactat ccttcgcaag acccttcctc 10500
tatataagga agttcatttc atttggagag aacacggggg actcttgac 10549

```

<210> 4
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> CaMV35SpolyA Primer

<400> 4
ctgaattaac gccgaattaa ttcgggggat ctg 33

<210> 5
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> CaMV35Spr Primer

<400> 5
ctagagcagc ttgccaacat ggtggagca 29

<210> 6
<211> 12592
<212> DNA
<213> Artificial Sequence

<220>
<223> pAg2 Plasmid

```

<400> 6
gtacgaagaa ggccaagaac ggccgcctgg tgacgggtatc cgagggtgaa gccttgatta 60
gccgctacaa gatcgtaaag agcgaaaccg ggccggccgga gtacatcgag atcgagctag 120
ctgattggat gtaccgcgag atcacagaag gcaagaaccc ggacgtgctg acggttcacc 180
ccgattactt tttgatcgat ccgggcacgt gccgttttct ctaccgcctg gcacgcgcgg 240
ccgcaggcaa ggcagaagcc agatggttgc tcaagacgat ctacgaacgc agtggcagcg 300
ccggagagtt caagaagttc tgtttcacc tgccgaagct gatcgggtca aatgacctgc 360
cggagtagca tttgaaggag gaggcggggc aggtctggcc gatcctagtc atgcgtacc 420
gcaacctgat cgagggcgaa gcatccggcg gttcctaag tacggagcag atgctagggc 480
aaattgccct agcaggggaa aaaggtcgaa aaggtctctt tcctgtggat agcacgtaca 540

```

WO 02/096923

PCT/US02/17451

-10-

ttgggaaccc	aaagccgtac	attgggaacc	ggaacccgta	cattgggaac	ccaaagccgt	600
acattgggaa	ccggtcacac	atgtaagtga	ctgatataaa	agagaaaaaa	ggcgattttt	660
ccgcctaaaa	ctctttaaaa	cttattaaaa	ctcttaaaac	ccgcctggcc	tgtgcataac	720
tgtctggcca	gcgcacagcc	gaagagctgc	aaaaagcgcc	tacccttcgg	tcgctgcgct	780
ccctacgccc	cgcgcttcg	cgtcggccta	tcgcgccgc	tggccgctca	aaaatggctg	840
gcctacggcc	aggcaatcta	ccaggggcgc	gacaagccgc	gccgtcgcca	ctcgacggcc	900
ggcgccca	tcaaggcacc	ctgcctcgcg	cgtttcggtg	atgacgggtg	aaacctctga	960
cacatgcagc	tcccgagagac	ggtcacagct	tgtctgtaag	cggatgccgg	gagcagacaa	1020
gcccgtcagg	gcgcgtcagc	gggtgttggc	gggtgtcggg	gcgcagccat	gaccagtc	1080
cgtagcgata	goggagtgtg	tactggctta	actatgcggc	atcagagcag	attgtactga	1140
gagtgcacca	tatgcggtgt	gaaataccgc	acagatgcgt	aaggagaaaa	taccgcatca	1200
ggcgctcttc	cgttctctcg	ctcactgact	cgtcgcgtc	ggctgttcgg	ctgcggcgag	1260
cggtatcagc	tcactcaaag	gcggtaatat	ggttatccac	agaatcaggg	gataacgcag	1320
gaaagaacat	gtgagcaaaa	ggccagcaaa	aggccaggaa	ccgtaaaaag	gccgcgttgc	1380
tggcgttttt	ccataggctc	cgcctccctg	acgagcatca	caaaaatcga	cgctcaagtc	1440
agaggtggcg	aaacccgaca	ggactataaa	gataccaggc	gtttccccc	ggaagctccc	1500
tcgtgcgctc	tcctgttcgg	accctgccc	ttaccggata	cctgtccgcc	tttctccctt	1560
cgggaagcgt	ggcgctttct	catagctcac	gctgtaggta	tctcagttcg	gtgtaggctg	1620
ttcgctccaa	gctgggctgt	gtgcacgaac	ccccgcttca	gcccgaocgc	tgcgccttat	1680
ccggtaaacta	tcgtcttgag	tccaacccgg	taagacacga	cttatcgcca	ctggcagcag	1740
ccactggtaa	caggattagc	agagcgagg	atgtaggcgg	tgctacagag	ttcttgaagt	1800
gggtggcctaa	ctacggctac	actagaagga	cagtatttgg	tatctgcgct	ctgctgaagt	1860
cagttacctt	cggaaaaaga	gttggtagct	cttgatccgg	caaaacaaacc	accgctggta	1920
gcggtggttt	ttttgtttgc	aagcagcaga	ttacgcgcag	aaaaaaagga	tctcaagaag	1980
atcctttgat	cttttctacg	gggtctgacg	ctcagtggaa	cgaaaaactca	cgtaaggga	2040
ttttgtcat	gattcttagg	tactaaaaca	attcatccag	taaaatataa	tattttattt	2100
tctccaatc	agccttgatc	ccagtaagt	caaaaaatag	ctcgacatac	tggtcttccc	2160
cgatatcctc	cctgatcgac	cggacgcaga	aggcaatgtc	ataccacttg	tccgcccctg	2220
cgcttctccc	aagatcaata	aagccactta	ctttgccatc	tttcacaaag	atgttgctgt	2280
ctcccaggtc	gcccgtgggaa	aagacaagtt	cctcttcggg	cttttccgct	tttaaaaaat	2340
catcacgctc	gcccggatct	ttaaatggag	tgtctctctc	ccagttttcg	caatccacat	2400
cggccagatc	gttattcagt	aagtaatcca	attcggctaa	gcggctgtct	aagctattcg	2460
tatagggaca	atccgatatg	tcgatggagt	gaaagagcct	gatgcactcc	gcatacagct	2520
cgataatctt	ttcagggtct	tgttcatctt	catactcttc	cgagcaaagg	acgccatcgg	2580
cctcaactcat	gagcagattg	ctccagccat	catgccgttc	aaagtgcagg	acctttggaa	2640
caggcagctt	tccttcacag	catagcatca	tgtccttttc	ccgttccaca	tcataagtg	2700
tccctttata	cgggtgtcc	gtcattttta	aatataggtt	ttcattttct	cccaccagct	2760
tataatcctt	agcaggagac	attccttcgg	tatcttttac	gcagcgggat	ttttcgatca	2820
gttttttcaa	ttccgggtgat	attctcattt	tagccattta	ttatttctct	cctcttttct	2880
acagttattt	aagatacccc	aagaagctaa	ttataacaag	acgaactcca	attcactggt	2940
ccttgcattc	taaaacctta	aataccagaa	aacagctttt	tcaaagttgt	tttcaaagtt	3000
ggcgtataac	atagtataca	cggagccgat	tttgaacccg	cgggtgatcac	aggcagcaac	3060
gctctgtcat	cgttacatca	aacatgctac	cctccgcgag	atcatccgtg	tttcaaaccc	3120
ggcagcttag	ttgccgttct	tccgaatagc	atcggttaaca	tgagcaaagt	ctgccgcctt	3180
acaacggctc	tcccgtgac	gccgtcccgg	actgatgggc	tgccgtgatc	gagtgggtgat	3240
tttgtgccga	gctgccgggtc	ggggagctgt	tggctggctg	gtggcaggat	atattgtggg	3300
gtaaacaaat	tgacgcttag	acaacttaat	aacacattgc	ggacgttttt	aatgtactga	3360
attaaocgcg	aattaattcg	gggatcttgg	attttagtac	tggatttttg	ttttaggaat	3420
tagaaatttt	attgatagaa	gtatttttaca	aatacaata	cataactaagg	gtttcttata	3480
tgctcaacac	atgagcgaaa	ccctatagga	accctaattc	ccttatctgg	gaactactca	3540
cacattatta	tggagaaact	cgagtcaaat	ctcggtgacg	ggcaggaccg	gacggggcgg	3600
taccggcagg	ctgaagtcca	gctgccagaa	accacgctca	tgccagttcc	cgtgcttgaa	3660
gccggccgcc	cgcagcatgc	cgcggggggc	atatccgagc	gcctcgtgca	tgccagcgtg	3720
cgggtcggtg	ggcagcccga	tgacagcgac	cacgctcttg	aagccctgtg	cctccaggga	3780
cttcagcagg	tgggtgtaga	gcgtggagcc	cagtcgccgc	cgtcgggtgg	ggggggagac	3840
gtacacgggtc	gactcggccg	tccagtcgta	ggcgttgccg	gccttccagg	ggcccgcgta	3900
ggcgatgccc	gagacctcgc	cgtccacctc	ggcgacgagc	cagggatagc	gctcccgcag	3960
acggcagagg	tcgtccgccc	actcctgccc	ttcctgccc	tcggtagcga	agttgacctg	4020
gottgtctcg	atgtagtggg	tgacgatggg	gcagaccgcc	ggcatgtccg	cctcggtggc	4080
acggcggatg	tcggccgggc	gtcgttctgg	gctcatggta	gactcagag	agatagattt	4140
gtagagagag	actggtgatt	tcagcgtgtc	ctctccaaat	gaaatgaact	tccttatata	4200
gaggaagggtc	ttgcgaagg	tagtgggatt	gtcgcgtcatc	ccttacgtca	gtggagatat	4260
cacatcaatc	cacttgcttt	gaagacgtgg	ttggaaacgtc	ttctttttcc	acgatgctcc	4320
tgcgtgggtg	gggtccatct	ttgggaccac	tgtcggcgaga	ggcatcttga	acgatagcct	4380
ttcctttatc	gcaatgatgg	cattttgtagg	tgccaccttc	cttttctact	gtccttttga	4440
tgaagtgaca	gatagctggg	caatggaatc	cgaggagggtt	tcccgatatt	accctttggt	4500
gaaaagctctc	aatagccctt	tgggtctctg	agactgtatc	tttgatattc	ttggagtaga	4560

WO 02/096923

PCT/US02/17451

-11-

cgagagtgtc	gtgtccacc	atgttatcac	atcaatccac	ttgctttgaa	gacgtgggtg	4620
gaacgtcttc	ttttccacg	atgtcctcgc	tgggtggggg	tccatctttg	ggaccactgt	4680
cggcagaggc	atcttgaacg	atagcctttc	ctttatcgca	atgatggcat	ttgtaggtgc	4740
caccttcctt	ttctactgtc	cttttgatga	agtgcacgat	agctgggcaa	tggaaatccga	4800
ggaggtttcc	cgatattacc	ctttgttgaa	aagtctcaat	agccctttgg	tcttctgaga	4860
ctgtatcttt	gatattcttg	gagtagacga	gagtgctgtg	ctccaccatg	ttggcaagct	4920
gctctagcca	atacgcaaac	cgctctccc	cgcgcttgg	ccgattcatt	aatgcagctg	4980
gcacgacagg	tttcccgact	ggaaagcggg	cagtgcgcgc	aacgcaatta	atgtgagtta	5040
gctcactcat	taggcacccc	aggctttaca	ctttatgctt	ccggctcgta	tgttgtgtgg	5100
aatttgtgagc	ggataacaat	ttcacacagg	aaacagctat	gaccatgatt	acgaattcga	5160
gccttgacta	gagggctcgac	ggatatacaga	catgataaga	tacattgatg	agtttggaca	5220
aaccacaact	agaatgcagt	gaaaaaaatg	ctttatattgt	gaaatttgtg	atgctattgc	5280
tttattttgta	accattataa	gctgcaataa	acaagttggg	gtgggcgaag	aactccagca	5340
tgagatcccc	gcgctggagg	atcatccagc	cggcgtcccc	gaaaacgatt	ccgaagccca	5400
acctttcata	gaaggcggcg	gtggaatcga	aatctcgtag	cacgtgtcag	tcctgtctct	5460
cggccacgaa	gtgcacgcag	ttgccggcgc	ggcgcgcgag	ggcgaactcc	cgccccacg	5520
gctgctcgcc	gatctcggtc	atggccggcc	cggaggcgtc	ccggaagttc	gtggacacga	5580
cctccgacca	ctcggcgtac	agctcgtcca	ggccgcgcac	ccacacccag	gccagggtgt	5640
tgtccggcac	cacctgggtc	tggaccgcgc	tgatgaacag	ggtcacgtcg	tcccggacca	5700
caccggcgaa	gtcgtcctcc	acgaagtccc	gggagaaccc	gagccgggtc	gtccagaact	5760
cgaccgtctc	ggcgacgtcg	cgcgcgggtg	gcaccggaac	ggcactgggtc	aacttggcca	5820
tggatccaga	tttctgctcaa	gttagtataa	aaaagcaggc	ttcaatcctg	caggaaattc	5880
atcgacactc	tcgtctactc	caagaatatc	aaagatacag	tctcagaaga	ccaaagggct	5940
attgagactt	ttcaacaaag	ggtaatatcg	ggaaacctcc	tccgattcca	ttgccagct	6000
atctgtcact	tcataaaaag	gacagtagaa	aagggaaggtg	gcacctacaa	atgccatcat	6060
tgcgataaag	gaaaggctat	cgttcaagat	gcctctgcgc	acagtgggtc	caaagatgga	6120
ccccaccaca	cgaggagcat	cgtggaaaaa	gaagacgttc	caaccacgtc	ttcaaaacaa	6180
gtggattgat	gtgataacat	ggtaggacac	gacactctcg	tctactccaa	gaatatcaaa	6240
gatacagctc	cagaagacca	aagggtattt	gagacttttc	aacaaagggg	aatatcgga	6300
aacctcctcg	gattccattg	cccagctatc	tgtcacttca	tcaaaaggac	agtagaaaag	6360
gaaggtagga	cctacaaatg	ccatcattgc	gataaaggaa	aggctatcgt	tcaagatgcc	6420
tctgccgaca	gtgggtccaa	agatggaccc	ccaccacga	ggagcatcgt	ggaaaaagaa	6480
gacgttccaa	cgacgtcttc	aaagcaagtg	gattgatgtg	atatctccac	tgacgtaaag	6540
gatgacgcac	aatcccacta	tccttcgcaa	gaccttcttc	tatataagga	agttcatttc	6600
atttgagagag	gacacgctga	aatcaccagt	ctctctctac	aaatctatct	ctctcgagct	6660
ttcgcagatc	cgggggggca	atgagatatg	aaaaagcctg	aaotcaccgc	gacgtctgtc	6720
gagaagtctc	tgatcgaaaa	gttcgcagc	gtctccgacc	tgatgcagct	ctcggagggc	6780
gaagaatctc	gtgctttcag	cttcgatgta	ggtaggcgtg	gatatgtcct	gcgggtaaat	6840
agctgcgcgc	atgggtttct	caaagatcgt	tatgtttatc	ggcactttgc	atcggccgcg	6900
ctcccgattc	cggaagtgtc	tgacattggg	gagtttagcg	agagcctgac	ctattgcac	6960
tcccgccgtg	cacaggggtg	cacgttgcaa	gacctgcctg	aaaccgaact	gcccgtctgt	7020
ctacaacccg	tccgcgaggc	tatggatgcg	atcgtcgcgc	ccgatcttag	ccagacgagc	7080
gggttcggcc	cattccggacc	gcaaggaatc	ggcctaatac	ctacatggcg	tgatttcata	7140
tgcgcgattg	ctgatcccca	tgtgtatcac	tggcaaaactg	tgatggacga	caccgtcagt	7200
gcgtccgtcg	cgcaggctct	cgatgagctg	atgctttggg	ccgaggactg	cccgaagtc	7260
cggcacctcg	tgcacgcgga	tttcggctcc	aacaatgtcc	tgacggacaa	tggccgcata	7320
acagcggta	ttgactggag	cgaggcgatg	ttcggggatt	cccaatacga	ggtcgccaac	7380
atcttctctt	ggaggccgtg	gttggcttgt	atggagcagc	agacgcgcta	cttcgagcgg	7440
aggcatccgg	aggcttcagg	atcgccacga	ctccggcgct	atatgctccg	cattggctct	7500
gaccaactct	atcagagctt	ggttgacggc	aatttcgatg	atgcagcttg	ggcgcagggt	7560
cgatgcgacg	caatcgtccg	atccggagcc	gggactgtcg	ggcgtacaca	aatcgccgc	7620
agaagcgcgg	ccgtctggac	cgatggctgt	gtagaagtac	tcgccgatag	tggaaaccga	7680
cgccccagca	ctcgtccgag	ggcaaaagaa	tagagtagat	gccgaccgga	tctgtcgatc	7740
gacaagctcg	agtttctcca	taataatgtg	tgagttagttc	ccagataagg	gaattagggg	7800
tcctataggg	tttcgctcat	gtgttgagca	tataagaaac	ccttagtatg	tatttgtatt	7860
tgtaaaatac	ttctatcaat	aaaattttct	attcctaata	ccaaaatcca	gtactaaaat	7920
ccagatcccc	cgaattaatt	cggcggttaat	tcagatcaag	cttggcactg	gccgtcggtt	7980
tcaacgtctg	tgactgggaa	aaccttggcg	ttacccaact	taatcgccct	gcagcacatc	8040
ccctttctcg	cagctcgcggt	aatagcgaag	aggcccgcac	cgatcgccct	tcccaacagt	8100
tgcgcagcct	gaatggcgaa	tgctagagca	gcttgagctt	ggatcagatt	gtcgtttccc	8160
gccttcagtt	tggggatcct	ctagactgaa	ggcgggaaac	gacaatctga	tcatgagcgg	8220
agaattaagg	gagtcacggt	atgacccccg	ccgatgacgc	gggacaagcc	gttttacggt	8280
tggaaactgac	agaaccgcaa	cgttgaagga	gccactcagc	cgcgggtttc	tggagttaa	8340
tgagctaaag	acatacgtca	gaaaccatta	ttgcgcgttc	aaaagtcgcc	taaggtcact	8400
atcagctagc	aaatattttc	tgtcaaaaat	gctccactga	cgttccataa	attccctcgc	8460
gtatccaatt	agagtctcat	attcactctc	aatccaaata	atctgcacgc	gatctcgaga	8520
atcgaattcc	cgcggccgcg	atggtagatc	tgactagtaa	aggagaagaa	cttttccactg	8580

WO 02/096923

PCT/US02/17451

-12-

gagttgtccc	aattcttgtt	gaattagatg	gtgatgttaa	tgggcacaaa	ttttctgtca	8640
gtggagaggg	tgaaggatgat	gcaacatacg	gaaaacttac	ccttaaattt	atttgcacta	8700
ctggaaaact	acctgttccg	tggccaacac	ttgtcactac	tttctcttat	ggtgttcaat	8760
gcttttcaag	ataccagat	catatgaagc	ggcacgactt	cttcaagagc	gccatgcctg	8820
agggatacgt	gcaggagagg	accatcttct	tcaaggacga	cgggaaactac	aagacacgtg	8880
ctgaagtcaa	gtttgaggga	gacacctctg	tcaacaggat	cgagcttaag	ggaatcgatt	8940
tcaaggagga	cggaacatc	ctcggccaca	agttggaata	caactacaac	tcccacaacg	9000
tatacatcat	ggccgacaag	caaaagaacg	gcatcaaagc	caacttcaag	acccgccaca	9060
acatcgaaga	cggcggcgtg	caactcgtcg	atcattatca	acaaaatact	ccaattggcg	9120
atggccctgt	ccttttacc	gacaaccatt	acctgtccac	acaatctgcc	ctttcgaaag	9180
atcccaacga	acattttaata	cacatggtcc	ttotttgatt	tgtaacagct	gctgggatta	9240
cacatggcat	ggatgaacta	tacaaagcta	gccaccacca	ccaccaccac	gtgtgaattg	9300
gtgaccagct	cgaatttccc	cgatcgttca	aacatttggc	aataaagttt	cttaagattg	9360
aatcctgttg	cgggtcttgc	gatgattatc	atataatttc	tggtgaatta	cgtaagcat	9420
gtaataatta	acatgtaatg	catgacgtta	tttatgagat	gggtttttat	gattagagtc	9480
ccgcaattat	acattttaata	cgcgatagaa	aacaaaatat	agcgcgcaaa	ctaggataaa	9540
ttatcgcgcg	cgggtgtcatc	tatgttacta	gatcggaat	taaactatca	gtgtttgaca	9600
ggatatattg	gcgggtaaac	ctaagagaaa	agagcgttta	ttagaataac	ggatatatta	9660
aagggcggtga	aaagggtttat	ccgttcgtcc	atgtgtatgt	gcataccaac	cacagggttc	9720
cctcgggat	caaagtactt	tgatccaacc	cctcgcgtgc	tatagtgcag	tgggttctcg	9780
acgttcagtg	cagccgtctt	ctgaaaacga	catgtgcac	aagtcctaag	ttacgcgaca	9840
ggctgccgpc	ctgccccttt	cctggcggtt	tcttgcgcg	tggttttagtc	gcataaagta	9900
gaataacttg	gactagaacc	ggagacatta	cgccatgaac	aagagcgccg	ccgctggcct	9960
gctgggctat	gcccgcgtca	gcaccgacga	ccaggacttg	accaaccaac	gggccgaact	10020
gcacgcgcc	ggctgcacca	agctgttttc	cgagaagatc	acgggcacca	ggcgcgaccg	10080
ccggagctg	gcccaggatg	ttgaccaact	acggcctggc	gacgttgtga	cagtgaccag	10140
gctagaccgc	ctggcccgcga	gcaccgcgca	cctactggac	attgcccagc	gcataccagg	10200
ggccggcgcg	ggcctgcgta	gcctggcaga	gcccgtggcc	gacaccacca	cgccggcgccg	10260
ccgcatggtg	ttgaccgtgt	tgcgcggcat	tgccgagttc	gagcgttccc	taatcatcga	10320
ccgcaccggg	agcggggcgcg	aggccgcgca	ggcccagagg	gtgaagtttg	gccccgcgcc	10380
tacctcacc	ccggcacagc	tgcgcacgcg	ccgcgagctg	atcgaccagg	aaggccgcac	10440
cgtgaaagag	gcggctgcac	tgcttggcgt	gcactgctcg	acctgtacc	gcgcacttga	10500
gcgcagcgag	gaagtgacgc	ccaccgaggg	caggcgcgcg	ggtgccttcc	gtgaggacgc	10560
attgaccgag	gcccagcgcc	tgccggcgcc	cgagaatgaa	cgccaagagg	aacaagcatg	10620
aaaccgcacc	aggacggcca	ggacgaaccg	tttttcatta	ccgaagagat	cgaggcgag	10680
atgatcgcg	ccgggtacgt	gttcgagccg	cccgcgacgc	tctcaaccgt	gcggctgcac	10740
gaaatccttg	ccggtttgtc	tgatgccaag	ctggcgccct	ggccggccag	cttggccgct	10800
gaagaaaccg	agcgcccgcc	tctaaaaagg	tgatgtgtat	ttgagtaaaa	cagcttgctg	10860
catgcggtcg	ctgctgtat	gatgcgatga	gtaataaaac	aaatacgcaa	ggggaaacgca	10920
tgaaggttat	cgctgtactt	aaccagaaaag	gcgggtcagg	caagacgacc	atcgcaaccc	10980
atctagcccg	cgccctgcaa	ctcgccgggg	ccgatgttct	gttagtcgat	tccgatcccc	11040
agggcagtg	ccgcgattgg	cgggccgtgc	gggaagatca	accgctaacc	gttgtcggca	11100
tgcacccgcc	gacgattgac	cgcgacgtga	agggcatcgg	ccggcgcgac	ttcgtagtga	11160
tgcacggagc	gccccaggcg	gcggacttgg	ctgtgtccgc	gatcaaggca	gccgacttcc	11220
tgctgattcc	ggtgcagcca	agcccttacg	acatatgggc	caccgcgcac	ctggtggagc	11280
tggttaagca	gcgcatttag	gtcacggatg	gaaggctaca	agcggccttt	gtcgtgtcgc	11340
gggcgatcaa	aggcacgcgc	atcgccgggt	aggttgccga	ggcgtggcc	gggtacgagc	11400
tgcccatctt	tgagtcctcg	atcacgcagc	gcgtgagcta	cccaggcact	gccgcgcgcg	11460
gcacaaccgt	tcttgaatca	gaaccgcagg	gcgacgctgc	ccgcgaggtc	caggcgctgg	11520
ccgctgaaat	taaatcaaaa	ctcatttgag	ttaatgaggt	aaagagaaaa	tgagcaaaaag	11580
cacaaacacg	ctaagtgcgc	gcccgtccgag	cgcacgcagc	agcaaggctg	caacgttggc	11640
