

pJG4-5 (pB42AD)

GAL1 promoter

1 CCCATTATC TTAGCCTAAA AAAACCTTCT CTTTGGAACT TTCAGTAATA  
GGGGTAATAG AATCGGATTT TTTTGGAAGA GAAACCTTGA AAGTCATTAT

GAL1 promoter

51 CGCTTAACTG CTCATTGCTA TATTGAAGTA CGGATTAGAA GCCGCCGAGC  
GCGAATTGAC GAGTAACGAT ATAACTTCAT GCCTAATCCT CGGCGGCTCG

GAL1 promoter

101 GGGTGACAGC CCTCCGAAGG AAGACTCTCC TCCGTGCGTC CTCGTCTTCA  
CCCCTGTCG GGAGGCTTCC TTCTGAGAGG AGGCACGCAG GAGCAGAAGT

GAL1 promoter

151 CCGGTCGCGT TCCTGAAACG CAGATGTGCC TCGCGCCGCA CTGCTCCGAA  
GGCCAGCGCA AGGACTTTGC GTCTACACGG AGCGCGGCGT GACGAGGCTT

GAL1 promoter

201 CAATAAAGAT TCTACAATAC TAGCTTTTAT GGTTATGAAG AGGAAAAATT  
GTTATTTCTA AGATGTTATG ATCGAAAATA CCAATACTTC TCCTTTTTAA

GAL1 promoter

251 GGCAGTAACC TGGCCCCACA AACCTTCAAA TGAACGAATC AAATTAACAA  
CCGTCATTGG ACCGGGGTGT TTGGAAGTTT ACTTGCTTAG TTTAATTGTT

GAL1 promoter

301 CCATAGGATG ATAATGCGAT TAGTTTTTTA GCCTTATTTTC TGGGGTAATT  
GGTATCCTAC TATTACGCTA ATCAAAAAAT CGGAATAAAG ACCCCATTAA

GAL1 promoter

351 AATCAGCGAA GCGATGATTT TTGATCTATT AACAGATATA TAAATGCAAA  
TTAGTCGCTT CGCTACTAAA AACTAGATAA TTGTCTATAT ATTTACGTTT

GAL1 promoter

401 AACTGCATAA CCACTTTAAC TAATACTTTC AACATTTTTCG GTTTGTATTA  
TTGACGTATT GGTGAAATTG ATTATGAAAG TTGTAAAAGC CAAACATAAT

GAL1 promoter

451 CTTCTTATTC AAATGTAATA AAAGTATCAA CAAAAAATTG TTAATATACC  
GAAGAATAAG TTTACATTAT TTTCATAGTT GTTTTTTAAC AATTATATGG

GAL1 promoter

NLS

+3

HindIII  
~~~~~

M G A P P K .

501 TCTATACTTT AACGTCAAGG AGGAATTAAG CTTATGGGTG CTCCTCCAAA  
AGATATGAAA TTGCAGTTCC TCCTTAATTC GAATACCCAC GAGGAGGTTT

pJG4-5 (pB42AD)

NLS

B42AD

+3 • K K K R K V A G I N K D I E E C N A •

551 AAAGAAGAGA AAGGTAGCTG GTATCAATAA AGATATCGAG GAGTGCAATG  
TTTCTTCTCT TTCCATCGAC CATAGTTATT TCTATAGCTC CTCACGTTAC

B42AD

+3 • A I I E Q F I D Y L R T G Q E M P

601 CCATCATTGA GCAGTTTATC GACTACCTGC GCACCGGACA GGAGATGCCG  
GGTAGTAACT CGTCAAATAG CTGATGGACG CGTGGCCTGT CCTCTACGGC

B42AD

+3 M E M A D Q A I N V V P G M T P K •

651 ATGGAAATGG CGGATCAGGC GATTAACGTG GTGCCGGGCA TGACGCCGAA  
TACCTTTACC GCCTAGTCCG CTAATTGCAC CACGGCCCGT ACTGCGGCTT

B42AD

+3 • K T I L H A G P P I Q P D W L K S N •

701 AACCATTTCTT CACGCCGGGC CGCCGATCCA GCCTGACTGG CTGAAATCGA  
TTGGTAAGAA GTGCGGCCCG GCGGCTAGGT CGGACTGACC GACTTTAGCT

B42AD

+3 • N G F H E I E A D V N D T S L L L

751 ATGGTTTTCA TGAAATTGAA GCGGATGTTA ACGATAACCAG CCTCTTGCTG  
TACCAAAGT ACTTTAACTT CGCCTACAAT TGCTATGGTC GGAGAACGAC

HA tag

B42AD

EcoRI

+3 S G D A S Y P Y D V P D Y A S

801 AGTGGAGATG CCTCCTACCC TTATGATGTG CCAGATTATG CCTCTCCCGA  
TCACCTCTAC GGAGGATGGG AATACTACAC GGTCTAATAC GGAGAGGGCT

EcoRI

HindIII

ADH Terminator

XhoI

851 ATTCGGCCGA CTCGAGAAGC TTTGGACTTC TTCGCCAGAG GTTTGGTCAA  
TAAGCCGGCT GAGCTCTTCG AAACCTGAAG AAGCGGTCTC CAAACCAGTT

ADH Terminator

901 GTCTCCAATC AAGGTTGTCG GCTTGTCTAC CTTGCCAGAA ATTTACGAAA  
CAGAGGTTAG TTCCAACAGC CGAACAGATG GAACGGTCTT TAAATGCTTT

ADH Terminator