cagcctggca	gacacgccag	ccatgaagcg	ggtcaacttt	cagttgcccg	cggaggatca	11700
caccaagctg	aagatgtacg	cggtaacgca	aggcaagacc	attaccgagc	tgctatctga	11760
atacatcgcg	cagctaccag	agtaaatgag	caaataaata	aatgagtaga	tgaatttttag	11820
cggctaaagg	aggcggcatg	gaaaaatcaag	aacaaccagg	caccgacgcc	gtggaatgcc	11880
ccatgtgtgg	aggaacgggc	ggttggccag	gcgtaaagcg	ctgggttgct	tgccggccct	11940
gcaatggcac	tggaaacccc	aagcccagagg	aatcggcgtg	acggtcgcaa	accatccggc	12000
ccggtacaaa	tggcgcgccg	gctgggtgat	gacctgggtg	agaagttgaa	ggccgcgcag	12060
gcccggccga	ggcaacgcac	cgaggcagaa	gacctggccg	gtgaatcgtg	gcaagcgccc	12120
gctgatcgaa	tccgcaaaga	atcccggcaa	ccgcggcgag	ccggtgcgcc	gtcgattagg	12180
aagccgcccc	agggcgacga	gcaaccagat	tttttcgttc	cgatgctcta	tgacgtgggc	12240
acccgcgata	gtcgcagcat	catggacgtg	gcccgtttcc	gtctgtcgaa	gcgtgaccga	12300
cgagctggcg	aggtgatccg	ctacgagctt	ccagacgggc	acgtagaggt	ttccgcaggg	12360
ccggccggca	tgggcagttg	gtgggattac	gacctgggtac	tgatggcggt	ttcccatcta	12420
accgaatcca	tgaaccgata	ccgggaaggg	aagggagaca	agcccgcccg	cgtgttccgt	12480
ccacacgttg	cggacgtact	caagttctgc	cggcgagccg	atggcggaag	gcagaaagac	12540
gacctggtag	aaacctgcat	tccgttaaac	accacgcacg	ttgccatgca	gc	12592

WO 02/096923

PCT/US02/17451

-13-

<210> 7

<211> 3357

<212> DNA

<213> Artificial Sequence

<220>

<223> pGEMEasyNOS Plasmid

<400> 7

tatcactagt	gaattcgcgg	ccgcctgcag	gtcgaccata	tgggagagct	cccaacgcgt	60
tggatgcata	gcttgagtat	totatagtgt	cacctaaata	gcttggcgta	atcatgggtca	120
tagctgtttc	ctgtgtgaaa	ttgttatccg	ctcacaattc	cacacaacat	acgagccgga	180
agcataaagt	gtaaagcctg	gggtgcctaa	tgagtgcgt	aactcacatt	aattgcggtg	240
cgctcactgc	ccgctttcca	gtcgggaaac	ctgtcgtgcc	agctgcatta	atgaatcggc	300
caacgcgcgg	ggagaggcgg	tttgcgctatt	gggcgctcct	ccgcttcctc	gctcactgac	360
tgcgtgcgct	cggtcgttcg	gctgcggcga	gcggtatcag	ctcactcaaa	ggcggtaata	420
cgggttatcca	cagaatcagg	ggataacgca	ggaaagaaca	tgtgagcaaa	aggccagcaa	480
aaggccagga	accgtaaaaa	ggccgcgttg	ctggcggttt	tccataggct	ccgccccct	540
gacgagcatc	acaaaaatcg	acgctcaagt	cagagggtgg	gaaacccgac	aggactataa	600
agataccagg	cgtttccccc	tggaagctcc	ctcgtgcgct	ctcctgttcc	gaccctgccg	660
cttaccggat	acctgtccgc	ctttctccct	tccgggaagcg	tggcgctttc	tcatagtctca	720
cgctgtaggt	atctcagttc	gggtgtaggtc	gttcgctcca	agctgggctg	tgtgacagaa	780
cccccgcttc	agcccgaccg	ctgcgcctta	tccggtaact	atcgtcttga	gtccaacccg	840
gtaagacacg	acttatcgcc	actggcagca	gccactggta	acaggattag	cagagcgagg	900
tatgtaggcg	gtgctacaga	gttcttgaag	tgggtggccta	actacggcta	cactagaaga	960
acagtatattg	gtatctgcgc	tctgctgaag	ccagttacct	tccgaaaaag	agttggtagc	1020
tcttgatccg	gcaaaacaaac	caccgctggg	agcgggtggt	tttttgtttg	caagcagcag	1080
attacgcgca	gaaaaaaagg	atctcaagaa	gatcctttga	tcttttctac	ggggtctgac	1140
gctcagtggg	acgaaaactc	acgttaaggg	attttgggtca	tgagattatc	aaaaaggatc	1200
ttcacctaga	tcctttttaa	ttaaaaatga	agtttttaaat	caatctaaag	tatatatgag	1260
taaacttggt	ctgacagtta	ccaatgctta	atcagtgagg	cacctatctc	agcgatctgt	1320
ctatctcggt	catccatagt	tgctgactc	cccgctggtg	agataactac	gatacgggag	1380
ggottaccat	ctggcccccag	tgctgcaatg	ataccgcgag	acccacgctc	accggctcca	1440
gatttatcag	caataaacca	gccagccgga	agggccgagc	gcagaagtgg	tcctgcaact	1500
ttatccgcct	ccatccagtc	tattaattgt	tgccgggaag	ctagagtaag	tagttcgcca	1560
gttaatatgt	tgcgcaacgt	tggtgccatt	gctacaggca	tcgtgggtgtc	acgctcgctc	1620
tttggtatgg	cttcattcag	ctccggttcc	caacgatcaa	ggcgagttac	atgatcccc	1680
atgttggtga	aaaaagcggg	tagctccttc	ggctcctccga	tcgttgctcag	aagtaagttg	1740
gccgcagtg	tatcactcat	ggttatggca	gcactgcata	attctcttac	tgtcatgcca	1800
tccgtaagat	gcttttctgt	gactgggtgag	tactcaacca	agtcattctg	agaatagtg	1860
atgcggcgac	cgagttgctc	ttgcccggcg	tcaatacggg	ataataccgc	gccacatagc	1920
agaactttaa	aagtgtctat	catttgaaaa	cgttcttcgg	ggcgaaaact	ctcaaggatc	1980
ttaccgctgt	tgagatccag	ttcgatgtaa	ccactcgtg	cacccaactg	atcttcagca	2040
tcttttactt	tcaccagcgt	ttctgggtga	gcaaaaacag	gaaggcaaaa	tgccgcaaaa	2100
aagggaataa	gggcgacacg	gaaatgttga	atactcatac	tcttcctttt	tcaatattat	2160
tgaagcatit	atcaggggtta	ttgtctcatg	agcggataca	tatttgaatg	tatttagaaa	2220
aataaacaaa	taggggttcc	gcgcacattt	ccccgaaaag	tgccacctga	tgccggtgtga	2280
aataccgcac	agatgcgtaa	ggagaaaata	ccgcatcagg	aaattgtaag	cgttaatat	2340
ttgttaaaat	tgcggttaaa	tttttgttaa	atcagctcat	tttttaacca	ataggccgaa	2400
atcggcaaaa	tcccttataa	atcaaaagaa	tagaccgaga	taggggttag	tgttgtttca	2460
gtttggaaca	agagtccact	attaaagaac	gtggactcca	acgtcaaagg	gcgaaaaacc	2520
gtctatcagg	gcgatggccc	actacgtgaa	ccatcacctc	aatcaagttt	tttggggctc	2580
agggtccgta	aagcactaaa	tcggaaccct	aaaggagacc	cccgatttag	agcttgacgg	2640
ggaaagccgg	cgaacgtggc	gagaaaggaa	gggaagaaag	cgaagggagc	gggcgctagg	2700
gcgctggcaa	gtgtagcggg	cacgctgcgc	gtaaccacca	caccgcgcgc	gcttaatgcg	2760
ccgctacagg	gcgcgtccat	tcgccattca	ggctgcgcaa	ctggtgggaa	gggcgatcgg	2820
tgcgggcctc	ttcgctatta	cgccagctgg	cgaagggggg	atgtgctgca	aggcgattaa	2880
gttggttaac	gccagggttt	tcccagtcac	gacgttgtaa	aacgacggcc	agtgaattgt	2940
aatacgcact	actatagggc	gaattggccc	cgagctcgca	tgctcccggc	cgccatggcg	3000
gccgcgggaa	ttcgattctc	gagatccggg	gcagattatt	tggattgaga	gtgaatatga	3060
gactctaatt	ggataccgag	gggaatttat	ggaacgtcag	tggagcattt	ttgacaagaa	3120
atatttgcta	gctgatagtg	accttagggc	acttttgaa	gcgcaataat	ggtttctgac	3180
gtatgtgctt	agctcattaa	actccagaaa	ccgcggctg	agtggctcct	tcaacgttgc	3240
ggttctgtca	gttccaaacg	ttaaacggct	tgtcccgctg	catcgccggg	ggtcataacg	3300
tgactccctt	aattctccgc	tcattgatcag	attgtcgttt	ccgccttca	gtctaga	3357

<210> 8

WO 02/096923

PCT/US02/17451

-14-

<211> 10122
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> p1302NOS Plasmid

<400> 8

catggtatgat	ctgactagta	aaggagaaga	actttttcact	ggagttgtcc	caattcttgt	60
tgaattagat	ggtgatgta	atgggcacaa	attttctgtc	agtggagagg	gtgaagggtga	120
tgcaacatac	ggaaaactta	cccttaaatt	tattttgcact	actggaaaac	tacctgttcc	180
gtggccaaca	cttgtcacta	ctttctctta	tgggtgttcaa	tgtttttcaa	gatacccgaga	240
tcatatgaag	cggcaccgact	tcttcaagag	cgccatgcct	gagggatagc	tgcaggagag	300
gacctatctt	ttcaaggagc	acgggaacta	caagacacgt	gctgaagtca	agtttgaggg	360
agacaccctc	gtcaacagga	tcgagcttaa	gggaatcgat	ttcaaggagg	acggaaacat	420
cctcggccac	aagtgtggaat	acaactacaa	ctcccacaac	gtatacatca	tggccgacaa	480
gcaaaagaac	ggcatcaaag	ccaacttcaa	gacccgccac	aacatcgaag	acggcggcgt	540
gcaactcgct	gatcattatc	aacaaaatac	tccaattggc	gatggccctg	tccttttacc	600
agacaacccat	tacctgtcca	cacaatctgc	cctttcgaag	gatcccaacg	aaaagagaga	660
ccacatggct	cttcttgagt	ttgtaacagc	tgtctgggatt	acacatggca	tggatgaact	720
atacaaagct	agccaccacc	accaccacca	cgtgtgaatt	ggtgaccagc	togaatttcc	780
ccgatcggtc	aaacatttgg	caataaagtt	tcttaagatt	gaatcctgtt	gccgggtcttg	840
cgatgattat	catataattt	ctgttgaatt	acgttaagca	tgtataaatt	aacatgtaat	900
gcatgacggt	atttatgaga	tgggttttta	tgattagagt	cccgcatta	tacattttaat	960
acgcgataga	aaacaaaata	tagcgcgcaa	actaggataa	attatcgcg	gcggtgtcat	1020
ctatgtttac	agatcgggaa	ttaaactatc	agtgtttgac	aggatatatt	ggcgggtaaa	1080
cctaagagaa	aaagagcgtt	attagaataa	cggatattta	aaagggcgtg	aaaagggtta	1140
tccgttcgtc	catttgtatg	tgcattgcaa	ccacagggtt	cccctcggga	tcaaagtact	1200
ttgatccaac	cctccgctg	ctatagtcca	gtcggcttct	gacgttcagt	gcagccgctc	1260
tctgaaaacg	acatgtcgca	caagtccata	gttacgcgac	aggctgccgc	cctgcccttt	1320
tcttggcggt	ttcttctgcg	gtgttttagt	cgcataaagt	agaatacttg	cgactagaac	1380
cggagacatt	acgccatgaa	caagagcgcc	gcgcgtggcc	tgtctgggcta	tgcccgcgtc	1440
agcaccgacg	accaggactt	gaccaaccaa	cgggcggaac	tgcacgcggc	cggctgcacc	1500
aagctgtttt	ccgagaagat	caccggcacc	aggcgcgacc	gcccggagct	ggccaggatg	1560
cttgaccacc	tacgcccttg	cgacgttgtg	acagtgaaca	ggctagaccg	cctggcccgc	1620
agcaccgcg	acctactgga	cattgcccag	cgcattccagg	aggccggcgc	gggcccgtgc	1680
agcctggcag	agccgtgggc	cgacaccacc	acgcggcccg	gccgatgggt	gttgaccgtg	1740
ttcgccggca	ttgcgcggtt	cgagcgttcc	ctaatacatc	accgcaccgc	gagcgggcgc	1800
gaggccgcca	aggcccagag	cgtgaagttt	ggcccccgcc	ctaccctcac	cccggcacag	1860
atcgcgacg	cccgcgagct	gatcgaccag	gaaggccgca	ccgtgaaaga	ggcggctgca	1920
ctgcttggcg	tgcacgcgtc	gacctgttac	cgcgcacttg	agcgcagcga	ggaagtgaag	1980
cccaccgagg	ccaggcggcg	cgggtgcctt	cgtgaggacg	cattgaccga	ggccgacggc	2040
ctggcggcgg	ccgagaatga	acgccaagag	gaacaagcat	gaaaccgcac	caggacggcc	2100
aggacgaacc	gttttttcatt	accgaagaga	tgcaggcgga	gatgatcgcg	gccgggtacg	2160
tgttcgagcc	gcccgcgcac	gtctcaaccg	tgcggctgca	tgaatacctg	gccgggttgt	2220
ctgatgccaa	gctggcggcc	tggccggcca	gcttggccgc	tgaagaaacc	gagcgcgcgc	2280
gtctaaaaag	gtgatgtgta	tttgagtaaa	acagcttgcg	tcatgcggtc	gctgctgata	2340
tgatgcgatg	agtaataaaa	caaatacgca	aggcgaaacg	atgaagggtta	tgcgtgtact	2400
taaccagaaa	ggcgggtcag	gcaagacgac	catcgcaacc	catctagccc	gcgccctgca	2460
actcgccggg	gcccgatgtt	tgttagtcca	ttccgatccc	cagggcagtg	cccgcgattg	2520
ggcggccggt	cgggaagatc	aaccgctaac	cgttgtcgcc	atcgaccgcc	cgacgattga	2580
ccgcgacgtg	aaggccatcg	gccggcgccg	cttcgtagt	atcgaccgag	cgccccaggc	2640
ggcggacatt	gctgtgtccg	cgatcaaggc	agccgacttc	gtgctgattc	cgggtgcagc	2700
aagcccttac	gacatattgg	ccaccgcccga	cctgggtggag	ctgggttaagc	agcgcattga	2760
ggtcacggat	ggaaggctac	aagcggcctt	tgtcgtgtcg	cgggcgatca	aaggcacgcg	2820
catcgccggt	gaggttgccg	aggcgctggc	cgggtacgag	ctgcccattc	ttgagtcocg	2880
tatcacgcag	cgcgtgagct	acccaggcac	tgcgcgcgcc	ggcacaaccg	ttcttgaatc	2940
agaaccgcag	ggcgacgctg	cccgcgaggt	ccaggcgctg	gccgctgaaa	ttaaatcaaa	3000
actcatttga	gttaatgagg	taaagagaaa	atgagcaaaa	gcacaaacac	gctaagtgcc	3060
ggccgtccga	gcccacgcag	cagcaaggct	gcaacgttgg	ccagcctggc	agacacgcca	3120
gccatgaagc	gggtcaactt	tcagttgccc	gcggaggatc	acaccaagct	gaagatgtac	3180
gcggtacgcc	aaggcaagac	cattaccgag	ctgctatctg	aatacatcgc	gcagctacca	3240
gagtaaatga	gcaaatgaat	aaatgagtag	atgaatttta	gcggctaaag	gaggcggcat	3300
ggaaaaatcaa	gaacaaccag	gcaccgacgc	cgtgggaatgc	cccatgtgtg	gaggaacggg	3360
cggttggcca	ggcgtaagcg	gctgggttgt	ctgccggccc	tgcaatggca	ctggaacccc	3420
caagcccgcg	gaatcgccgt	gacggctgca	aaccatccgg	cccggtacaa	atcgccgcgg	3480
cgctgggtga	tgacctggtg	gagaagttga	aggccgcgca	ggccgcccag	cggcaacgca	3540

WO 02/096923

PCT/US02/17451

-15-

tcgagggcaga	agcacgcggc	gggtgaatcgt	ggcaagcggc	cgctgatcga	atccgcaaag	3600
aatcccgcca	accgcccga	gccgggtgcg	cgctcgattag	gaagccggcc	aagggcgacg	3660
agcaaccaga	ttttttcggt	ccgatgctct	atgacgtggg	caccgcgat	agtcgcagca	3720
tcattggacgt	ggcggttttc	cgtctgtcga	agcgtgaccg	acgagctggc	gaggtgatcc	3780
gctacgagct	tccagacggg	cacgtagagg	tttccgcagg	gccggccggc	atggccagt	3840
tgtgggatta	cgacctggta	ctgatggcgg	tttcccatct	aaccgaatcc	atgaaccgat	3900
accgggaagg	gaagggagac	aagcccggcc	gcgtgttccg	tccacacgtt	gcggacgtac	3960
tcaagttctg	ccggcgagcc	gatggcggaa	agcagaaaga	cgacctggta	gaaacctgca	4020
ttcggttaaa	caccacgcac	gttgccatgc	agcgtacgaa	gaaggccaag	aacggccgcc	4080
tgggtgacgg	atccgaggg	gaagccttga	ttagccgcta	caagatcgta	aagagcgaaa	4140
ccgggcccgc	ggagttacatc	gagatcgagc	tagctgattg	gatgtaccgc	gagatcacag	4200
aaggcaagaa	ccgggacgtg	ctgacgggtc	accccgatta	ctttttgatc	gatcccggca	4260
tcggccggtt	tctctacgc	ctggcacgcc	gcgcgcgagg	caaggcagaa	gccagatggg	4320
tgttcaagac	gatctacgaa	cgagtgagg	gcgcgcggaga	gttcaagaag	ttctgtttca	4380
ccgtgcgcaa	gctgatcggg	tcaaatgacc	tgcggagta	cgatttgaag	gaggaggcgg	4440
ggcaggctgg	cccgatccta	gtcatgcgct	accgcaacct	gatcgagggc	gaagcatccg	4500
cgggttccta	atgtacggag	cagatgctag	ggcaaattgc	cctagcaggg	gaaaaagggtc	4560
gaaaagggtc	ctttctgtg	gatagcacgt	acattgggaa	cccaaagccg	tacattggga	4620
accggaaccc	gtacattggg	aacccaaagc	cgtacattgg	gaaccggtca	cacatgtaag	4680
tgactgatat	aaaagagaaa	aaaggcgatt	tttccgccta	aaactcttta	aaacttatta	4740
aaactcttaa	aaccgcgctg	gcctgtgcat	aactgtctgg	ccagcgca	gccgaagagc	4800
tgcaaaaagc	gcctaccctt	cggtcgctgc	gctccctacg	ccccgcgct	tcgcgtcggc	4860
ctatcgccgc	cgctggccgc	tcaaaaatgg	ctggcctacg	gccaggcaat	ctaccagggc	4920
gcggaacaag	cgcccgctcg	ccactcgacc	gccggcgccc	acatcaaggc	accctgcctc	4980
gcgcgcttct	gtgatgacgg	tgaaaacctc	tgacacatgc	agctcccgga	gacgggtcac	5040
gcttctgtct	aagcggatgc	cgggagcaga	caagcccgct	agggcgcgct	agcgggtggt	5100
ggcggtgtgc	ggggcgagc	catgaccagc	tcacgtagcg	atagcggagt	gtatactggc	5160
ttactatgc	ggcatcagag	cagattgtac	tgagagtgc	ccatatgcgg	tgtgaaatac	5220
cgcacagatg	cgtaaggaga	aaataccgca	tcaggcgctc	ttccgcttcc	tcgctcactg	5280
actcgctgcg	ctcggtcggt	cggctcgccg	gagcgggtatc	agctcactca	aaggcggtaa	5340
tacggttatc	cacagaatca	ggggataacg	caggaaagaa	catgtgagca	aaaggccagc	5400
aaaaggccag	gaaccgtaaa	aaggcccgct	tgctggcggt	tttccatagg	ctccgcccc	5460
ctgacgagca	tcacaaaaat	cgacgctcaa	gtcagagggtg	gcgaaacccg	acaggactat	5520
aaagatacca	ggcggtttcc	cctggaagct	ccctcgctgc	ctctcctggt	ccgaccctgc	5580
cgcttaccgg	atacctgtcc	gcctttctcc	cttcgggaag	cgtggcgctt	tctcatagct	5640
cacgctgtag	gtatctcagt	tcgggtgtagg	tcggttcgctc	caagctgggc	tgtgtgcacg	5700
aaccccccgt	tcagcccgag	cgctgcgct	tatccggtaa	ctatcgctct	gagtcacaac	5760
cggtaagaca	cgacttatcg	ccactggcag	cagccactgg	taacaggatt	agcagagcga	5820
ggatgtagg	cgggtgtaca	gagttcttga	agtgggtggc	taactacggc	tacactagaa	5880
ggacagttat	tgggtatctgc	gctctgctga	agccagttac	cttcggaaaa	agagttggta	5940
gctcttgatc	cggcaaaaaa	accaccgctg	gtagcgggtg	tttttttgtt	tgcaagcagc	6000
agattacgog	cagaaaaaaa	ggatctcaag	aagatccttt	gatcttttct	acggggtctg	6060
acgctcagtg	gaacgaaaaa	tcacgttaag	ggattttggt	catgcattct	aggtactaaa	6120
acaattcatc	cagtaaaaaa	taatatctta	ttttctccca	atcaggcttg	atccccagta	6180
agtcaaaaaa	tagctcgaca	tactgttctt	ccccgatatc	ctccctgate	gaccggagcg	6240
agaaggcaat	gtcataccac	ttgtccgccc	tgccgcttct	cccaagatca	ataaagccac	6300
ttactttgcc	atcttttcaca	aagatgttgc	tgctctccag	gtcgcggtgg	gaaaagacaa	6360
gttctctctc	gggctttttcc	gtcttttaaa	aatcatacag	ctcgcgcgga	tcttttaaatg	6420
gagtgctctc	ttcccagttt	tcgcaatcca	catcggccag	atcggtattc	agtaagtaat	6480
ccaattcggc	taagcggctg	tctaagctat	tcgtataggg	acaatccgat	atgtcgatgg	6540
agtgaagag	cctgatgcac	tcgcataaca	gctcgataat	cttttcaggg	ctttgttcat	6600
cttcatactc	ttccagagca	aggacgccat	cggcctcact	catgagcaga	ttgctccagc	6660
catcatgccc	ttcaaagtgc	aggacctttg	gaacaggcag	ctttccttcc	agccatagca	6720
tcattgtcct	ttcccggtcc	acatcatagg	tgggtccctt	ataccggtcg	tcgctcattt	6780
ttaaatatag	gttttcatct	tctcccacca	gcttatatac	cttagcagga	gacattcctt	6840
ccgtatcttt	tacgcagcgg	tatttttoga	tcagtttttt	caattccggg	gatattctca	6900
tttttagccat	ttattatttc	cttcctcttt	tctacagtat	ttaaagatac	cccaagaagc	6960
taattataac	aagacgaact	ccaattcact	gttctcttgc	ttctaaaacc	ttaaatacca	7020
gaaaacagct	ttttcgaagt	gtttttcaaa	gttggcggtat	aacatagtat	cgacggagcc	7080
gattttgaaa	ccgcgggtgat	cacaggcagc	aacgctctgt	catcggtaca	atcaacatgc	7140
taccctccgc	gagatcatcc	gtgtttcaaa	cccgccagct	tagttgcccgt	tcttccgaat	7200
agcatcggtg	acatgagcaa	agtctgcgcg	cttacaacgg	ctctcccgct	gacgcggtcc	7260
cggactgatg	ggctggcctg	atcgagtggg	gattttgtgc	cgagctgccc	gtcggggagc	7320
tgttggctgg	ctgggtggcag	gatataattg	gggtgtaaca	aattgacgct	tagacaactt	7380
aataacacat	tgccggacgtt	tttaatgtac	tgaattaacg	ccgaattaat	tcgggggatc	7440
tggatttttag	tactggattt	tggtttttagg	aattagaaat	tttattgata	gaagtatttt	7500
acaaatacaa	atacatacta	agggtttctt	atatgctcaa	cacatgagcg	aaacctata	7560

WO 02/096923

PCT/US02/17451

-16-

```

ggaacccctaa ttcccttata tgggaactac tcacacatta ttatggagaa actcgagctt 7620
gtcgatcgac agatccggtc ggcactctact ctatttcttt gccctcggac gagtgtctggg 7680
gcgctcggttt ccactatcgg cgagtaacttc tacacagcca tcggtccaga cggcccgct 7740
tctgcggggcg atttgtgtac gcccagacagt cccggctcgg gatcggacga ttgctgcga 7800
tcgacccctgc gcccaagctg catcatcgaa attgccgtca accaagctct gatagagttg 7860
gtcaagacca atgcggagca tatacgcccc gagtgcgtggc gatcctgcaa gctccggatg 7920
cctcogctcg aagtagcgcg tctgctgctc catacaagcc aaccacggcc tcagaagaa 7980
gatgtttggcg acctcgattt gggaatcccc gaacatcgcc tcgctccagt caatgaccgc 8040
tgttatgogg ccattgtccg tcaggacatt gttggagccg aaatccgctg gcacgaggtg 8100
ccggacttcg gggcagtcct cggcccaaag catcagctca tcgagagcct gcgcgacgga 8160
cgactgacg gtgtcgcca tcacagtttg ccagtgatac acatggggat cagcaatcgc 8220
gcatatgaaa tcacgccatg tagtgatttg accgattcct tgcggtccga atgggcccga 8280
cccgctcgtc tggctaagat cggccgcagc gatcgcatcc atagcctccg cgaccggttg 8340
tagaacagcg ggcagttcgg tttcaggcag gtcttgcaac gtgacaccct gtgacggcg 8400
ggagatgcaa taggtcaggc tctcgctaaa ctcccaatg tcaagcactt cgggaatcgg 8460
gagcgcggcc gatgcaaagt gccgataaac ataacgatct ttgtagaaac catcggcgca 8520
gctatttacc cgcaggacat atccacgccc tcctacatcg aagctgaaag cacgagattc 8580
ttcgccctcc gagagctgca tcaggtcgga gacgtgtcg aacttttoga tcagaaactt 8640
ctcgacagac gtgcgggtga gttcaggcct ttccatctct cattgcccc cggatctgc 8700
gaaagctcga gagagataga tttgtagaga gagactggtg atttcagcgt gtccctctca 8760
aatgaaatga acttccttat atagaggaag gtcttgcgaa ggatagtggt attgtgcgtc 8820
atcccttacc tcagtggaga tatcacatca atccacttgc tttgaagacg tgggtggaac 8880
gtcttctttt tccacgatgc tctcgtggg tgggggtcca tctttgggac cactgtcggc 8940
agaggcatct tgaacgatag cctttccttt atcgcaatga tggcatttgt aggtgccacc 9000
ttccttttct actgtccttt tgatgaagtg acagatagct gggcaatgga atccgaggag 9060
gtttcccgat attacccttt gttgaaaagt ctcaatagcc ctttggctct ctgagactgt 9120
atotttgata ttcttggagt agacgagagt gtcgtgtccc accatgttat cacatcaatc 9180
cacttgcttt gaagacgtgg ttggaacgtc ttctttttcc acgatgctcc tcgtgggttg 9240
gggtccatct ttgggaccac tgtcggcaga ggcactcttga acgatagcct ttcttttatc 9300
gcaatgatgg catttgtagg tgccaccttc cttttctact gtcccttttga tgaagtga 9360
gatagctggg caatggaatc cgaggaggtt tccgatatt accctttgtt gaaaagtctc 9420
aatagccctt tggctctctg agactgtatc ttgatattc ttggagtaga cgagagtgtc 9480
gtgctccacc atgttgcaa gctgctctag ccaatacgca aaccgcctct ccccgcgct 9540
tggccgattc attaatgcag ctggcacgac aggtttcccg actggaaagc gggcagtgag 9600
cgcaacgcaa ttaatgtgag ttagctcact cattaggcac ccaggtctt acactttatg 9660
cttcggctc gtatgttgtg tggaaatttg agcggataac aatttcacac aggaaacagc 9720
tatgaccatg attacgaatt cgagctcgg acccggggat cctctagact gaaggcggga 9780
aacgacaatc tgatcatgag cggagaatta agggagtcac gttatgaccc cgcggatga 9840
cgcgggacaa gccgttttac gtttggaaact gacagaaccg caacgttgaa ggagccactc 9900
agccgcgggt ttctggagtt taatgagcta agcacatacg tcagaaacca ttattgcgcg 9960
ttcaaaagtc gcctaaggtc actatcagct agcaaatatt tcttgtcaaa aatgtctcac 10020
tgacgttcca taaattcccc tcggtatcca attagagtct catattcact ctcaatccaa 10080
ataatctgca ccggatctcg agaatcgaat tcccgcggcc gc 10122

```

<210> 9

<211> 621

<212> DNA

<213> Artificial Sequence

<220>

<223> N. tabacum rDNA intergenic spacer (IGS) sequence

<300>

<308> Genbank #Y08422

<309> 1997-10-31

<400> 9

```

gtgctagcca atgtttaaca agatgtcaag cacaatgaat gttggtgggt ggtggtcgtg 60
gctggcggtg gtggaaaatt ggcgtggttc gacggtgagt gatcggcgat ggttgggtgt 120
tgcagcggtg tttgatatcg gaatcactta tgggtggtgt cacaatggag gtgcgtcatg 180
gttattgggtg gttggtcatc tatataatatt tataataata ttaagtattt tacctatttt 240
ttacatatatt tttattaaat ttatgcattg tttgtatttt taaatagttt ttatcgtact 300
tgttttataa aatattttat tattttatgt gttattatatt tacttgatgt attggaaatt 360
ttctccattg tttttctat attttataat attttcttat tttttttgtt tttattatgt 420
attttttcgt tttataataa atattttatta aaaaaatat tattttttgt aaatatatca 480
tttacaatgt ttaaaagtca tttgtgaata tattagctaa gttgtacttc tttttgtgca 540
tttggtgttg tacatgtcta ttatgattct ctggccaaaa catgtctact cctgtcactt 600

```

WO 02/096923

PCT/US02/17451

-17-

gggtttttttt ttttaagaca t

621

<210> 10
 <211> 25
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Primer NTIGS-F1

<400> 10
 gtgctagcca atgtttaaca agatg

25

<210> 11
 <211> 28
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR Primer NTIGS-RI

<400> 11
 atgtcttaaa aaaaaaaacc caagtgc

28

<210> 12
 <211> 233
 <212> DNA
 <213> Mus musculus

<300>
 <308> Genbank #V00846
 <309> 1989-07-06

<400> 12
 gacctggaat atggcgagaa aactgaaaat cacggaaaat gagaaataca cacttttagga 60
 cgtgaaatat ggcgaggaaa actgaaaaag gtggaaaatt tagaaatgtc cactgttagga 120
 cgtggaatat ggcaagaaaa ctgaaaatca tggaaaatga gaaacatcca cttgacgact 180
 tgaaaaatga cgaaatcact aaaaaacgtg aaaaatgaga aatgcacact gaa 233

<210> 13
 <211> 31
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer MSAT-F1

<400> 13
 aataccgcgg aagcttgacc tggaatatcg c

31

<210> 14
 <211> 27
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Primer MSAT-RI

<400> 14
 ataaccgcgg agtccttcag tgtgcat

27

<210> 15
 <211> 277
 <212> DNA
 <213> Artificial Sequence

<220>

WO 02/096923

PCT/US02/17451

-18-

<223> Nopaline Synthase Promoter Fragment

<300>

<308> Genbank #U09365

<309> 1997-10-17

<400> .15

```

gagctcgaat ttccccgatc gttoaaacat ttggcaataa agtttcttaa gattgaatcc 60
tggtgocggg cttgcgatga ttatcatata atttctgttg aattacgtta agcatgtaat 120
aattaacatg taatgcatga cgttatttat gagatggggtt tttatgatta gagtcccgca 180
attatacatt taatacgaga tagaaaacaa aatatagcgc gcaaactagg ataaattatc 240
gcgcgcgggtg tcattctatgt tactagatcg ggaattc 277

```

<210> 16

<211> 1812

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1)...(1812)

<223> Beta-glucuronidase

<300>

<308> Genbank #S69414

<309> 1994-09-23

<400> 16

```

atg tta cgt cct gta gaa acc cca acc cgt gaa atc aaa aaa ctc gac 48
Met Leu Arg Pro Val Glu Thr Pro Thr Arg Glu Ile Lys Lys Leu Asp
  1             5             10             15

ggc ctg tgg gca ttc agt ctg gat cgc gaa aac tgt gga att gat cag 96
Gly Leu Trp Ala Phe Ser Leu Asp Arg Glu Asn Cys Gly Ile Asp Gln
          20             25             30

cgt tgg tgg gaa agc gcg tta caa gaa agc cgg gca att gct gtg cca 144
Arg Trp Trp Glu Ser Ala Leu Gln Glu Ser Arg Ala Ile Ala Val Pro
      35             40             45

ggc agt ttt aac gat cag ttc gcc gat gca gat att cgt aat tat gcg 192
Gly Ser Phe Asn Asp Gln Phe Ala Asp Ala Asp Ile Arg Asn Tyr Ala
      50             55             60

ggc aac gtc tgg tat cag cgc gaa gtc ttt ata ccg aaa ggt tgg gca 240
Gly Asn Val Trp Tyr Gln Arg Glu Val Phe Ile Pro Lys Gly Trp Ala
      65             70             75             80

ggc cag cgt atc gtg ctg cgt ttc gat gcg gtc act cat tac ggc aaa 288
Gly Gln Arg Ile Val Leu Arg Phe Asp Ala Val Thr His Tyr Gly Lys
      85             90             95

gtg tgg gtc aat aat cag gaa gtg atg gag cat cag ggc ggc tat acg 336
Val Trp Val Asn Asn Gln Glu Val Met Glu His Gln Gly Gly Tyr Thr
      100             105             110

cca ttt gaa gcc gat gtc acg ccg tat gtt att gcc ggg aaa agt gta 384
Pro Phe Glu Ala Asp Val Thr Pro Tyr Val Ile Ala Gly Lys Ser Val
      115             120             125

cgt atc acc gtt tgt gtg aac aac gaa ctg aac tgg cag act atc ccg 432
Arg Ile Thr Val Cys Val Asn Asn Glu Leu Asn Trp Gln Thr Ile Pro
      130             135             140

ccg gga atg gtg att acc gac gaa aac ggc aag aaa aag cag tct tac 480
Pro Gly Met Val Ile Thr Asp Glu Asn Gly Lys Lys Lys Gln Ser Tyr
      145             150             155             160

```

WO 02/096923

PCT/US02/17451

-19-

ttc cat gat ttc ttt aac tat gcc gga atc cat cgc agc gta atg ctc	528
Phe His Asp Phe Phe Asn Tyr Ala Gly Ile His Arg Ser Val Met Leu	
165 170 175	
tac acc acg ccg aac acc tgg gtg gac gat atc acc gtg gtg acg cat	576
Tyr Thr Thr Pro Asn Thr Trp Val Asp Asp Ile Thr Val Val Thr His	
180 185 190	
gtc gcg caa gac tgt aac cac gcg tct gtt gac tgg cag gtg gtg gcc	624
Val Ala Gln Asp Cys Asn His Ala Ser Val Asp Trp Gln Val Val Ala	
195 200 205	
aat ggt gat gtc agc gtt gaa ctg cgt gat gcg gat caa cag gtg gtt	672
Asn Gly Asp Val Ser Val Glu Leu Arg Asp Ala Asp Gln Gln Val Val	
210 215 220	
gca act gga caa ggc act agc ggg act ttg caa gtg gtg aat ccg cac	720
Ala Thr Gly Gln Gly Thr Ser Gly Thr Leu Gln Val Val Asn Pro His	
225 230 235 240	
ctc tgg caa ccg ggt gaa ggt tat ctc tat gaa ctg tgc gtc aca gcc	768
Leu Trp Gln Pro Gly Glu Gly Tyr Leu Tyr Glu Leu Cys Val Thr Ala	
245 250 255	
aaa agc cag aca gag tgt gat atc tac ccg ctt cgc gtc ggc atc cgg	816
Lys Ser Gln Thr Glu Cys Asp Ile Tyr Pro Leu Arg Val Gly Ile Arg	
260 265 270	
tca gtg gca gtg aag ggc gaa cag ttc ctg att aac cac aaa ccg ttc	864
Ser Val Ala Val Lys Gly Glu Gln Phe Leu Ile Asn His Lys Pro Phe	
275 280 285	
tac ttt act ggc ttt ggt cgt cat gaa gat gcg gac ttg cgt ggc aaa	912
Tyr Phe Thr Gly Phe Gly Arg His Glu Asp Ala Asp Leu Arg Gly Lys	
290 295 300	
gga ttc gat aac gtg ctg atg gtg cac gac cac gca tta atg gac tgg	960
Gly Phe Asp Asn Val Leu Met Val His Asp His Ala Leu Met Asp Trp	
305 310 315 320	
att ggg gcc aac tcc tac cgt acc tcg cat tac cct tac gct gaa gag	1008
Ile Gly Ala Asn Ser Tyr Arg Thr Ser His Tyr Pro Tyr Ala Glu Glu	
325 330 335	
atg ctc gac tgg gca gat gaa cat ggc atc gtg gtg att gat gaa act	1056
Met Leu Asp Trp Ala Asp Glu His Gly Ile Val Val Ile Asp Glu Thr	
340 345 350	
gct gct gtc ggc ttt aac ctc tct tta ggc att ggt ttc gaa gcg ggc	1104
Ala Ala Val Gly Phe Asn Leu Ser Leu Gly Ile Gly Phe Glu Ala Gly	
355 360 365	
aac aag ccg aaa gaa ctg tac agc gaa gag gca gtc aac ggg gaa act	1152
Asn Lys Pro Lys Glu Leu Tyr Ser Glu Glu Ala Val Asn Gly Glu Thr	
370 375 380	
cag caa gcg cac tta cag gcg att aaa gag ctg ata gcg cgt gac aaa	1200
Gln Gln Ala His Leu Gln Ala Ile Lys Glu Leu Ile Ala Arg Asp Lys	
385 390 395 400	
aac cac cca agc gtg gtg atg tgg agt att gcc aac gaa ccg gat acc	1248
Asn His Pro Ser Val Val Met Trp Ser Ile Ala Asn Glu Pro Asp Thr	
405 410 415	
cgt ccg caa ggt gca cgg gaa tat ttc gcg cca ctg gcg gaa gca acg	1296
Arg Pro Gln Gly Ala Arg Glu Tyr Phe Ala Pro Leu Ala Glu Ala Thr	

WO 02/096923

PCT/US02/17451

-20-

420	425	430	
cgt aaa ctc gac ccg acg cgt ccg atc acc tgc gtc aat gta atg ttc			1344
Arg Lys Leu Asp Pro Thr Arg Pro Ile Thr Cys Val Asn Val Met Phe			
435	440	445	
tgc gac gct cac acc gat acc atc agc gat ctc ttt gat gtg ctg tgc			1392
Cys Asp Ala His Thr Asp Thr Ile Ser Asp Leu Phe Asp Val Leu Cys			
450	455	460	
ctg aac cgt tat tac gga tgg tat gtc caa agc ggc gat ttg gaa acg			1440
Leu Asn Arg Tyr Tyr Gly Trp Tyr Val Gln Ser Gly Asp Leu Glu Thr			
465	470	475	480
gca gag aag gta ctg gaa aaa gaa ctt ctg gcc tgg cag gag aaa ctg			1488
Ala Glu Lys Val Leu Glu Lys Glu Leu Leu Ala Trp Gln Glu Lys Leu			
485	490	495	
cat cag ccg att atc atc acc gaa tac ggc gtg gat acg tta gcc ggg			1536
His Gln Pro Ile Ile Ile Thr Glu Tyr Gly Val Asp Thr Leu Ala Gly			
500	505	510	
ctg cac tca atg tac acc gac atg tgg agt gaa gag tat cag tgt gca			1584
Leu His Ser Met Tyr Thr Asp Met Trp Ser Glu Glu Tyr Gln Cys Ala			
515	520	525	
tgg ctg gat atg tat cac cgc gtc ttt gat cgc gtc agc gcc gtc gtc			1632
Trp Leu Asp Met Tyr His Arg Val Phe Asp Arg Val Ser Ala Val Val			
530	535	540	
ggc gaa cag gta tgg aat ttc gcc gat ttt gcg acc tcg caa ggc ata			1680
Gly Glu Gln Val Trp Asn Phe Ala Asp Phe Ala Thr Ser Gln Gly Ile			
545	550	555	560
ttg cgc gtt ggc ggt aac aag aaa ggg atc ttc act cgc gac cgc aaa			1728
Leu Arg Val Gly Gly Asn Lys Lys Gly Ile Phe Thr Arg Asp Arg Lys			
565	570	575	
ccg aag tcg gcg gct ttt ctg ctg caa aaa cgc tgg act ggc atg aac			1776
Pro Lys Ser Ala Ala Phe Leu Leu Gln Lys Arg Trp Thr Gly Met Asn			
580	585	590	
ttc ggt gaa aaa ccg cag cag gga ggc aaa caa tga			1812
Phe Gly Glu Lys Pro Gln Gln Gly Gly Lys Gln *			
595	600		

<210> 17
 <211> 603
 <212> PRT
 <213> Escherichia coli

<300>
 <308> Genbank #S69414
 <309> 1994-09-23

<400> 17
 Met Leu Arg Pro Val Glu Thr Pro Thr Arg Glu Ile Lys Lys Leu Asp
 1 5 10 15
 Gly Leu Trp Ala Phe Ser Leu Asp Arg Glu Asn Cys Gly Ile Asp Gln
 20 25 30
 Arg Trp Trp Glu Ser Ala Leu Gln Glu Ser Arg Ala Ile Ala Val Pro
 35 40 45
 Gly Ser Phe Asn Asp Gln Phe Ala Asp Ala Asp Ile Arg Asn Tyr Ala
 50 55 60
 Gly Asn Val Trp Tyr Gln Arg Glu Val Phe Ile Pro Lys Gly Trp Ala
 65 70 75 80

WO 02/096923

PCT/US02/17451

-21-

Gly	Gln	Arg	Ile	Val	Leu	Arg	Phe	Asp	Ala	Val	Thr	His	Tyr	Gly	Lys
			85						90					95	
Val	Trp	Val	Asn	Asn	Gln	Glu	Val	Met	Glu	His	Gln	Gly	Gly	Tyr	Thr
			100					105					110		
Pro	Phe	Glu	Ala	Asp	Val	Thr	Pro	Tyr	Val	Ile	Ala	Gly	Lys	Ser	Val
			115					120				125			
Arg	Ile	Thr	Val	Cys	Val	Asn	Asn	Glu	Leu	Asn	Trp	Gln	Thr	Ile	Pro
			130					135				140			
Pro	Gly	Met	Val	Ile	Thr	Asp	Glu	Asn	Gly	Lys	Lys	Lys	Gln	Ser	Tyr
			145					150				155			160
Phe	His	Asp	Phe	Phe	Asn	Tyr	Ala	Gly	Ile	His	Arg	Ser	Val	Met	Leu
				165					170					175	
Tyr	Thr	Thr	Pro	Asn	Thr	Trp	Val	Asp	Asp	Ile	Thr	Val	Val	Thr	His
			180					185					190		
Val	Ala	Gln	Asp	Cys	Asn	His	Ala	Ser	Val	Asp	Trp	Gln	Val	Val	Ala
			195					200				205			
Asn	Gly	Asp	Val	Ser	Val	Glu	Leu	Arg	Asp	Ala	Asp	Gln	Gln	Val	Val
			210					215				220			
Ala	Thr	Gly	Gln	Gly	Thr	Ser	Gly	Thr	Leu	Gln	Val	Val	Asn	Pro	His
			225					230				235			240
Leu	Trp	Gln	Pro	Gly	Glu	Gly	Tyr	Leu	Tyr	Glu	Leu	Cys	Val	Thr	Ala
				245					250					255	
Lys	Ser	Gln	Thr	Glu	Cys	Asp	Ile	Tyr	Pro	Leu	Arg	Val	Gly	Ile	Arg
			260					265					270		
Ser	Val	Ala	Val	Lys	Gly	Glu	Gln	Phe	Leu	Ile	Asn	His	Lys	Pro	Phe
			275					280				285			
Tyr	Phe	Thr	Gly	Phe	Gly	Arg	His	Glu	Asp	Ala	Asp	Leu	Arg	Gly	Lys
			290				295				300				
Gly	Phe	Asp	Asn	Val	Leu	Met	Val	His	Asp	His	Ala	Leu	Met	Asp	Trp
			305				310				315				320
Ile	Gly	Ala	Asn	Ser	Tyr	Arg	Thr	Ser	His	Tyr	Pro	Tyr	Ala	Glu	Glu
			325						330					335	
Met	Leu	Asp	Trp	Ala	Asp	Glu	His	Gly	Ile	Val	Val	Ile	Asp	Glu	Thr
			340					345					350		
Ala	Ala	Val	Gly	Phe	Asn	Leu	Ser	Leu	Gly	Ile	Gly	Phe	Glu	Ala	Gly
			355					360				365			
Asn	Lys	Pro	Lys	Glu	Leu	Tyr	Ser	Glu	Glu	Ala	Val	Asn	Gly	Glu	Thr
			370				375				380				
Gln	Gln	Ala	His	Leu	Gln	Ala	Ile	Lys	Glu	Leu	Ile	Ala	Arg	Asp	Lys
			385				390				395				400
Asn	His	Pro	Ser	Val	Met	Trp	Ser	Ile	Ala	Asn	Glu	Pro	Asp	Thr	
			405					410					415		
Arg	Pro	Gln	Gly	Ala	Arg	Glu	Tyr	Phe	Ala	Pro	Leu	Ala	Glu	Ala	Thr
			420					425					430		
Arg	Lys	Leu	Asp	Pro	Thr	Arg	Pro	Ile	Thr	Cys	Val	Asn	Val	Met	Phe
			435				440					445			
Cys	Asp	Ala	His	Thr	Asp	Thr	Ile	Ser	Asp	Leu	Phe	Asp	Val	Leu	Cys
			450				455				460				
Leu	Asn	Arg	Tyr	Tyr	Gly	Trp	Tyr	Val	Gln	Ser	Gly	Asp	Leu	Glu	Thr
			465				470				475				480
Ala	Glu	Lys	Val	Leu	Glu	Lys	Glu	Leu	Leu	Ala	Trp	Gln	Glu	Lys	Leu
				485					490					495	
His	Gln	Pro	Ile	Ile	Thr	Glu	Tyr	Gly	Val	Asp	Thr	Leu	Ala	Gly	
			500					505				510			
Leu	His	Ser	Met	Tyr	Thr	Asp	Met	Trp	Ser	Glu	Glu	Tyr	Gln	Cys	Ala
			515				520					525			
Trp	Leu	Asp	Met	Tyr	His	Arg	Val	Phe	Asp	Arg	Val	Ser	Ala	Val	Val
			530				535					540			
Gly	Glu	Gln	Val	Trp	Asn	Phe	Ala	Asp	Phe	Ala	Thr	Ser	Gln	Gly	Ile
			545				550			555					560
Leu	Arg	Val	Gly	Gly	Asn	Lys	Lys	Gly	Ile	Phe	Thr	Arg	Asp	Arg	Lys
				565					570					575	
Pro	Lys	Ser	Ala	Ala	Phe	Leu	Leu	Gln	Lys	Arg	Trp	Thr	Gly	Met	Asn
			580					585					590		
Phe	Gly	Glu	Lys	Pro	Gln	Gln	Gly	Gly	Lys	Gln					
			595					600							

WO 02/096923

PCT/US02/17451

-22-

<210> 18
 <211> 277
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Nopaline Synthase Terminator Sequence

<300>
 <308> Genbank #U09365
 <309> 1995-10-17

<400> 18
 gagctcgaat ttccccgato gttcaaacat ttggcaataa agtttcttaa gattgaatcc 60
 tgttgccgggt cttgcgatga ttatcatata atttctgttg aattacgtta agcatgtaat 120
 aattaacatg taatgcatga cggtattttat gagatgggtt tttatgatta gagtcccgca 180
 attatacatt taatacgcga tagaaaacaa aatatagcgc gcaaactagg ataaattatc 240
 gcgcgcgggtg tcattctatgt tactagatcg ggaattc 277

<210> 19
 <211> 3438
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> pLIT38attBZeo Plasmid

<400> 19
 tcgacccctct agtcaaggcc ttaagtgagt cgtattacgg actggccgctc gttttacaac 60
 gtcgtgactg ggaaaaccct ggcggttacc aacttaatcg ccttgacgca catccccctt 120
 tcgccagctg gcgtaatagc gaagaggccc gcacccgatcg ccttcccaa cagttgcgca 180
 gcctgaatgg cgaatggcgc ttccgcttgg aataaagccc gcttcggcgg gctttttttt 240
 gtttaactacg tcaggtggca cttttcgggg aaatgtgcgc ggaaccccta tttgtttatt 300
 tttctaaata cattcaaata tgtatccgct catgagacaa taaccctgat aaatgcttca 360
 ataattattga aaaaggaaga gtatgagtat tcaacatttc cgtgtcgccc ttattccctt 420
 ttttgccgca ttttgccctc ctgtttttgc tcacccagaa acgctgggtga aagtaaaaga 480
 tgctgaagat cagttgggtg cacgagtgag ttacattcga ctggatctca acagcggtaa 540
 gatccttgag agttttcgcc ccgaagaacg ttctccaatg atgagcactt ttaaagttct 600
 gctatgtggc gcggtattat ccggtgttga cgcggggcaa gagcaactcg gtcgcccgc 660
 acactattct cagaatgact tgggtgagta ctccaccagtc acagaaaagc atcttacgga 720
 tggcatgaca gtaagagaat tatgcagtgc tgccataacc atgagtgata acactgcggc 780
 caacttactt ctgacaacga tcggaggacc gaaggagcta accgcttttt tgcacaacat 840
 gggggatcat gtaactcgcc ttgatcgttg ggaaccggag ctgaatgaag ccataccaaa 900
 cgacgagcgt gacaccacga tgccgtgtagc aatggcaaca acgttgcgca aactattaac 960
 tggcgaacta ctactctag cttcccggca acaattaata gactggatgg aggcggataa 1020
 agttgcagga ccacttctgc gtcggccctc tccggctggc tggtttattg ctgataaatc 1080
 tggagccggt gagcgtgggt ctgcgggtat cattgcagca ctggggccag atggttaagc 1140
 tccccgtatc gtagttatct acacgacggg gagtcaggca actatggatg aacgaaatag 1200
 acagatcgct gagataggtg cctcactgat taagcattgg taactgtcag accaagttaa 1260
 ctcatatata ctttagattg atttaccocg gttgataatc agaaaagccc caaaaacagg 1320
 aagattgtat aagcaaatat ttaaattgta aacgtaata ttttgtaaaa attcgcgtta 1380
 aatttttgtt aaatcagctc attttttaac caataggccg aaatcggcaa aatcccttat 1440
 aaatcaaaaag aatagcccga gatagggttg agtgttggc cagtttggaa caagagtcca 1500
 ctattaaaaga acgtggactc caacgtcaaa gggcgaaaaa ccgtctatca gggcgatggc 1560
 ccactacgtg aaccatcacc caaatcaagt tttttggggc cgaggtgccg taaagcacta 1620
 aatcggaacc cttaaaggag cccccgattt agagcttgac ggggaaagcg aacgtggcga 1680
 gaaaggaagg gaagaaagcg aaaggagcgg gcgctagggc gctggcaagt gtagcggta 1740
 cgctgcgctg aaccaccaca cccgccgcgc ttaatgcgcc gctacagggc gcgtaaaagg 1800
 atctaggtga agatcctttt tgataatctc atgaccaaaa tcccttaacg tgagttttcg 1860
 ttccactgag cgtcagaccc cgtagaaaag atcaaaggat cttcttgaga tccttttttt 1920
 ctgcgcgtaa tctgctgctt gcaaacaaaa aaaccaccgc taccagcggg ggtttgtttg 1980
 ccggatcaag agctaccaac tctttttccg aaggtaactg gcttcagcag agcgcagata 2040
 ccaaactactg ttcttctagt gtagccgtag ttaggccacc acttcaagaa ctctgtagca 2100
 ccgctacatc aacctcgtct gctaactcgt ttaccagtgg ctgctgccag tggcgataag 2160
 tcgtgtctta ccgggttggc ctcaagacga tagttaccgg ataaggcgca gcggtcgggc 2220
 tgaacggggg gttcgtgcac acagcccagc ttggagcgaa cgacctacac cgaactgaga 2280
 tacctacagc gtgagctatg agaaagcgcc acgcttcccc aaggagagaa ggcggacagg 2340

WO 02/096923

PCT/US02/17451

-23-

```

tatccggtaa  gccgcagggt  cggaaacagga  gagcgacga  gggagcttcc  agggggaaac  2400
gcctgggtatc  tttatagtc  tgcggggttt  cgccacctct  gacttgagcg  tcgatttttg  2460
tgatgctcgt  cagggggg  gagcctatgg  aaaaacgcca  gcaacgcggc  ctttttacgg  2520
ttcctggcct  tttgctggcc  ttttctcac  atgtaatgtg  agttagctca  ctcattaggc  2580
acccaggct  ttacacttta  tgcttcggc  tcgtatgttg  tgtggaattg  tgagcggata  2640
acaattttcac  acaggaaaca  gctatgacca  tgattacgcc  aagctacgta  atacgactca  2700
ctagtggggc  ccgtgcaatt  gaagccggct  ggcgccaagc  ttctctgcag  gattgaagcc  2760
tgctttttta  tactaacttg  agcgaatct  ggatccatgg  ccaagttgac  cagtgcctgt  2820
ccggtgctca  ccgcgcgga  cgtcccgga  gcggtcgagt  tctggaccga  ccggctcggg  2880
ttctcccg  acttcgtgga  ggacgacttc  gcgggtgtgg  tccgggacga  cgtgacctg  2940
ttcatcagcg  cggtcaggga  ccagggtgtg  ccggacaaca  ccctggcctg  ggtgtgggtg  3000
cgccggcctgg  acgagctgta  cgccgagtg  tcggaggtcg  tgtccacgaa  cttccgggac  3060
gcctccggg  cggccatgac  cgagatcg  gagcagccgt  gggggcgga  gttccgctg  3120
cgcgaccgg  ccggcaactg  cgtgcacttc  gtggcgagg  agcaggactg  acacgtgcta  3180
cgagatttcg  attccaccgc  cgcttctat  gaaaggttg  gcttcggaat  cgttttcgg  3240
gacgcggct  ggatgatcct  ccagcggg  gatctcatgc  tggagtctt  cgcccaccc  3300
aacttgttta  ttgcagctta  taatggttac  aaataaagca  atagcatcac  aaatttcaca  3360
aataaagcat  ttttttact  gcattctagt  tgtggtttgt  ccaaactcat  caatgtatct  3420
tatcatgtct  gtataccg  3438

```

<210> 20

<211> 3451

<212> DNA

<213> Artificial Sequence

<220>

<223> HindIII Fragment containing the beta-glucuronidase coding sequence, the rDNA intergenic spacer, and the Mast1 sequence

<400> 20

```

aagcttgacc  tggaaatcgc  cgagtaaact  gaaaatcacg  gaaaatgaga  aatacacact  60
ttaggacgtg  aaatatggcg  aggaaaactg  aaaaagggtg  aaaatttaga  aatgtccact  120
gtaggacgtg  gaatatggca  agaaaactga  aaatcatgga  aaatgagaaa  catccacttg  180
acgacttgaa  aaatgacgaa  atcactaaaa  aacgtgaaaa  atgagaaatg  cacactgaag  240
gactccgcgg  gaattcgatt  gtgctagcca  atgtttaaca  agatgtcaag  cacaatgaat  300
gttgggtggt  ggtggtcgtg  gctggcggtg  gtggaaaatt  gcgggtggtc  gagcggtagt  360
gatcggcgat  ggttggtgtt  tgcagcggtg  tttgatatcg  gaatcactta  tgggtggtgt  420
cacaatggag  gtgcgtcatg  gttattggtg  gttggtcatc  tataatattt  tataataata  480
ttaagtattt  tacctatttt  ttacatattt  tttattaaat  ttatgcattg  tttgtatttt  540
taaatagttt  ttatcgtact  tgttttataa  aatattttat  tattttatgt  gttatattat  600
tacttgatgt  attggaattt  ttctccattg  ttttttctat  atttataata  attttcttat  660
tttttttgt  ttttttatgt  attttttcgt  tttataataa  atattttatta  aaaaaaatat  720
tatttttgta  aaatatatca  tttacaatgt  ttaaaagtca  tttgtgaata  tattagctaa  780
gttgtaacttc  tttttgtgca  tttggtgttg  tacatgtcta  ttatgattct  ctggccaaaa  840
catgtctact  cctgtcactt  gggttttttt  ttttaagaca  taatcactag  tgattatata  900
tagactgaag  gcgggaaacg  acaatctgat  catgagcgga  gaattaaggg  agtcacgtta  960
tgaccccg  cgatgacgcg  ggacaagccg  ttttacgttt  ggaaactgaca  gaaccgcaac  1020
gttgaaggag  ccactcagcc  gcgggtttct  ggagtttaat  gagctaagca  catacgtcag  1080
aaaccattat  tgcgcgttca  aaagtgcct  aaggtcacta  tcagctagca  aatatttctt  1140
gtcaaaaatg  ctccactgac  gttccataaa  ttcccctcgg  tatccaatta  gagtctcata  1200
ttcactctca  atccaaataa  totgcaccgg  atctcgagat  cgaattcccg  cggccgcgaa  1260
ttcactagt  gatccccggg  tacgggtcagt  cccttatgtt  acgtcctgta  gaaaccccaa  1320
cccgtaaat  caaaaaactc  gacggcctgt  gggcattcag  tctggatcgc  gaaaactgtg  1380
gaattgagca  gcgttggtgg  gaaagcgct  tacaagaaag  ccgggcaatt  gctgtgccag  1440
gcagttttta  cgatcagttc  gccgatgcag  atattcgtaa  ttatgtgggc  aacgtctggt  1500
atcagcgcca  agtctttata  ccgaaagggt  gggcaggcca  gcgtatcgtg  ctgcgtttcg  1560
atcggtcac  tcattacggc  aaagtgtggg  tcaataatca  ggaagtgatg  gagcatcagg  1620
gcgggtatac  gccatgtgaa  gccgatgtca  cgcgtatgt  tattgcggg  aaaagtgtac  1680
gtatcacagt  ttgtgtgaac  aacgaactga  actggcagac  tatcccgccg  ggaatggtga  1740
ttaccgacga  aaacggcaag  aaaaagcagt  cttacttcca  tgatttcttt  aactacgccg  1800
ggatccatcg  cagcgtaatg  ctctacacca  cgccgaacac  ctgggtggac  gatatacccg  1860
tggtgacgca  tgcgcgcaa  gactgtaacc  acgctctgt  tgactggcag  gtggtggcca  1920
atggtgatgt  cagcgttgat  ctgcgtgatg  cggatcaaca  ggtggttgca  actggacaag  1980
gcaccagcgg  gactttgcaa  gtggtgaatc  cgcacctctg  gcaaccgggt  gaaggttatc  2040
tctatgaact  gtacgtcaca  gccaaaagcc  agacagagtg  tgatatctac  ccgctgcgcg  2100
tcggcatccg  gtcagtggca  gtgaagggcg  aacagttcct  gatcaaccac  aaaccgttct  2160

```

WO 02/096923

PCT/US02/17451

-24-

```

actttactgg ctttggccgt catgaagatg cggattttgcg cggcaaagga ttcgataacg 2220
tgctgatggg gcacgatcac gcattaatgg actggatttgg ggccaactcc taccgtacct 2280
cgcatattccc ttacgctgaa gagatgctcg actgggacaga tgaacatggc atcgtgggtga 2340
ttgatgaaac tgcagctgtc ggctttaacc tctcttttagg cattgggttc gaagcgggca 2400
acaagccgaa agaactgtac agcgaagagg cagtcaacgg ggaaactcag caggcgact 2460
tacaggcgat taaagagctg atagcgctg acaaaaacca cccaagcgtg gtgatgtgga 2520
gtattgccaa cgaaccggat acccgctccgc aaggtgcacg ggaatatttc gcgccactgg 2580
cggaagcaac gcgtaaactc gatccgacgc gtccgatcac ctgctcaat gtaatgttct 2640
gcgacgctca caccgatacc atcagcgatc tctttgatgt gctgtgcttg aaccgttatt 2700
acggttggta tgtccaaagc ggcgatttgg aaacggcaga gaaggtagtg gaaaaagaac 2760
ttctggcctg ctgcacgac cgattatcat caccgaatac ggcggtgata 2820
cgtagccgg gctgcactca atgtacaccg acatgtggag tgaagagtat cagtgtgcat 2880
ggctggatat gtatcaccgc gtctttgatc gcgtcagcgc cgtcgtcggg gaacagggtat 2940
ggaatttccg cgattttgog acctcgcaag gcatattgog cgttggcggg aacaagaagg 3000
ggatcttcac ccgcgaccgc aaaccgaagt cggcggtttt tctgctgcaa aaacgctgga 3060
ctggcatgaa cttcggtgaa aaaccgcagc agggaggcaa acaatgaatc aacaactctc 3120
ctggcgacc atcgtcggct acagcctcgg gaattgcgta ccgagctcga atttcccca 3180
tcgttcaaac atttggcaat aaagtttctt aagattgaat cctgttgccg gtcttgcgat 3240
gattatcata taatttctgt tgaattacgt taagcatgta ataattaaca tgtaatgcat 3300
gacgttattt atgagatggg tttttatgat tagagtccc caattataca ttaataacgc 3360
gatagaaaac aaaatatagc gcgcaacta ggataatta tcgcgcgcgg tgtcatctat 3420
gttactagat cgggaattcg atatcaagct t 3451

```

<210> 21
 <211> 14627
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> pAg11a Plasmid

```

<400> 21
catgccaaac acaggggttc cctcggggtc aaagtacttt gatccaaccc ctccgctgct 60
atagtgcagt cggcttctga cgttcagtgc agccgtcttc tgaaaacgac atgtcgcaca 120
agtcctaagt tacgcgacag gctgcccggc tgcccttttc ctggcgtttt cttgtcgcgt 180
gttttagtgc cataaagtag aatacttgcg actagaaccg gagacattac gccatgaaca 240
agagcgcgcg cgctggcctg ctgggctatg cccgcgtcag caccgacgac caggacttga 300
ccaaccaacg ggccgaactg caccgcgcgc agtgccacaa gctgttttcc gagaagatca 360
ccggcaccag gcgcgaccgc ccggagctgg ccaggatgct tgaccaccta cgccctggcg 420
acgttgtgac agtgaccagg ctgaccgccc tggcccgcag caccgcgcgc ctactggaca 480
ttgcccagag catccaggag gccggcgccg gcctgcgtag cctggcagag ccgtgggccc 540
acaccaccac gccggccggc cgcattggtg tgaccgtgtt gcgccgcatt gccgagttcg 600
agcgttccct aatcatcgac cgcacccgga gcgggcgcga ggccgcgaag gcccgaggcg 660
tgaagtttgg ccccccgcct accctcaccg cggcacagat cgcgcacgcc cgcgagctga 720
tcgaccagga aggcgcgacc gtgaaagagg cggctgcact gcttggcgtg catcgctcga 780
ccctgtaccg cgcacttgag cgcagcgagg aagtgcgcgc caccgaggcc aggcggcgcg 840
gtgccttccg tgaggacgca ttgaccgagg ccgacgcctt ggccggccgc gagaatgaac 900
gccaaagatg acaagcatga aaccgcacca ggacggccag gacgaaccgt ttttcattac 960
cgaagagatc gaggcggaga tgatcgcgcc cgggtacgtg ttcgagccgc ccgcgcagct 1020
ctcaaccgtg cggctgcagt aaatcctggc cggtttgtct gatgccaaagc tggcggcctg 1080
gccggccagc ttggccgctg aagaaaaccg gcgcgcgcgt ctaaaaaggt gatgtgtatt 1140
tgagtaaaac agcttgogtc atgcccgtgc tgcgtatatg atgcgatgag taaataaaca 1200
aatacgcaag gggaacgcct gaaggttatc gctgtactta accagaaagg cgggtcaggc 1260
aagacgacca tcgcaaccca tctagccgcg gccctgcaac tcgcgggggc cgatgttctg 1320
ttagtgcatt ccgatcccca gggcagtgcc cgcgattggg cggccgtgog ggaagatcaa 1380
ccgctaaccg ttgtcggcat cgaccgcccg acgattgacc gcgacgtgaa ggccatcggc 1440
cggcgcgact tcgtagtgat cgacggagcg ccccgaggcg cggacttgcc tgtgtccgcg 1500
atcaaggcag ccgacttcgt gctgattccg gtgcagccaa gcccttacga catatgggccc 1560
accgcggaac tggtggagct gggttaagcag gcattgagg tcacggatgg aaggctacaa 1620
gcggcctttg tcgtgtcgcg ggcgatcaaa ggcacgcgca tcggcgggtga ggttgccgag 1680
gcgctggccg ggtacgagct gccattctt gagtcccgtg tcacgcagcg cgtgagctac 1740
ccaggcactg ccgcgcgcgg cacaaccggt cttgaatcag aaccggaggg cgacgctgcc 1800
cgcgaggtcc aggcgctggc cgctgaaatt aaatcaaac tcatttgagt taatgagga 1860
aagagaaaat gagcaaaaagc acaaacacgc taagtgcgg ccgtccgagc gcacgcagca 1920
gcaaggctgc aacgttggcc agcctggcag acacgcgacg catgaagcgg gtcaactttc 1980
agttgcggcg ggaggatcac accaagctga agatgtacgc ggtacgcca ggcaagacca 2040
ttaccgagct gctatctgaa tacatcgogc agtaccaga gtaaatgagc aatatgaata 2100

```

WO 02/096923

PCT/US02/17451

-25-

atgagtagat	gaatTTTTagc	ggctaaagga	ggcggcatgg	aaaatcaaga	acaaccaggg	2160
accgacggcg	tggaatgccc	catgtgtgga	ggaacggggc	gttggccagg	cgtaagcggc	2220
tgggttgtct	gccggccctg	caatggcact	ggaaccccca	agcccaggga	atcggcggtga	2280
cggctcgcaa	ccatccggcc	cggtagcaaat	cggcgcgggc	ctgggtgatg	acctggtgga	2340
gaagttgaag	ccgcgcgagg	ccgccagcg	gcaacgcata	gaggcagaag	cacgcccgcg	2400
tgaatcgtgg	caagcggccg	ctgatcgaat	ccgcaaagaa	tcccggcaac	cgcggcgagc	2460
cgggtgcgcg	tgcattagga	agccgcccga	gggcgacgag	caaccagatt	ttttcgttcc	2520
gatgctctat	gacgtgggca	cccgcgatag	tgcagcatc	atggacgtgg	ccgttttccg	2580
tctgtcgaag	cgtgaccgac	gagctggcga	ggtgatccgc	tacgagcttc	cagacgggca	2640
cgtagagggt	tccgcagggc	cggccggcat	ggccagtgtg	tgggattacg	acctggtact	2700
gatggcgggt	tcccatctaa	ccgaatccat	gaaccgatac	cgggaaggga	agggagacaa	2760
gcccggccgc	gtgttccgtc	cacacgttgc	ggacgtactc	aagttctgcc	ggcgagccga	2820
tggcggaag	cagaaagacg	acctggtaga	aacctgcatt	cgttaaaca	ccacgcacgt	2880
tgccatgcag	cgtacgaaga	aggccaagaa	cggccgcctg	gtgacggtat	ccgagggtga	2940
agccttgatt	agccgctaca	agatcgtaaa	gagcgaaacc	ggcgggccgg	agtacatcga	3000
gatcgagcta	gctgattgga	tgtaccgga	gatcacagaa	ggcaagaacc	cggacgtgct	3060
gacggttcac	cccgattact	ttttgatcga	tcccggcatc	ggccgttttc	tctaccgctc	3120
ggcacgccc	gccgcaggca	aggcagaagc	cagatggttg	ttcaagacga	tctacgaacg	3180
cagtggcagc	gccggagagt	tcaagaagtt	ctgtttcacc	gtgcgcaagc	tgatcgggtc	3240
aatgacctg	ccgagtagc	atttgaagga	ggaggcgggg	caggctggcc	cgatcctagt	3300
catgcgctac	cgcacacctga	tcgaggcgga	agcatccgcc	ggttctaat	gtacggagca	3360
gatgctaggg	caaattgccc	tagcagggga	aaaaggctga	aaaggctctc	ttcctgtgga	3420
tagcacgtac	attgggaacc	caaagccgta	cattgggaac	cggaaaccgt	acattgggaa	3480
cccaaagccg	tacattggga	accggtcaca	catgtaagt	actgatataa	aagagaaaaa	3540
aggcgatttt	tccgcctaaa	actctttaaa	acttattaaa	actcttaaaa	cccgcctggc	3600
ctgtgcataa	ctgtctggcc	agcgcacagc	cgaagagctg	caaaaagcgc	ctacccttcg	3660
gtcgctgcgc	tccctacgcc	cgcgcgcttc	gcgtcggcct	atcgccggcg	ctggccgctc	3720
aaaaatggct	ggcctacggc	caggcaatct	accaggcgcc	ggacaagccg	cgcgctcgcc	3780
actcgaccgc	cggcgccccc	atcaaggcac	cctgcctcgc	gcgtttcggt	gatgacggtg	3840
aaaacctctg	acacatgcag	ctcccggaga	cggtcacagc	ttgtctgtaa	gcggatgccg	3900
ggagcagaca	agcccgctcag	ggcgcgtcag	cgggtgttgg	cgggtgtcgg	ggcgagacca	3960
tgaccacagc	acgtagcgat	agcggagtgt	atactggctt	aactatgcgg	catcagagca	4020
gattgtactg	agagtgcacc	atatgcggtg	tgaatatccg	cacagatgcg	taaggagaaa	4080
ataccgcata	aggcgctctt	ccgcttcttc	gctcactgac	tcgctgcgct	cggtcgctcg	4140
gctgcggcga	gcgggtatcag	ctcactcaaa	ggcggttaata	cgggttatcca	cagaatcagg	4200
ggataacgca	ggaaagaaca	tgtgagcaaa	aggccagcaa	aaggccagga	accgtaaaaa	4260
ggccgcggtg	ctggcggttt	tccataggct	ccgccccctt	gacgagcatc	acaaaaatcg	4320
acgctcaagt	cagagggtggc	gaaaccogac	aggactataa	agataaccagg	cgtttccccc	4380
tggaaagctcc	ctcgtgcgct	ctcctgttcc	gaccctgccg	cttaccggat	acctgtccgc	4440
ctttctccct	tccggaagcg	tggcgctttc	tcatagctca	cgtgttaggt	atctcagttc	4500
ggtgtaggtc	gttcgctcca	agctgggctg	tgtgcacgaa	ccccccgttc	agcccgaccg	4560
ctgcgcctta	tccggttaact	atcgtcttga	gtccaaccgg	gtaagacacg	acttatcgcc	4620
actggcagca	gccactggta	acaggattag	cacagcgagg	tatgtaggcg	gtgctacaga	4680
gttcttgaag	tgggtggccta	actacggcta	cactagaagg	acagtatttg	gtatctgcgc	4740
tctgtgaag	ccagttacct	tccgaaaaag	agttggtagc	tcttgatccg	gcaaacaaac	4800
caccgctggt	agcgggtggt	tttttgtttg	caagcagcag	attacgcgca	gaaaaaaagg	4860
atctcaagaa	gatoctttga	tcttttctac	ggggtctgac	gctcagtgga	acgaaaactc	4920
acgttaaggg	attttggttca	tgcaattatg	gtactaaaac	aattcatcca	gtaaaatata	4980
atattttatt	ttctcccaat	caggcttgat	ccccagtaag	tcaaaaaata	gctcgacata	5040
ctgttcttcc	ccgatattct	ccctgatcga	ccggacgcag	aaggcaatgt	cataccactt	5100
gtccgcccctg	ccgcttctcc	caagatcaat	aaagccactt	actttgccat	ctttcacaaa	5160
gatgttgotg	tctcccagggt	cgcgctggga	aaagacaagt	tctcttcggg	gcttttccgt	5220
ctttaaaaaa	tcatacagct	cgcgcgggac	tttaaatgga	gtgtcttctt	cccagttttc	5280
gcaatccaca	tccgccagat	cgttattcag	taagtaatcc	aattcggcta	agcggctgtc	5340
taagctattc	gtatagggac	aatccgatat	gtcgatggag	tgaaagagcc	tgatgcactc	5400
cgcatacagc	tcgataatct	tttcagggct	ttgttcattc	tcatactctt	ccgagcaaa	5460
gacgccatcg	gcctcactca	tgagcagatt	gctccagcca	tcatgccgtt	caaagtgcag	5520
gacottttgga	acaggcagct	ttccttccag	ccatagcatc	atgtcctttt	ccggttccac	5580
atcataggtg	gtccctttat	accggctgtc	cgtcattttt	aaatataggt	tttcattttc	5640
tcccaccagc	ttatatacct	tagcaggaga	cattccttcc	gtatctttta	cgcagcggtg	5700
tttttogatc	agttttttca	attccggtga	tattctcatt	ttagccattt	attatttccct	5760
tctcttttcc	tacagtattt	aaagataccc	caagaagcta	attataacaa	gacgaactcc	5820
aattcactgt	tccttgcat	ctaaaacctt	aaataccaga	aaacagcttt	ttcaaagtgg	5880
ttttcaaaag	tggcgataaa	catagtatcg	accgagccga	ttttgaaacc	cgggtgatca	5940
caggcagcaa	cgtctgttca	tcggttacaat	caacatgcta	ccctccgcga	gatcatccgt	6000
gtttcaaacc	cggcagctta	gttgccgttc	ttccgaatag	catcggtaac	atgagcaaa	6060
tctgcgcct	tacaacggct	ctcccgtgga	cgcgctcccg	gactgatggg	ctgcctgtat	6120

WO 02/096923

PCT/US02/17451

-26-

cgagtgggtga	ttttgtgccg	agctgccggg	cggggagctg	ttggctggct	gggtggcagga	6180
tatattgtgg	tgtaaacaaa	ttgacgctta	gacaacttaa	taacacattg	cggacgtttt	6240
taatgtactg	aattaacgcc	gaattaattc	gggggatctg	gatttttagta	ctggattttg	6300
gttttaggaa	ttagaaattt	tattgataga	agtattttac	aaatacaaat	acatactaag	6360
ggtttcttat	atgctcaaca	catgagcgaa	accctatagg	aaccctaatt	cccttatctg	6420
ggaactactc	acacattatt	atggagaaac	tcgagtcaaa	tctcggtgac	gggcaggacc	6480
ggacggggcg	gtaccggcag	gctgaagtcc	agctgccaga	aaccacagtc	atgccagttc	6540
ccgtgcttga	agccggccgc	ccgcagcatg	ccgcgggggg	catatccgag	cgccctcgtg	6600
atgcgacgcg	tcgggtcggt	gggcagcccg	atgacagcga	ccacgctcct	gaagccctgt	6660
gcctccaggg	acttcagcag	gtgggtgtag	agcgtggagc	ccagtcccg	ccgctgggtg	6720
cggggggaga	cgtacacggg	cgactcggcc	gtccagtcgt	aggcgttgcg	tgcctccag	6780
gggcccgcgt	aggcgatgcc	ggcgacctcg	ccgtccacct	cggcgacgag	ccagggatag	6840
cgctcccgcg	gacggagcag	gtcgtccgtc	cactcctgcg	gttcctgcgg	ctcgggtacg	6900
aagttgaccg	tgcttgtctc	gatgtagtgg	ttgacgatgg	tgcagaccgc	cggcatgtcc	6960
gcctcgggtg	cacggcggag	gtcggccggg	cgtcgttctg	ggctcatggt	agactcgaga	7020
gagatagatt	tgtagagaga	gactgggtgat	ttcagcgtgt	cctctccaaa	tgaaatgaac	7080
ttccttatat	agaggaaggt	cttgccaagg	atagtgggat	tgtgcgtcat	cccttacgtc	7140
agtggagata	tcacatcaat	ccacttgctt	tgaagacgtg	gttggacgt	cttctttttc	7200
cacgatgctc	ctcgtgggtg	ggggtccatc	tttgggacca	ctgtcggcag	aggcatcttg	7260
aacgatagcc	tttcttttat	cgcaatgatg	gcattttagt	gtgccacctt	ccttttctac	7320
tgctcctttg	atgaagtgcg	agatagctgg	gcaatggaat	ccgaggagg	ttcccgatat	7380
taccctttgt	tgaaaagtct	caatagccct	ttgggtcttct	gagactgtat	ctttgatatt	7440
cttgagtag	acgagagtgt	cgtgctccac	catgttatca	catcaatcca	cttgctttga	7500
agacgtgggt	ggaacgtctt	ctttttccac	gatgctcctc	gtgggtgggg	gtccatcttt	7560
gggaccactg	tcggcagagg	catcttgaac	gatagccttt	cctttatcgc	aatgatggca	7620
tttgtaggtg	ccaccttctc	tttctactgt	cctttttagt	aagtgcagag	tagctgggca	7680
atggaatccg	agcagggtttc	ccgatattac	cctttgttga	aaagtctcaa	tagccctttg	7740
gtcttctgag	actgtatctt	tgatattctt	ggagtagacg	agagtgtcgt	gctccaccat	7800
gttggcaagc	tgctctagcc	aatacgcaaa	ccgcctctcc	ccgcgcgttg	gccgattcat	7860
taatgcagct	ggcacgacag	gtttcccgac	tggaaagcgg	gcagtgcagc	caacgcgaat	7920
aatgttagtt	agctcactca	ttaggcaccc	caggctttac	actttatgct	tccggctcgt	7980
atgttgtgtg	gaattgtgag	cggataacaa	tttcacacag	gaaacagcta	tgaccatgat	8040
tacgaattcg	agccttgact	agagggtcga	cggatatacag	acatgataag	atacattgat	8100
gagtttgagc	aaaccacaac	tagaatgcag	tgaaaaaaat	gctttatttg	tgaattttgt	8160
gatgctattg	ctttattttg	aaccattata	agctgcaata	aacaagtttg	gggtggcgaa	8220
gaactccagc	atgagatccc	cgcgctggag	gatcatccag	ccggcgtccc	ggaaaacgat	8280
tccgaagccc	aacctttcat	agaaggcggc	gggtggaatcg	aaatctcgta	gcacgtgtca	8340
gtcctgctcc	tcggccacga	agtgcacgca	gttcgcggcc	gggtcgcgca	gggcgaactc	8400
ccgcccccac	ggctgctcgc	cgatctcggt	catggccggc	ccggaggcgt	cccgaagtt	8460
cgtggacacg	acctccgacc	actcggcgta	cagctcgtcc	aggccgcgca	cccacacca	8520
ggccagggtg	ttgtccggca	ccacctggtc	ctggaccgcg	ctgatgaaca	gggtcacgtc	8580
gtcccggacc	acacccggca	agtcgtcctc	cacgaagtcc	cgggagaacc	cgagccggtc	8640
ggccagaaac	tcgaccgctc	cggcgacgtc	ggcgccgggtg	agcaccgga	cggcactggt	8700
caacttggcc	atggatccag	atttcgctca	agttagtata	aaaaagcagg	cttcaatcct	8760
gcaggaattc	gatcgacact	ctcgtctact	ccaagaatat	caaagataca	gtctcagaag	8820
accaaagggc	tattgagact	tttcaacaaa	gggtaatatc	gggaaacctc	ctcggattcc	8880
attgccagc	tatctgtcac	ttcatcaaaa	ggacagtaga	aaaggaaggt	ggcacctaca	8940
aatgcccata	tttgcgataa	ggaaaggcta	tcgttcaaga	tgctctgccc	gacagtggtc	9000
ccaaagatgg	acccccaccc	acgaggagca	tcgtggaaaa	agaagacgtt	ccaaccacgt	9060
cttcaaagca	agtggattga	tgtgataaca	tggtggagca	cgacactctc	gtctactcca	9120
agaatatcaa	agatacagtc	tcagaagacc	aaagggctat	tgagactttt	caacaaaggg	9180
taatatcggt	aaacctcctc	ggattccatt	gcccagctat	ctgtcacttc	atcaaaagga	9240
cagtagaaaa	ggaagggtggc	acctacaaat	gccatcattg	cgataaagga	aaggctatcg	9300
ttcaagatgc	ctctgccgac	agtgggtcca	aagatggacc	cccacccacg	aggagcatcg	9360
tggaaaaaga	agacgtttcca	accagctctt	caaagcaagt	ggattgatgt	gatattctca	9420
ctgacgtaag	ggatgacgca	caatcccact	atccttcgca	agaccttctc	ctatataagg	9480
aagttcattt	cattttggaga	ggacacgctg	aaatcaccag	tctctctcta	caaatctatc	9540
ttctctcgag	tttcgcagat	ccgggggggg	aatgagatat	gaaaaagcct	gaactcaccc	9600
cgacgtctgt	cgagaagttt	ctgatcgaaa	agttcgacag	cgtctccgac	ctgatgcagc	9660
tctcggaggg	cgaagaatct	cgtgctttca	gcttcgatgt	aggagggcgt	ggatatgtcc	9720
tgccggtaaa	tagctgcgcc	gatgggtttct	acaaagatcg	ttatgtttat	cggcactttg	9780
catcgccgcg	gctcccgaat	ccggaagtgc	ttgacattgg	ggagtttagc	gagagcctga	9840
cctattgcgt	ctcccgcgt	gcacagggtg	tcacgttgca	agacctgcct	gaaaccgaac	9900
tgcccgcgtg	tctacacccg	gtcgcggagg	ctatggatgc	gatcgtgcg	gccgatctta	9960
gccagacgag	cgggttcggc	ccattcggac	cgcaagggaat	cggtcataac	actacatggc	10020
gtgatttcat	atgcgcgatt	gctgatcccc	atgtgtatca	ctggcaaac	gtgatggacg	10080
acaccgtcag	tgcgtccgtc	gctcaggctc	tcgatgagct	gatgctttgg	gccgaggact	10140

WO 02/096923

PCT/US02/17451

-27-

gccccgaagt	cgggcacctc	gtgcacgcgg	atttcggctc	caacaatgtc	ctgacggaca	10200
atggccgcgt	aacagcgggtc	attgactgga	gcgaggcgat	gttcggggat	tcccaatacg	10260
aggctcgcaa	catcttcttc	tggaggccgt	ggttggcttg	tatggagcag	cagacgcgct	10320
acttcgagcg	gaggcatccg	gagcttgacg	gatcgccacg	actccggcg	tatatgctcc	10380
gcattggtct	tgaccaactc	tatcagagct	tggttgacgg	caatttcgat	gatgcagctt	10440
ggggcgagg	tcgatgcgac	gcaatcgctc	gatccggagc	cgggactgtc	gggcgtaac	10500
aaatcgcccg	cagaagcgcg	gccgtctgga	ccgatggctg	tgtagaagta	ctcgccgata	10560
gtggaaaccg	acgccccagc	actcgctccg	gggcaaagaa	atagagtaga	tgccgaccgg	10620
atctgtcgat	cgacaagctc	gagtttctcc	ataataatgt	gtgagtagtt	cccagataag	10680
ggaattaggg	ttcctatagg	gtttcgctca	tgtgttgagc	atataagaaa	cccttagtat	10740
gtatttgtat	ttgtaaaata	cttctatcaa	taaaatttct	aattcctaaa	accaaaatcc	10800
agtactaaaa	tccagatccc	cogaattaat	tcggcggttaa	ttcagatcaa	gcttgacctg	10860
gaatatcgcg	agtaaaactga	aaatcacgga	aaatgagaaa	tacacacttt	aggacgtgaa	10920
atatggcgag	gaaaactgaa	aaaggtggaa	aatttagaaa	tgtccactgt	aggacgtgga	10980
atatggcaag	aaaactgaaa	atcatggaaa	atgagaaaca	tccacttgac	gacttgaaaa	11040
atgacgaaat	cactaaaaaa	cgtgaaaaat	gagaaatgca	cactgaagga	ctccgcggga	11100
attcgattgt	gctagccaat	gtttaacaag	atgtcaagca	caatgaatgt	tgggtggttg	11160
tggctcgtgg	tggcggtggt	ggaaaattgc	gggtggttcca	gcggtagtga	tcggcgatgg	11220
ttggtgtttg	cagcggtggt	tgatatcgga	atcacttatg	gtggttgtca	caatggaggt	11280
cgctcatggt	tatttggtgt	tggtcatcta	tatatatttt	taataatatt	aagtatttta	11340
cctatttttt	acataatttt	tattaaattt	atgcattggt	tgtatttttt	aatagttttt	11400
atcgtaactg	ttttataaaa	tattttatta	ttttatgtgt	tatatattta	cttgatgtat	11460
tggaaatttt	ctccattggt	ttttctatat	ttataataat	tttctatttt	ttttttgttt	11520
tattatgtat	tttttcgttt	tataataaat	atthattaaa	aaaaataatta	tttttgtaaa	11580
atatatcatt	tacaatgttt	aaaagtcatt	tgtgaatata	ttagctaagt	tgtacttctt	11640
tttgtgcatt	tggtgttgt	catgtctatt	atgattctct	ggccaaaaca	tgtctactcc	11700
tgtcatcttg	tttttttttt	ttaagacata	atcactagt	attatatcta	gactgaaggc	11760
gggaaacgac	aatctgatca	tgagcggaga	attaagggag	tcacgttatg	accccgccg	11820
atgacgcggg	acaagccggt	ttacgtttgg	aactgacaga	accgcaacgt	tgaaggagcc	11880
actcagccgc	gggtttcttg	agtttaatga	gctaagcaca	tacgtcagaa	accattattg	11940
cgcgttcaaa	agtcgcctaa	ggctcactat	agctagcaaa	tatttcttgt	caaaaatgct	12000
ccactatact	ttcctatatt	cccctcggt	tccaattaga	gtctcatatt	cactctcaat	12060
ccaaataatc	tgcaaccgat	ctcgagatcg	aattcccgcg	gccgcgaatt	cactagtgg	12120
tccccgggta	cggtcagtc	cttatgttac	gtcctgtaga	aaccccaacc	cgtgaaatca	12180
aaaaactcga	cggcctgttg	gcattcagtc	tggatcgcca	aaactgtgga	attgagcagc	12240
gttggtggga	aagcgcggt	caagaaagcc	gggcaattgc	tgtgccaggg	agttttaacg	12300
atcagttcgc	cgatgcagat	attcgtaatt	atgtgggcaa	cgtctggtat	cagcgcgag	12360
tctttatacc	gaaaggttg	gcaggccagc	gtactgtgct	gcgtttcgat	gcggtcactc	12420
attacggcaa	agtgtgggtc	aataatcagg	aagtgtgga	gcatcagggc	ggctatacgc	12480
catttgaaag	cgatgtcag	ccgtatgtta	ttgccgggaa	aagtgtacgt	atcacagttt	12540
gtgtgaacaa	cgaactgaac	tggcagacta	tcccgcgggg	aatggtgatt	accgacgaaa	12600
acggcaagaa	aaagcagtc	tacttccat	atthctttta	ctacgccggg	atccatcgca	12660
gcgtaatgct	ctacaccagc	ccgaacacct	gggtggacga	tatcaccggt	gtgacgcag	12720
tcgcgcaaga	ctgtaaccac	gcgtctgttg	actggcaggt	ggtggccaat	ggtgatgtca	12780
gcgttgaact	gcgtgatgag	gatcaacagg	tgggtgcaac	tggacaaggc	accagcgga	12840
ctttgcaagt	ggtgaatccg	cacctctggc	aaccgggtga	aggttatctc	tatgaactgt	12900
acgtcacagc	caaaagccag	acagagtgtg	atatctaccc	gctgcgcgtc	ggcatccggt	12960
cagtcggcag	gaaggcgag	cagttcctga	tcaaccacaa	accgttctac	tttactggct	13020
ttggccgtca	tgaggatgag	gatttgccgc	gcaaaggatt	cgataacgtg	ctgatggtgc	13080
acgatcacgc	attaatggac	tggattgggg	ccaactccta	ccgtacctcg	cattaccctt	13140
acgctgaaga	gatgctcgac	tgggcagatg	aacatggcat	cgtggtgatt	gatgaaactg	13200
cagctgtcgg	ctttaacctc	tctttaggca	ttggtttcga	agcgggcaac	aagccgaaag	13260
aactgtacag	cgaagaggca	gtcaacgggg	aaactcagca	ggcgcaacta	caggcgatta	13320
aagagctgat	agcgcgtagc	aaaaaccacc	caagcgtggt	gatgtggagt	attgccaaag	13380
aaccggatac	cggtccgcaa	ggtgcaagg	aatatttcgc	gccactggcg	gaagcaacgc	13440
gtaaactcga	tccgacgcgt	ccgatcacct	gcgtcaatgt	aatgttctgc	gacgctcaca	13500
ccgataccat	cagcgatctc	tttgatgtgc	tgtgctgaa	ccgttattac	ggttggtatg	13560
tccaaagcgg	cgatttgga	acggcagaga	aggtactgga	aaaagaactt	ctggcctggc	13620
aggagaaact	actcatcgcc	attatcatca	ccgaatacgg	cgtggatacg	ttagccgggc	13680
tgcactcaat	gtacaccgac	atgtggagt	aagagtatca	gtgtgcatgg	ctggatagt	13740
atcacccggt	ctttgatcgc	gtcagcgccg	tcgtcggtga	acaggtatgg	aatttcgcgc	13800
atthtgcgac	ctcgcaaggc	atattgcgcg	ttggcggtaa	caagaagggg	atcttcaccc	13860
gcgaccgcaa	accgaagtcg	gcggcttttc	tgtgcaaaa	acgctggact	ggcatgaact	13920
tcggtgaaaa	accgcagcag	ggaggcaaac	aatgaatcaa	caactctcct	ggcgaccat	13980
cgtcggtac	agcctcgga	attgcgtacc	gagctcgaat	ttccccgato	gttcaaacat	14040
ttggcaataa	agtttcttaa	gattgaatcc	tgttgccggt	cttgcgatga	ttatcatata	14100
atttctgttg	aattacgtta	agcatgtaat	aattaacatg	taatgcatga	cgttatttat	14160

WO 02/096923

PCT/US02/17451

-28-

gagatggggt	tttatgatta	gagtccegc	attatacatt	taatacgcga	tagaaaaaca	14220
aatatagcgc	gcaaaactagg	ataaattatc	gcgcgcgggtg	tcactctatgt	tactagatcg	14280
ggaattcgat	atcaagcttg	gcactggccg	tcgtttttaca	acgtcgtgac	tgggaaaacc	14340
ctggcggttac	ccaacttaat	cgccctgcag	cacatcccc	tttcgccagc	tggcgtaata	14400
gcgaagaggc	ccgcaccgat	cgcccttccc	aacagttgcg	cagcctgaat	ggcgaatgct	14460
agagcagctt	gagcttggat	cagattgtcg	tttcccgcc	tcagttttaa	ctatcagtg	14520
ttgacaggat	atattggcgg	gtaaacctaa	gagaaaagag	cgtttattag	aataacggat	14580
attttaaagg	gcgtgaaaag	gtttatccgt	tcgtccattt	gtatgtg		14627

<210> 22
 <211> 4257
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> pPUR Plasmid

<400> 22

ctgtggaatg	tgtgtcagtt	agggtgtgga	aagtcccag	gctcccagc	aggcagaagt	60
atgcaaagca	tgcattctaa	ttagtcagca	accaggtgtg	gaaagtcccc	aggctcccca	120
gcaggcagaa	gtatgcaaag	catgcatctc	aattagtcag	caaccatagt	cccgccccta	180
actccgcccc	tcocgcccc	aactccgccc	agttccgccc	attctccgcc	ccatgggtga	240
ctaatttttt	ttattttatgc	agaggccgag	gccgcctcgg	cctctgagct	attccagaag	300
tagtgaggag	gcttttttgg	agggcctaggc	ttttgcaaaa	agcttgcatg	cctgcaggtc	360
ggccgcaccg	accggtgcgg	ccaccatccc	ctgaccacag	cccctgaccc	ctcacaagga	420
gaagaccttc	catgaccgag	tacaagccca	cggtgcgcct	cgccaccgcg	gaagacgtcc	480
cccgggcccgt	acgcaccctc	gccgcgcgct	tcgcgcgacta	cccgcgcacg	cgccacacgg	540
tcgaccggga	ccgcacacac	gagcgggtca	ccgagctgca	agaactcttc	ctcacgcgcg	600
tcgggctcga	catcggaag	gtgtgggtcg	cgagcgcagg	cgccgcgggtg	gcggtctgga	660
ccacgcggga	gagcgtcgaa	gcgggggcgg	tggtcgccga	gatcgccccc	cgcatggccg	720
agttgagcgg	ttcccggtcg	gccgcgcagc	aacagatgga	aggcctcctg	gcgcgcgacc	780
ggcccaagga	gccgcgcttg	ttcctggcca	ccgtcggcgt	ctcgcccgac	caccagggca	840
agggtctggg	cagcgcgctg	gtgctccccg	gagtgagggc	ggccgagcgc	gcgggggtgc	900
ccgccttcct	ggagacctcc	gcgccccgca	acctccccct	ctacgagcgg	ctcggtctca	960
ccgtcaccgc	cgacgtcgag	gtgcccgaag	gaccgcgcac	ctggtgcatg	accgcgaagc	1020
ccggtgcctg	acgcccgcgc	cacgaccgcg	agcgcgcgac	cgaaaggagc	gcacgacccc	1080
atggctccga	ccgaagccga	cccggggcgg	cccgcgcgac	ccgcacccgc	ccccgagggc	1140
caccgactct	agaggatcat	aatcagccat	accacatttg	tagaggtttt	acttgcttta	1200
aaaaacctcc	cacacctccc	cctgaacctg	aaacataaaa	tgaatgcaat	tgttggttgt	1260
aacttgctta	ttgcagctta	taatgggtac	aaataaagca	atagcatcac	aaatttcaca	1320
aataaagcat	ttttttcaact	gcattctagt	tggtggttgt	ccaaactcat	caatgtatct	1380
tatcatgtct	ggatccccag	gaagctcctc	tggtgtcctc	taaaccctaa	cctcctctac	1440
ttgagaggac	attccaatca	taggctgccc	atccaccctc	tggtgtcctc	tggttaattag	1500
gtcacttaac	aaaaaggaaa	ttgggtaggg	gtttttcaca	gaccgctttc	taagggtaat	1560
tttaaaatat	ctgggaagtc	ccttcactcg	ctgtgttcca	gaagtgttgg	taaacagccc	1620
acaaatgtca	acagcagaaa	catacaagct	gtcagctttg	cacaaggggc	caacaccctg	1680
ctcatcaaga	agcactgtgg	ttgctgtgtt	agtaatgtgc	aaaacaggag	gcacattttc	1740
cccactctgt	taggtttcaa	aatatctagt	gttttcattt	ttacttggat	caggaaacca	1800
gcactccact	ggataagcat	tatccttatc	caaaacagcc	ttgtgggtcag	tggtcatctg	1860
ctgactgtca	actgtagcat	tttttgggg	tacagtttga	gcaggatatt	tggtcctgta	1920
gtttgtcaac	acaccctgca	gctccaaagg	ttccccacca	acagcaaaaa	aatgaaaatt	1980
tgacccttga	atgggttttc	cagcaccatt	ttcatgagtt	ttttgtgtcc	ctgaatgcaa	2040
gtttaacata	gcagttaccc	caataacctc	agttttaaca	gtaacagctt	cccatatcaa	2100
aatattttcca	cagggttaagt	cctcatttaa	attaggcaaa	ggaattcttg	aagacgaaag	2160
ggcctcgtga	tacgcctatt	tttataggtt	aatgtcatga	taataatggg	ttcttagacg	2220
tcagggtggca	cttttcgggg	aaatgtgcgc	ggaaccccta	tttggtttatt	tttctaataa	2280
cattcaataa	tgtatccgct	catgagacaa	taacctgat	aaatgcttca	ataatattga	2340
aaaagggaaga	gtatgagtat	tcaacatttc	cgtgtcgcgc	ttattccctt	ttttgcggca	2400
ttttgccttc	ctgtttttgc	tcaccagaaa	acgtcgtgta	aagtaaaaaga	tgctgaagat	2460
cagttgggtg	cacgagtggtg	ttacatcgaa	ctggatctca	acagcggtaa	gatccttgag	2520
agttttcgcc	ccgaagaacg	ttttccaatg	atgagcactt	ttaaagttct	gctatgtggc	2580
gcggtattat	cccgtgttga	cgccgggcaa	gagcaactcg	gtcgccgcac	acactattct	2640
cagaatgact	tggttgagta	ctcaccagtc	acagaaaagc	atcttacgga	tggcatgaca	2700
gtaagagaat	tatgcagtcg	tgccataacc	atgagtgata	acactgcggc	caacttaact	2760
ctgacaacga	tcggaggacc	gaaggagcta	accgcttttt	tgcaacaacat	gggggatcat	2820
gtaactcgcc	ttgatcgttg	ggaacccggg	ctgaatgaag	ccataccaaa	cgacgagcgt	2880
gacaccacga	tgccctgcagc	aatggcaaca	acgttgcgca	aactattaac	tggcgaacta	2940

WO 02/096923

PCT/US02/17451

-29-

```

cttactctag cttcccgcca acaattaata gactggatgg aggcggataa agttgcagga 3000
ccacttctgc gctcgccctt tccggctggc tgggtttattg ctgataaatc tggagccggt 3060
gagcgtgggt ctccggttat cattgcagca ctggggccag atggtaagcc ctcccgtatc 3120
gtagttatct acacgcaggg gactcaggca actatggatg aacgaaatag acagatcgct 3180
gagataggtg cctcactgat taagcattgg taactgtcag accaagttta ctcatatata 3240
ctttagattg atttaaaact tcatttttaa tttaaaagga tctaggtgaa gatccttttt 3300
gataatctca tgacaaaaat cccttaacgt gagttttcgt tccactgagc gtcagacccc 3360
gtagaaaaga tcaaaggate ttcttgagat cctttttttc tgcgcgtaat ctgctgcttg 3420
caaacaaaaa aaccaccgct accagcggtg gtttgtttgc cggatcaaga gctaccaact 3480
ctttttccga aggtaactgg cttcagcaga gcgcagatac caaatactgt ccttctagt 3540
tagccgtagt taggccacca cttcaagaac tctgtagcac cgcctacata cctcgctctg 3600
ctaactcgtg taaccagtggc tgctgccagt ggcgataagt cgtgtcttac cgggttgagc 3660
tcaagacgat agttaccgga taaggcgcag cggctcgggt gaacggggggg ttcgtgcaca 3720
cagcccagct tggagcgaac gacctacacc gaactgagat acctacagcg tgagctatga 3780
gaaagcgcca cgcttcccga agggagaaaag gcggacaggt atccggtaag cggcagggtc 3840
ggaacaggag agcgacgag ggagcttcca gggggaaaacg cctggtatct ttatagtct 3900
gtcgggtttc gccacctctg acttgagcgt cgatttttgt gatgctcgtc aggggggcgg 3960
agcctatgga aaaacgccag caacgcggcc tttttacggg tcttggcctt ttgctggcct 4020
tttgctcaca tgttctttcc tgcgttatcc cctgattctg tggataaccg tattaccgcc 4080
tttgagttag ctgataccgc tcgcccagc cgaacgaccg agcgcagcga gtcagttagc 4140
gaggaagcgg aagagcgctt gatgcggtat tttctcctta cgcactgtg cggtatctca 4200
caccgcatat ggtgcactct cagtacaatc tgctctgatg ccgcatagtt aagccag 4257

```

<210> 23
<211> 2713
<212> DNA
<213> Artificial Sequence

<220>
<223> pNEB193 Plasmid

```

<400> 23
tcgcgcgttt cgggtgatgac ggtgaaaacc tctgacacat gcagctcccc gagacgggtca 60
cagcttgtct gtaagcggat gccgggagca gacaagcccc tcaggcgcg tcagcgggtg 120
ttggcgggtg tcggggctgg cttaactatg cggcatcaga gcagattgta ctgagagtgc 180
accatattcg gtgtgaaata ccgcacagat gcgtaaggag aaaataccgc atcaggcgcc 240
attcgccatt caggctgcgc aactgttggg aaggcgatc ggtgcggggc tcttcgctat 300
tagccagctt ggcgaaaagg ggatgtgctg caaggcgatt aagttgggta acgcccagggt 360
tttcccagtc acgacgttgt aaaaacgacg ccagtgaatt cgagctcggg acccgggggc 420
gcgcgcggat cttaattaag tctagagtcg actgtttaaa cctgcaggca tgcaagcttg 480
gcgtaatcat ggtcatagct gtttcctgtg tgaaattggt atccgctcac aattccacac 540
aacatacgag ccggaagcat aaagtgtaaa gcctgggggt cctaatagag gagctaactc 600
acattaattg cgttgccgct actgcccgct ttccagtcgg gaaacctgtc gtgccagact 660
cattaatgaa tcgggcaacg cgcggggaga ggcggtttgc gtattgggcg ctcttcgct 720
tctcgcctca ctgactcgct gcgctcggtc gttcggctgc ggcgagcggg atcagctcac 780
tcaaaggcgg taatacgggt atccacagaa tcaggggata acgcaggaaa gaacatgtga 840
gcaaaaggcc agcaaaaggc caggaaccgt aaaaaggccg cgttgctggc gtttttccat 900
aggctccgcc cccctgacga gcatcacaaa caatcgacgt caagtcagag gtggcgaaac 960
cgcacaggac tataaagata ccaggcgttt cccctggaa gctccctcgt gcgctctcct 1020
gttccgaccc tgccgcttac cggatacctg tccgcctttc tcccttcggg aagcgtggcg 1080
ctttctcata gctcacgctg taggtatctc agttcgggtg aggtcggttc ctccaagctg 1140
ggctgtgtgc acgaaccccc cgttcagccc gaccgctgcg ccttatccgg taactatcgt 1200
cttgagtcca acccggtaag acacgactta tcgccactgg cagcagccac tggtaacagg 1260
attagcagag cgaggtatgt aggcgggtgt acagagttct tgaagtgggt gcctaactac 1320
ggctacacta gaaggacagt atttgggtatc tgcgctctgc tgaagccagt taccttcgga 1380
aaaagagttg gtagctcttg atccggcaaa caaaccaccg ctggtagcgg tggttttttt 1440
gtttgcaagc agcagattac gcgcagaaaa aaaggatctc aagaagatcc tttgatcttt 1500
tctacggggg ctgacgctca gtggaacgaa aactcacgtt aagggatttt ggtcatgaga 1560
ttatcaaaaa ggatcttcac ctagatcctt ttaaatataa aatgaagttt taaatcaatc 1620
taaagtatat atgagtaaac ttggtctgac agttaccaat gcttaatcag tgaggcacct 1680
atctcagcga totgtctatt tcgttcatcc atagttgcct gactccccgt cgtgtagata 1740
actacgatac gggagggcct accatctggc ccagtgctg caatgatacc gcgagacca 1800
cgctcaccgg ctccagattt atcagcaata aaccagccag ccggaaggcg cgagcgaga 1860
agtggctctg caactttatc cgctccatc cagtctatta attgttgccg ggaagctaga 1920
gtaagttagt cgccagttaa tagtttgccg aacgttgttg ccattgctac aggcacgtg 1980
gtgtcacgct cgtcgtttgg tatggcttca ttcagctccg gttccaacg atcaaggcga 2040
gttacatgat ccccatgtt gtgcaaaaaa gcggttagct ccttogggtc tccgatcgtt 2100

```

WO 02/096923

PCT/US02/17451

-30-

```

gtcagaagta agttggccgc agtggttatca ctcatgggta tggcagcact gcataattct 2160
cttactgtca tgccatccgt aagatgcttt tctgtgactg gtgagtactc aaccaagtca 2220
ttctgagaat agtgtatgcg gcgaccgagt tgcctcttgcc cggcgtcaat acgggataat 2280
accgcgccac atagcagaac tttaaaagtg ctcatcattg gaaaacgttc ttcggggcga 2340
aaactctcaa ggatcttacc gctgttgaga tccagttoga tgtaaccacac tctgtgcacc 2400
aactgatctt cagcatcttt tactttcacc agcgtttctg ggtgagcaaa aacaggaagg 2460
caaaatgccg caaaaaaggg aataagggcg acacggaaat gttgaatact catactcttc 2520
ctttttcaat attattgaag catttatcag ggttattgtc tcatgagcgg atacatattt 2580
gaatgtattt agaaaaataa acaaataggg gttccgcgca catttccccg aaaagtgcc 2640
cctgacgtct aagaaacatc tattatcatg acattaacct ataaaaatag gcgtatcacg 2700
aggcccttgc gtc 2713

```

<210> 24

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> attPUP Primer

<400> 24

ccttgcgcta atgctctgtt acagg

25

<210> 25

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> attPDWN Primer

<400> 25

cagaggcagg gagggggaca aaattg

26

<210> 26

<211> 4346

<212> DNA

<213> Artificial Sequence

<220>

<223> pSV40193attPsensePUR Plasmid

<400> 26

```

ccggtgccgc caccatcccc tgaccacgc cctgacccc tcacaaggag acgaccttcc 60
atgaccgagt acaagcccac ggtgcgcctc gccacccgcg acgacgtccc cggggccgta 120
cgcacccctc cgcgcgcgtt cgccgactac cccgccacgc gccacaccgt cgaccgcggac 180
cgccacatcg agcgggtcac cgagctgcaa gaactcttcc tcacgcgcgt cgggctcgac 240
atcggcgaag tgtgggtcgc ggacgacggc gcgcggtgg cggctcggac cagcccgag 300
agcgtcgaa cggggggcgt gtccgcggag atcggccgc gcattggcga gttgagcgg 360
tcccggctgg ccgcgcagca acagatggaa ggcctcctgg cgcgcaccc gcccaaggag 420
cccgcgtggt tcctggccac cgtcggcgtc tcgcccagac accagggcaa gggctcggg 480
agcgcgtcgt tgcctcccgg agtggaggcg gccgagcgc cgggggtgcc cgccttctc 540
gagacctccg cgcccgcgaa cctccccttc tacgagcggc tcggcttcac cgtcacccgc 600
gacgtcgagg tgcccgaagg accgcgcacc tgggtcatga cccgcaagcc cgggtgcctga 660
cgcccgcgcc acgacccgca gcgcccagac gaaaggagcg cagcacccca tggctccgac 720
cgaaagccgac cggggcggcc ccgcgcagcc cgcacccgcc cccgaggccc accgactcta 780
gaggatcata atcagccata ccacatttgt agagggttta cttgctttta aaaacctccc 840
acacctcccc ctgaacctga aacataaaat gaattgcaat gttgttgtaa acttggttat 900
tgacgcttat aatgggtaca aataaagcaa tagcatcaca aatttcacaa ataaagcatt 960
tttttctact cattctagtt gtggtttgtc caaactcatc aatgtatctt atcatgtctg 1020
gatccgcgcc ggatccttaa ttaagtctag agtcgactgt ttaaacctgc aggcattgca 1080
gcttggcgta atcatgggtc tagctgtttc ctgtgtgaaa ttgttatccg ctcaaatc 1140
cacacaacat accgagccgga agcataaagt gtaaaagcct ggggtgcctaa tgagttagct 1200
aactcacatt aattgcgttg cgctcactgc ccgctttcca gtcgggaaac ctgtcgtgcc 1260
agctgcatta atgaatcgcc caacgcgcgg ggagaggcgg tttgcgtatt gggcgctctt 1320
ccgcttcttc gctcactgac tcgtgcgct cggtcgttcg gctgcggcga gcggtatcag 1380
ctcactcaaa ggcggtaata cggttatcca cagaatcagg ggataacgca ggaaagaaca 1440

```

WO 02/096923

PCT/US02/17451

-31-

```

tgtgagcaaa aggccagcaa aaggccagga accgtaaaaa ggccgcgttg ctggcgtttt 1500
tccataggct ccgccccctt gacgagcatc acaaaaaatcg acgctcaagt cagaggtggc 1560
gaaacccgac aggactataa agataccagg cgtttccccc tggagagctcc ctcggtgcgt 1620
ctcctgttcc gaccctgccg cttaccggat acctgtccgc ctttctccct tcgggaagcg 1680
tggcgcttcc tcatagctca cgctgtaggt atctcagttc ggtgtaggtc gttcgctcca 1740
agctgggctg tgtgcacgaa cccccgttc agcccgaccg ctgcccctta tccggtaact 1800
atcgtcttga gtccaacccg gtaagacacg acttatcgcc actggcagca gccactggta 1860
acaggattag cagagcgagg tatgtaggcg gtgtacaga gttcttgaag tgggtggcta 1920
actacggcta cactagaagg acagtatttg gtatctggcg tctgctgaag ccagttacct 1980
tcggaaaaag agttggtagc tcttgatccg gcaaaaaaac caccgctggg agcgggtggg 2040
tttttggttg caagcagcag attacgcgca gaaaaaaaagg atctcaagaa gatcctttga 2100
tcttttctac ggggtctgac gctcagtgga acgaaaaactc acgttaaggg attttggta 2160
tgagattatc aaaaaggatc ttcacctaga tctttttaa ttaaaaatga agttttaaat 2220
caatctaaag tatatatgag taaacttggt ctgacagtta ccaatgctta atcagtgagg 2280
cacctatctc agcgtctgtt ctatttctgt catccatagt tgcctgactc cccgtcgtgt 2340
agataactac gattacggag ggcttacct ctggccccag tgctgcaatg ataccgcgag 2400
acccacgctc accggctcca gatttatcag caataaacca gccagccgga agggccgagc 2460
gcagaagtgg tcctgcaact ttatccgcct ccatccagtc tattaattgt tgcggggaag 2520
ctagagtaag tagttcgcca gttaatatgt tggcgaacgt tgttgccatt gctacaggca 2580
tcgtggtgac acgctcgtcg tttggtagtg ctccattcag ctccggttcc caacgatcaa 2640
ggcgagttac atgatcccc atgttgtgca aaaaagcggg tagctccttc ggtcctccga 2700
tcgttgtcag aagtaagttg gccgcagtg tatcactcat gggtatggca gcaactgcta 2760
attctcttac tgtcatgcca tccgtaagat gcttttctgt gactggtgag tactcaacca 2820
agtcattctg agaatagtgt atgcggcgac cgagtttgctc ttgcccggcg tcaatacggg 2880
ataataccgc gccacatagc agaactttaa aagtgtcat cattggaaaa cgttcttcgg 2940
ggcgaaaaac ctcaaggatc ttaccgctgt tgagatccag ttcgatgtaa cccactcgtg 3000
caccacaactg atcttcagca tcttttactt tcaccagcgt ttctgggtga gcaaaaaacag 3060
gaaggcaaaa tgcgcgcaaa aagggaataa gggcgacacg gaaatgttga atactcatac 3120
tcttcctttt tcaatattat tgaagcattt atcaggggta ttgtctcatg agcggataca 3180
tatttgaatg tatttgaaaa aataaacaac taggggttcc gcgcacattt ccccgaaaaag 3240
tgccacctga cgtctaagaa accattatta tcatgacatt aacctataaa aataggcgta 3300
tcacgagcca ctttcgtctc gcgcgtttcg gtgatgacgg tgaaaacctc tgacacatgc 3360
agctcccgga gacgggtcaca gcttgtctgt aagcggatgc cgggagcaga caagcccgtc 3420
agggcgcgct agcgggtgtt ggcgggtgtc ggggctggct taactatgcg gcatcagagc 3480
agattgtact gagagtgcac catatgcggt gtgaaatacc gcacagatgc gtaaggagaa 3540
aataccgcat caggcgccat tgcgccattc ggctgcgcaa ctggtgggaa gggcgatcgg 3600
tgcgggcctc ttcgctatta cgccagctgg cgaaaggggg atgtgctgca aggcgattaa 3660
gttgggtaac ttttatttat tcccagtcac gacgttgtaa aacgacggcc agtgaattcg 3720
agctgtggaa tgtgtgtcag ttagggtgtg gaaagtcccc aggtccccca gcaggcagaa 3780
gtatgcaaag catgcatctc aattagtcag caaccagggt tggaaagtcc ccaggctccc 3840
cagcaggcag aagtatgcaa agcatgcatc tcaattagtc agcaaccata gtcccgcgcc 3900
taactccgac catcccgccc ctaactccgc ccagttccgc ccattctccg ccccatggct 3960
gactaatttt ttttatttat gcaagggcgc aggcgcctc ggctctgag ctattccaga 4020
agtagtgagg aggtttttt ggaggctcgg taccoccttg cgctaattgt ctgttacagg 4080
tcactaatac catctaagta gttgattcat agtgactgca tatgttgtgt tttacagtat 4140
tatgtagtct gttttttatg caaaatctaa tttaatatat tgatatttat atcattttac 4200
gtttctcggt cagctttttt atactaagtt ggcattataa aaaagcattg ottatcaatt 4260
tgttgcaacg aacaggtcaa tatcagcaa aataaaatca ttatttgatt tcaattttgt 4320
cccatccct gcctctgggg ggcgcg 4346

```

<210> 27
 <211> 5855
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> pCXlamIntrR Plasmid

```

<400> 27
gtcgacattg attattgact agttattaat agtaatcaat tacgggggtca ttagttcata 60
gccatataat ggagttccgc gttacataac ttacggtaaa tggcccgctt ggctgaccgc 120
ccaacgaccc ccgcccattg acgtcaataa tgacgtatgt tcccatagta acgccaatag 180
ggactttcca ttgacgtcaa tgggtggact atttacggta aactgccacac ttggcagtac 240
atcaagtgtg tcatatgcca agtacgccc ctattgacgt caatgacggg aaatggcccg 300
cctggcatta tgcacgtac atgaccttat gggactttcc tacttggcag tacatctacg 360
tattagtcac cgctattacc atgggtcgag gtgagcccca cgttctgctt cactctcccc 420
atctccccc cctccccacc cccaattttg tatttattta ttttttaatt attttgtgca 480

```

WO 02/096923

PCT/US02/17451

-32-

```

gcgatggggg cggggggggg ggggggcgcgc gccaggcggg gcggggcggg gcgagggggc 540
ggggcggggc agggcgagag gtgcccggcg agccaatcag agcggcgcgc tccgaaagt 600
tcccttttat gcgaggcggc gggggcggcg gccctataaa aagcgaagcg cgcggcgggc 660
gggagtcgct gcgttgccct cggcccgctgc cccgctccgc gccgcctcgc gccgcccgc 720
ccggtctga ctgaccgct tactcccaca ggtgagcggg cgggacggcc cttctcctcc 780
gggctgtaat tagcgcttg tttaatgacg ggtcggtttct tttctgtggc tgcgtgaaag 840
ccttaaaggg ctccgggagg gccctttgtg cgggggggag cggctcgggg ggtgcgtgcg 900
tgtgtgtgtg cgtggggagc gccgcgtgcg gcccgcgctg cccggcggct gtgagcgctg 960
cgggcgcggc gggggccttt gtgcgtcccg cgtgtgcgcg aggggagcgc ggccgggggc 1020
ggtgccccgc ggtgcggggg ggctgcgagg ggaacaaagg ctgcgtgcgg ggtgtgtgcg 1080
tggggggggt agcagggggg gtgggcgcgg cggctcgggt gtaaccccc cctgcacccc 1140
cctccccgag ttgctgagca cggcccggtc tcgggtgcgg ggctccgtgc ggggcgtggc 1200
gcggggcctc ccgtgccggg cgggggggtg cggcaggtgg ggggtgccgg cggggcgggg 1260
ccgcctcggg ccggggaggg ctccggggag gggcgcggcg gccccggagc gccggcggct 1320
gtcagggcgc ggcgagccgc agccattgcc ttttatggta atcgtgcgag agggcgcagg 1380
gacttccttt gtcccaaatc tggcggagcc gaaatctggg aggcgcgcgc gcaccccccc 1440
tagcgggcgc gggcgaagcg gtgcggcgcc ggcaggaagg aaatggcgcg ggagggcctt 1500
cgtgcgtcgc cgcgcgcgcg tccctttctc catctccagc ctccgggctg ccgcaggggg 1560
acggctgcct tcggggggga cggggcaggg cgggggttcg cttctggcgt gtgacggcg 1620
gctctagagc ctctgctaac catgttcag ccttcttctt tttctacag ctccgggca 1680
acgtgctggt tgtgtgctg tctcatcatt ttggcaaga attcatggga agaaggcgaa 1740
gtcattgagc cggggattta cccctaacc ttatataag aaacaatgga tattactgct 1800
acagggaccc aaggacgggt aaagagttg gattaggcag agacaggcga atcgcaatca 1860
ctgaagctat acaggccaac attgagttat ttccaggaca caaacacaag cctctgacag 1920
cgagaatcaa cagtataat tccgttacg tacattcatg gcttgatcgc tacgaaaaaa 1980
tccctggcag gaggaatc aagcagaaga cactcataaa ttacatgagc aaaattaaag 2040
caataaggag ggtctgcct gatgctccac ttgaagacat caccacaaaa gaaattgcgg 2100
caatgctcaa tggatacata gacgagggca aggcggcgct agccaagtt atcagatcaa 2160
cactgagcga tgcattccga gaggcaatag ctgaaggcca tataacaaca aaccatgtcg 2220
ctgccactcg ccgagcaaaa tctagagtaa ggagatcaag acttacggct gacgaatacc 2280
tgaaaaatta tcaagcagca gaatcatcac catgttggct cagacttgca atggaactgg 2340
ctgttgttac cgggcaacga gttggtgatt tatgcgaat gaagtggct gatctgat 2400
atggatatct ttatgtcgag caaagcaaaa caggcgtaaa aattgccatc ccaacagcat 2460
tgcatattga tgcctcggga atatcaatga aggaacact tgataaatgc aaagagattc 2520
ttggcggaga aaccataatt gcatctactc gtccggaacc gctttcatcc ggcacagtat 2580
caaggtatct tatgcgcgca cgaaaagcat caggctcttc cttcgaaggg gatccgccta 2640
cctttcacga gttgcgcagt ttgtctgcaa gactctatga gaagcagata agcgataag 2700
ttgctcaaca tcttctcggg cataagtcgg acaccatggc atcacagtat cgtgatgaca 2760
gaggcaggga gtgggacaaa attgaaatca aataagaatt cactcctcag gtgcaggctg 2820
cctatcagaa ggtggtggct ggtgtggcca atgccctggc tcacaaatac cactgagatc 2880
tttttccctc tgccaaaaat tatggggaca tcatgaagcc ccttgagcat ctgacttctg 2940
gctaataaag gaaatttatt ttcatgcaa tagtgtgtg gaattttttg tgtctctcac 3000
tcggaaggac atatgggagg gcaaatcatt taaacacatc gaatgagtat ttggtttaga 3060
gtttggcaac atatgccata tgctggctgc catgaacaaa ggtggctata aagaggatcat 3120
cagtatatga aacagccccc tgctgtccat tccctattcc atagaaaagc cttgacttga 3180
ggttagatct tttttatatt ttgtttgtg ttattttttt ctttaacatc cctaaaattt 3240
tccttcatag ttttactaga cagatttttc ctcctctcct gactactccc agcttggcgt aatcatggct 3300
gtccctcttc tcttatgaag atccctcgac ctcgaccca agcttggcgt aatcatggct 3360
atagctgttt cctgtgtgaa attgttatcc gctocaaatt ccacacaaca tacgagccgg 3420
aagcataaag tgtaaagcct ggggtgccta atgagtgagc taactcacat taattgcgtt 3480
gcgctcactg cccgcttttc agtcgggaaa cctgtcgtgc cagcggatcc gcactctcaat 3540
tagtcagcaa ccatagtcct gccctaact ccgcccctac tccgcccag 3600
tccgccactc ctccgcccc atagagctatt ttatgtttta tttatgcaga ggcggaggcc 3660
gcctcggcct ctgagctatt ccagaagtag tgaggaggct tttttggagg cctaggcttt 3720
tgcaaaaagc taacttgttt attgcagctt ataattggtt caaataaagc aatagcatca 3780
caaatttcac aaataaagca tttttttcac tgcattctag ttgtggtttg tccaaactca 3840
tcaatgtatc ttatcatgtc tggatccgct gcattaatga atcggccaac gcgccccggg 3900
aggcggtttg cgtattgggc gctcttcgcg tctctcgcg actgactcgc tgcgctcgg 3960
cgttcggctg cggcgagcgg tatcagctca gtaatacggg gtaatacggg tatccacaga 4020
atcaggggat aacgcaggaa agaacatgtg agcaaaaggc cagcaaaagg ccaggaaccg 4080
taaaaaggcc gcgttgctgg cgtttttcca taggctccgc cccctgacg agcatcacia 4140
aaatcgacgc tcaagtcaga ggtggcgaag cccgacagga ctataaagat accaggcgtt 4200
tccccctgga agctccctcg tgogctctcc gtttccgacc ctgcccctta ccggatacc 4260
gtccgctttt ctcccttcgg gaagcgtggc gctttctcaa tgctcacgt gtaggatat 4320
cagttcgggt taggtcgttc gctcaaagc gggctgtgtg cagcaacccc ccgttcagcc 4380
cgaccgctgc gccttatccg gtaactatog tcttgagtc aaccgggtaa gacacgactt 4440
atcgccactg gcagcagcca ctggtaacag gattagcaga gcgaggtatg taggcgggtg 4500

```

WO 02/096923

PCT/US02/17451

-33-

```

tacagagttc ttgaagtggg ggcctaacta cggctacact agaaggacag tatttggtat 4560
ctgcgctctg ctgaagccag ttaccttcgg aaaaagagtt ggtagctctt gatccggcaa 4620
acaaaccacc gctggtagcg gtgggttttt tgtttgcaag cagcagatta cgcgcagaaa 4680
aaaaggatct caagaagatc ctttgatctt ttctacgggg tctgacgctc agtggaaacga 4740
aaactcacgt taagggatct tggtcatgag attatcaaaa aggatcttca cctagatcct 4800
tttaaattaa aaatgaagtt ttaaatcaat ctaaagtata tatgagtaaa cttgggtctga 4860
cagttaccaa tgottaatca gtgaggcacc tatctcagcg atctgtctat ttcgttcctc 4920
catagttgcc tgactccccg tcgtgtagat aactacgata cgggaggggt taccatctgg 4980
ccccagtgtc gcaatgatac cgcgagacc acgtccaccg gctccagatt tatcagcaat 5040
aaaccagcca gcgggaaggg ccgagcgag aagtggtcct gcaactttat ccgcctccat 5100
ccagtctatt aattgttgcc gggaagctag agtaagtagt tcgccagtta atagtttgcg 5160
caacgttggt gccattgcta caggcatcgt ggtgtcacgc tcgtcgtttg gtatggcttc 5220
attcagctcc ggttcccaac gatcaaggcg agttacatga tccccatgt tgtgcaaaaa 5280
agcggttagc tccttcgggc ctccgatcgt tgtcagaagt aagttggccg cagtgttatc 5340
actcatgggt atggcagcac tgcataattc tcttactgtc atgccatccg taagatgctt 5400
ttctgtgact ggtgagtact caaccaagtc attctgagaa tagtgtatgc ggcgaccgag 5460
ttgtctttgc ccggcgctcaa tacgggataa taccgcgcca catagcagaa ctttaaaagt 5520
gctcatcatt ggaaaacgtt cttcggggcg aaaactctca aggatcttac cgctgttgag 5580
atccagttcg atgtaaccca ctctgtcacc caactgatct tcagcatctt ttactttcac 5640
cagcgtttct gggtagacaa aaacaggaag gcaaaaatgcc gcaaaaaagg gaataagggc 5700
gacacggaaa tgttgaatac tcatactctt cctttttcaa tattattgaa gcatttatca 5760
gggttattgt ctcatgagcg gatacatatt tgaatgtatt tagaaaaata aacaaatagg 5820
ggttccgcgc acatttcccc gaaaagtgcc acctg 5855

```

<210> 28
 <211> 37
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> 5PacSV40 Primer

<400> 28
 ctgttaatta actgtggaat gtgtgtcagt taggggtg 37

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

<220>
 <223> Antisense Zeo Primer

<400> 29
 tgaacagggt cacgtcgtcc 20

<210> 30
 <211> 1032
 <212> DNA
 <213> Escherichia Coli

<220>
 <221> CDS
 <222> (1)...(1032)
 <223> nucleotide sequence encoding Cre recombinase

<400> 30
 atg tcc aat tta ctg acc gta cac caa aat ttg cct gca tta ccg gtc 48
 Met Ser Asn Leu Leu Thr Val His Gln Asn Leu Pro Ala Leu Pro Val
 1 5 10 15

gat gca acg agt gat gag gtt cgc aag aac ctg atg gac atg ttc agg 96
 Asp Ala Thr Ser Asp Glu Val Arg Lys Asn Leu Met Asp Met Phe Arg
 20 25 30

gat cgc cag gcg ttt tct gag cat acc tgg aaa atg ctt ctg tcc gtt 144
 Asp Arg Gln Ala Phe Ser Glu His Thr Trp Lys Met Leu Leu Ser Val

WO 02/096923

PCT/US02/17451

-34-

35	40	45	
tgc cgg tgc tgg gcg gca tgg tgc aag ttg aat aac cgg aaa tgg ttt			192
Cys Arg Ser Trp Ala Ala Trp Cys Lys Leu Asn Asn Arg Lys Trp Phe			
50	55	60	
ccc gca gaa cct gaa gat gtt cgc gat tat ctt cta tat ctt cag gcg			240
Pro Ala Glu Pro Glu Asp Val Arg Asp Tyr Leu Leu Tyr Leu Gln Ala			
65	70	75	80
cgc ggt ctg gca gta aaa act atc cag caa cat ttg ggc cag cta aac			288
Arg Gly Leu Ala Val Lys Thr Ile Gln Gln His Leu Gly Gln Leu Asn			
	85	90	95
atg ctt cat cgt cgg tcc ggg ctg cca cga cca agt gac agc aat gct			336
Met Leu His Arg Arg Ser Gly Leu Pro Arg Pro Ser Asp Ser Asn Ala			
	100	105	110
gtt tca ctg gtt atg cgg cgg atc cga aaa gaa aac gtt gat gcc ggt			384
Val Ser Leu Val Met Arg Arg Ile Arg Lys Glu Asn Val Asp Ala Gly			
	115	120	125
gaa cgt gca aaa cag gct cta gcg ttc gaa cgc act gat ttc gac cag			432
Glu Arg Ala Lys Gln Ala Leu Ala Phe Glu Arg Thr Asp Phe Asp Gln			
	130	135	140
gtt cgt tca ctc atg gaa aat agc gat cgc tgc cag gat ata cgt aat			480
Val Arg Ser Leu Met Glu Asn Ser Asp Arg Cys Gln Asp Ile Arg Asn			
	145	150	155
ctg gca ttt ctg ggg att gct tat aac acc ctg tta cgt ata gcc gaa			528
Leu Ala Phe Leu Gly Ile Ala Tyr Asn Thr Leu Leu Arg Ile Ala Glu			
	165	170	175
att gcc agg atc agg gtt aaa gat atc tca cgt act gac ggt ggg aga			576
Ile Ala Arg Ile Arg Val Lys Asp Ile Ser Arg Thr Asp Gly Gly Arg			
	180	185	190
atg tta atc cat att ggc aga acg aaa acg ctg gtt agc acc gca ggt			624
Met Leu Ile His Ile Gly Arg Thr Lys Thr Leu Val Ser Thr Ala Gly			
	195	200	205
gta gag aag gca ctt agc ctg ggg gta act aaa ctg gtc gag cga tgg			672
Val Glu Lys Ala Leu Ser Leu Gly Val Thr Lys Leu Val Glu Arg Trp			
	210	215	220
att tcc gtc tct ggt gta gct gat gat ccg aat aac tac ctg ttt tgc			720
Ile Ser Val Ser Gly Val Ala Asp Asp Pro Asn Asn Tyr Leu Phe Cys			
	225	230	235
cgg gtc aga aaa aat ggt gtt gcc gcg cca tct gcc acc agc cag cta			768
Arg Val Arg Lys Asn Gly Val Ala Ala Pro Ser Ala Thr Ser Gln Leu			
	245	250	255
tca act cgc gcc ctg gaa ggg att ttt gaa gca act cat cga ttg att			816
Ser Thr Arg Ala Leu Glu Gly Ile Phe Glu Ala Thr His Arg Leu Ile			
	260	265	270
tac ggc gct aag gat gac tct ggt cag aga tac ctg gcc tgg tct gga			864
Tyr Gly Ala Lys Asp Asp Ser Gly Gln Arg Tyr Leu Ala Trp Ser Gly			
	275	280	285
cac agt gcc cgt gtc gga gcc gcg cga gat atg gcc cgc gct gga gtt			912
His Ser Ala Arg Val Gly Ala Ala Arg Asp Met Ala Arg Ala Gly Val			
	290	295	300
tca ata ccg gag atc atg caa gct ggt ggc tgg acc aat gta aat att			960

WO 02/096923

PCT/US02/17451

-35-

Ser Ile Pro Glu Ile Met Gln Ala Gly Gly Trp Thr Asn Val Asn Ile
 305 310 315 320

gtc atg aac tat atc cgt aac ctg gat agt gaa aca ggg gca atg gtg 1008
 Val Met Asn Tyr Ile Arg Asn Leu Asp Ser Glu Thr Gly Ala Met Val
 325 330 335

cgc ctg ctg gaa gat ggc gat tag 1032
 Arg Leu Leu Glu Asp Gly Asp *
 340

<210> 31
 <211> 343
 <212> PRT
 <213> Escherichia Coli

<400> 31
 Met Ser Asn Leu Leu Thr Val His Gln Asn Leu Pro Ala Leu Pro Val
 1 5 10 15
 Asp Ala Thr Ser Asp Glu Val Arg Lys Asn Leu Met Asp Met Phe Arg
 20 25 30
 Asp Arg Gln Ala Phe Ser Glu His Thr Trp Lys Met Leu Leu Ser Val
 35 40 45
 Cys Arg Ser Trp Ala Ala Trp Cys Lys Leu Asn Asn Arg Lys Trp Phe
 50 55 60
 Pro Ala Glu Pro Glu Asp Val Arg Asp Tyr Leu Leu Tyr Leu Gln Ala
 65 70 75 80
 Arg Gly Leu Ala Val Lys Thr Ile Gln Gln His Leu Gly Gln Leu Asn
 85 90 95
 Met Leu His Arg Arg Ser Gly Leu Pro Arg Pro Ser Asp Ser Asn Ala
 100 105 110
 Val Ser Leu Val Met Arg Arg Ile Arg Lys Glu Asn Val Asp Ala Gly
 115 120 125
 Glu Arg Ala Lys Gln Ala Leu Ala Phe Glu Arg Thr Asp Phe Asp Gln
 130 135 140
 Val Arg Ser Leu Met Glu Asn Ser Asp Arg Cys Gln Asp Ile Arg Asn
 145 150 155 160
 Leu Ala Phe Leu Gly Ile Ala Tyr Asn Thr Leu Leu Arg Ile Ala Glu
 165 170 175
 Ile Ala Arg Ile Arg Val Lys Asp Ile Ser Arg Thr Asp Gly Gly Arg
 180 185 190
 Met Leu Ile His Ile Gly Arg Thr Lys Thr Leu Val Ser Thr Ala Gly
 195 200 205
 Val Glu Lys Ala Leu Ser Leu Gly Val Thr Lys Leu Val Glu Arg Trp
 210 215 220
 Ile Ser Val Ser Gly Val Ala Asp Asp Pro Asn Asn Tyr Leu Phe Cys
 225 230 235 240
 Arg Val Arg Lys Asn Gly Val Ala Ala Pro Ser Ala Thr Ser Gln Leu
 245 250 255
 Ser Thr Arg Ala Leu Glu Gly Ile Phe Glu Ala Thr His Arg Leu Ile
 260 265 270
 Tyr Gly Ala Lys Asp Asp Ser Gly Gln Arg Tyr Leu Ala Trp Ser Gly
 275 280 285
 His Ser Ala Arg Val Gly Ala Ala Arg Asp Met Ala Arg Ala Gly Val
 290 295 300
 Ser Ile Pro Glu Ile Met Gln Ala Gly Gly Trp Thr Asn Val Asn Ile
 305 310 315 320
 Val Met Asn Tyr Ile Arg Asn Leu Asp Ser Glu Thr Gly Ala Met Val
 325 330 335
 Arg Leu Leu Glu Asp Gly Asp
 340

<210> 32
 <211> 33
 <212> DNA
 <213> Artificial Sequence

WO 02/096923

PCT/US02/17451

-36-

<220>
<223> attB1 recognition sequence

<400> 32
tgaagcctgc ttttttatac taacttgagc gaa 33

<210> 33
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> m-att recognition sequence

<221> misc_difference
<222> 18
<223> n is a or g or c or t/u

<400> 33
rkycwgcttt yktrtacnaa stsgb 25

<210> 34
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> m-attB recognition sequence

<221> misc_difference
<222> 18
<223> n is a or c or g or t/u

<400> 34
agccwgcttt yktrtacnaa ctsgb 25

<210> 35
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> m-attR recognition sequence

<221> misc_difference
<222> 18
<223> n is a or g or c or t/u

<400> 35
gttcagcttt cktrtacnaa ctsgb 25

<210> 36
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> m-attL recognition sequence

<221> misc_difference
<222> 18
<223> n is a or g or c or t/u

<400> 36
agccwgcttt cktrtacnaa gtsgb 25

<210> 37

WO 02/096923

PCT/US02/17451

-37-

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

<220>
<223> m-attP1 recognition sequence

<221> misc_difference
<222> 18
<223> n is a or g or c or t/u

<400> 37
gttcagcttt yktrtacnaa gtsgb 25

<210> 38
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> attB2 recognition sequence

<400> 38
agcctgcttt cttgtacaaa cttgt 25

<210> 39
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> attB3 recognition sequence

<400> 39
accagcttt cttgtacaaa cttgt 25

<210> 40
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> attR1 recognition sequence

<400> 40
gttcagcttt tttgtacaaa cttgt 25

<210> 41
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> attR2 recognition sequence

<400> 41
gttcagcttt cttgtacaaa cttgt 25

<210> 42
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> attR3 recognition sequence

<400> 42

WO 02/096923

PCT/US02/17451

-38-

gttcagcttt cttgtacaaa gttgg

25

<210> 43

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> attL1 recognition sequence

<400> 43

agcctgcttt tttgtacaaa gttgg

25

<210> 44

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> attL2 recognition sequence

<400> 44

agcctgcttt cttgtacaaa gttgg

25

<210> 45

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> attL3 recognition sequence

<400> 45

acccagcttt cttgtacaaa gttgg

25

<210> 46

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> attP1 recognition sequence

<400> 46

gttcagcttt tttgtacaaa gttgg

25

<210> 47

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> attP2,P3 recognition sequence

<400> 47

gttcagcttt cttgtacaaa gttgg

25

<210> 48

<211> 282

<212> DNA

<213> Artificial Sequence

<220>

<223> attP recognition sequence

<400> 48

ccttgcgcta atgctctgtt acaggtcact aataccatct aagtagttga ttcatagtga 60

WO 02/096923

PCT/US02/17451

-39-

ctgcatatgt tgtgttttac agtattatgt agtctgtttt ttatgcaaaa totaatttaa 120
 tatattgata tttatatcat tttacgtttc tctgttcagct tttttatact aagttggcat 180
 tataaaaaag cattgcttat caatttgttg caacgaacag gtcactatca gtcaaaaataa 240
 aatcattatt tgatttcaat tttgtccac tccctgcctc tg 282

<210> 49
 <211> 1071
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> nucleotide sequence encoding Integrase E174R

<221> CDS
 <222> (1)...(1071)
 <223> Integrase E174R

<400> 49
 atg gga aga agg cga agt cat gag cgc cgg gat tta ccc cct aac ctt 48
 Met Gly Arg Arg Ser His Glu Arg Arg Asp Leu Pro Pro Asn Leu
 1 5 10 15

tat ata aga aac aat gga tat tac tgc tac agg gac cca agg acg ggt 96
 Tyr Ile Arg Asn Asn Gly Tyr Tyr Cys Tyr Arg Asp Pro Arg Thr Gly
 20 25 30

aaa gag ttt gga tta ggc aga gac agg cga atc gca atc act gaa gct 144
 Lys Glu Phe Gly Leu Gly Arg Asp Arg Arg Ile Ala Ile Thr Glu Ala
 35 40 45

ata cag gcc aac att gag tta ttt tca gga cac aaa cac aag cct ctg 192
 Ile Gln Ala Asn Ile Glu Leu Phe Ser Gly His Lys His Lys Pro Leu
 50 55 60

aca gcg aga atc aac agt gat aat tcc gtt acg tta cat tca tgg ctt 240
 Thr Ala Arg Ile Asn Ser Asp Asn Ser Val Thr Leu His Ser Trp Leu
 65 70 75 80

gat cgc tac gaa aaa atc ctg gcc agc aga gga atc aag cag aag aca 288
 Asp Arg Tyr Glu Lys Ile Leu Ala Ser Arg Gly Ile Lys Gln Lys Thr
 85 90 95

ctc ata aat tac atg agc aaa att aaa gca ata agg agg ggt ctg cct 336
 Leu Ile Asn Tyr Met Ser Lys Ile Lys Ala Ile Arg Arg Gly Leu Pro
 100 105 110

gat gct cca ctt gaa gac atc acc aca aaa gaa att gcg gca atg ctc 384
 Asp Ala Pro Leu Glu Asp Ile Thr Thr Lys Glu Ile Ala Ala Met Leu
 115 120 125

aat gga tac ata gac gag ggc aag gcg gcg tca gcc aag tta atc aga 432
 Asn Gly Tyr Ile Asp Glu Gly Lys Ala Ala Ser Ala Lys Leu Ile Arg
 130 135 140

tca aca ctg agc gat gca ttc cga gag gca ata gct gaa ggc cat ata 480
 Ser Thr Leu Ser Asp Ala Phe Arg Glu Ala Ile Ala Glu Gly His Ile
 145 150 155 160

aca aca aac cat gtc gct gcc act cgc gca gca aaa tct aga gta agg 528
 Thr Thr Asn His Val Ala Ala Thr Arg Ala Ala Lys Ser Arg Val Arg
 165 170 175

aga tca aga ctt acg gct gac gaa tac ctg aaa att tat caa gca gca 576
 Arg Ser Arg Leu Thr Ala Asp Glu Tyr Leu Lys Ile Tyr Gln Ala Ala
 180 185 190

gaa tca tca cca tgt tgg ctc aga ctt gca atg gaa ctg gct gtt gtt 624

WO 02/096923

PCT/US02/17451

-40-

Glu Ser Ser Pro Cys Trp Leu Arg Leu Ala Met Glu Leu Ala Val Val
 195 200 205
 acc ggg caa cga gtt ggt gat tta tgc gaa atg aag tgg tct gat atc 672
 Thr Gly Gln Arg Val Gly Asp Leu Cys Glu Met Lys Trp Ser Asp Ile
 210 215 220
 gta gat gga tat ctt tat gtc gag caa agc aaa aca ggc gta aaa att 720
 Val Asp Gly Tyr Leu Tyr Val Glu Gln Ser Lys Thr Gly Val Lys Ile
 225 230 235 240
 gcc atc cca aca gca ttg cat att gat gct ctc gga ata tca atg aag 768
 Ala Ile Pro Thr Ala Leu His Ile Asp Ala Leu Gly Ile Ser Met Lys
 245 250 255
 gaa aca ctt gat aaa tgc aaa gag att ctt ggc gga gaa acc ata att 816
 Glu Thr Leu Asp Lys Cys Lys Glu Ile Leu Gly Gly Glu Thr Ile Ile
 260 265 270
 gca tct act cgt cgc gaa ccg ctt tca tcc ggc aca gta tca agg tat 864
 Ala Ser Thr Arg Arg Glu Pro Leu Ser Ser Gly Thr Val Ser Arg Tyr
 275 280 285
 ttt atg cgc gca cga aaa gca tca ggt ctt tcc ttc gaa ggg gat ccg 912
 Phe Met Arg Ala Arg Lys Ala Ser Gly Leu Ser Phe Glu Gly Asp Pro
 290 295 300
 cct acc ttt cac gag ttg cgc agt ttg tct gca aga ctc tat gag aag 960
 Pro Thr Phe His Glu Leu Arg Ser Leu Ser Ala Arg Leu Tyr Glu Lys
 305 310 315 320
 cag ata agc gat aag ttt gct caa cat ctt ctc ggg cat aag tgc gac 1008
 Gln Ile Ser Asp Lys Phe Ala Gln His Leu Leu Gly His Lys Ser Asp
 325 330 335
 acc atg gca tca cag tat cgt gat gac aga ggc agg gag tgg gac aaa 1056
 Thr Met Ala Ser Gln Tyr Arg Asp Asp Arg Gly Arg Glu Trp Asp Lys
 340 345 350
 att gaa atc aaa taa 1071
 Ile Glu Ile Lys *
 355

<210> 50
 <211> 356
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Integrase E174R

<400> 50
 Met Gly Arg Arg Arg Ser His Glu Arg Arg Asp Leu Pro Pro Asn Leu
 1 5 10 15
 Tyr Ile Arg Asn Asn Gly Tyr Tyr Cys Tyr Arg Asp Pro Arg Thr Gly
 20 25 30
 Lys Glu Phe Gly Leu Gly Arg Asp Arg Arg Ile Ala Ile Thr Glu Ala
 35 40 45
 Ile Gln Ala Asn Ile Glu Leu Phe Ser Gly His Lys His Lys Pro Leu
 50 55 60
 Thr Ala Arg Ile Asn Ser Asp Asn Ser Val Thr Leu His Ser Trp Leu
 65 70 75 80
 Asp Arg Tyr Glu Lys Ile Leu Ala Ser Arg Gly Ile Lys Gln Lys Thr
 85 90 95
 Leu Ile Asn Tyr Met Ser Lys Ile Lys Ala Ile Arg Arg Gly Leu Pro
 100 105 110
 Asp Ala Pro Leu Glu Asp Ile Thr Thr Lys Glu Ile Ala Ala Met Leu

WO 02/096923

PCT/US02/17451

-41-

Asn	Gly	Tyr	Ile	Asp	Glu	Gly	Lys	Ala	Ala	Ser	Ala	Lys	Leu	Ile	Arg
130						135					140				
Ser	Thr	Leu	Ser	Asp	Ala	Phe	Arg	Glu	Ala	Ile	Ala	Glu	Gly	His	Ile
145					150					155					160
Thr	Thr	Asn	His	Val	Ala	Ala	Thr	Arg	Ala	Ala	Lys	Ser	Arg	Val	Arg
				165					170					175	
Arg	Ser	Arg	Leu	Thr	Ala	Asp	Glu	Tyr	Leu	Lys	Ile	Tyr	Gln	Ala	Ala
			180					185					190		
Glu	Ser	Ser	Pro	Cys	Trp	Leu	Arg	Leu	Ala	Met	Glu	Leu	Ala	Val	Val
	195						200					205			
Thr	Gly	Gln	Arg	Val	Gly	Asp	Leu	Cys	Glu	Met	Lys	Trp	Ser	Asp	Ile
210					215						220				
Val	Asp	Gly	Tyr	Leu	Tyr	Val	Glu	Gln	Ser	Lys	Thr	Gly	Val	Lys	Ile
225					230					235					240
Ala	Ile	Pro	Thr	Ala	Leu	His	Ile	Asp	Ala	Leu	Gly	Ile	Ser	Met	Lys
				245					250					255	
Glu	Thr	Leu	Asp	Lys	Cys	Lys	Glu	Ile	Leu	Gly	Gly	Glu	Thr	Ile	Ile
			260					265					270		
Ala	Ser	Thr	Arg	Arg	Glu	Pro	Leu	Ser	Ser	Gly	Thr	Val	Ser	Arg	Tyr
		275					280					285			
Phe	Met	Arg	Ala	Arg	Lys	Ala	Ser	Gly	Leu	Ser	Phe	Glu	Gly	Asp	Pro
	290				295						300				
Pro	Thr	Phe	His	Glu	Leu	Arg	Ser	Leu	Ser	Ala	Arg	Leu	Tyr	Glu	Lys
305					310					315					320
Gln	Ile	Ser	Asp	Lys	Phe	Ala	Gln	His	Leu	Leu	Gly	His	Lys	Ser	Asp
				325					330				335		
Thr	Met	Ala	Ser	Gln	Tyr	Arg	Asp	Asp	Arg	Gly	Arg	Glu	Trp	Asp	Lys
			340				345						350		
Ile	Glu	Ile	Lys												
			355												

<210> 51
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Lox P Site

<400> 51
 ataacttcgt ataattgtatg ctatacgaag ttat