951 AGATGGAAAA GGGTCAAATC GTTGGTAGAT ACGTTGTTGA CACTTCTAAA  
TCTACCTTTT CCCAGTTTAG CAACCATCTA TGCAACAAC TGAAGATTT

ADH Terminator

1001 TAAGCGAATT TCTTATGATT TATGATTTTT ATTATTAAAT AAGTTATAAA  
ATTCGCTTAA AGAATACTAA AACTAAAAA TAATAATTTA TTCAATATTT

pJG4-5 (pB42AD)

ADH Terminator

1051 AAAAATAAGT GTATACAAAT TTTAAAGTGA CTCTTAGGTT TTAAAACGAA  
TTTTTATTCA CATATGTTTA AAATTTCACT GAGAATCCAA AATTTTGCTT

ADH Terminator

1101 AATTCTTGTT CTTGAGTAAC TCTTTCCTGT AGGTCAGGTT GCTTTCTCAG  
TTAAGAACAA GAACTCATTG AGAAAGGACA TCCAGTCCAA CGAAAGAGTC

ADH Terminator

1151 GTATAGCATG AGGTCGCTCT TATTGACCAC ACCTCTACCG GCATGCCGAG  
CATATCGTAC TCCAGCGAGA ATAACTGGTG TGGAGATGGC CGTACGGCTC

ADH Terminator

1201 CAAATGCCTG CAAATCGCTC CCCATTTTAC CCAATTGTAG ATATGCTAAC  
GTTTACGGAC GTTTAGCGAG GGGTAAAGTG GGTTAACATC TATACGATTG

ADH Terminator

1251 TCCAGCAATG AGTTGATGAA TCTCGGTGTG TATTTTATGT CCTCAGAGGA  
AGGTCGTTAC TCAACTACTT AGAGCCACAC ATAAAATACA GGAGTCTCCT

ADH Terminator

BamHI

NotI

1301 CAACACCTGT TGTAATCGTT CTTCCACACG GATCCTCTAG AGTCGACTAG  
GTTGTGGACA ACATTAGCAA GAAGGTGTGC CTAGGAGATC TCAGCTGATC

NotI

1351 CGGCCGCTTC GACCTGCAGC AATTCTGAAC CAGTCCTAAA ACGAGTAAAT  
GCCGGCGAAG CTGGACGTCG TTAAGACTTG GTCAGGATTT TGCTCATTTA

1401 AGGACCGGCA ATTCTTCAAG CAATAAACAG GAATACCAAT TATTAAAAGA  
TCCTGGCCGT TAAGAAGTTC GTTATTTGTC CTTATGGTTA ATAATTTTCT

2  $\mu$ m Ori

HindIII

1451 TAACTTAGTC AGATCGTACA ATAAAGCTTT GAAGAAAAT GCGCCTTATT  
ATTGAATCAG TCTAGCATGT TATTTTCGAAA CTTCTTTTTA CGCGGAATAA

2  $\mu$ m Ori

1501 CAATCTTTGC TATAAAAAT GCCCAAAT CTCACATTGG AAGACATTTG  
GTTAGAAACG ATATTTTTTA CCGGGTTTTA GAGTGTAACC TTCTGTAAAC

2  $\mu$ m Ori

1551 ATGACCTCAT TTCTTTCAAT GAAGGGCCTA ACGGAGTTGA CTAATGTTGT  
TACTGGAGTA AAGAAAGTTA CTTCCCGGAT TGCCTCAACT GATTACAACA

2  $\mu$ m Ori

1601 GGGAAATTGG AGCGATAAGC GTGCTTCTGC CGTGGCCAGG ACAACGTATA  
CCCTTTAACC TCGCTATTGC CACGAAGACG GCACCGGTCC TGTTGCATAT

2  $\mu$ m Ori

1651 CTCATCAGAT AACAGCAATA CCTGATCACT ACTTCGCACT AGTTTCTCGG  
GAGTAGTCTA TTGTCGTTAT GGACTAGTGA TGAAGCGTGA TCAAAGAGCC

pJG4-5 (pB42AD)

2  $\mu$ m Ori

1701 TACTATGCAT ATGATCCAAT ATCAAAGGAA ATGATAGCAT TGAAGGATGA  
 ATGATACGTA TACTAGGTTA TAGTTTCCTT TACTATCGTA ACTTCCTACT

2  $\mu$ m Ori

1751 GACTAATCCA ATTGAGGAGT GGCAGCATAT AGAACAGCTA AAGGGTAGTG  
 CTGATTAGGT TAACTCCTCA CCGTCGTATA TCTTGTCGAT TTCCCATCAC

2  $\mu$ m Ori

1801 CTGAAGGAAG CATACGATAC CCCGCATGGA ATGGGATAAT ATCACAGGAG  
 GACTTCCTTC GTATGCTATG GGGCGTACCT TACCCTATTA TAGTGTCTTC

2  $\mu$ m Ori

1851 GTACTAGACT ACCTTTCATC CTACATAAAT AGACGCATAT AAGTACGCAT  
 CATGATCTGA TGGAAAGTAG GATGTATTTA TCTGCGTATA TTCATGCGTA

2  $\mu$ m Ori

1901 TTAAGCATAA ACACGCACTA TGCCGTTCTT CTCATGTATA TATATATACA  
 AATTCGTATT TGTGCGTGAT ACGGCAAGAA GAGTACATAT ATATATATGT

2  $\mu$ m Ori

1951 GGCAACACGC AGATATAGGT GCGACGTGAA CAGTGAGCTG TATGTGCGCA  
 CCGTTGTGCG TCTATATCCA CGCTGCACTT GTCACCTCGAC ATACACGCGT

2  $\mu$ m Ori

2001 GCTCGCGTTG CATTTTCGGA AGCGCTCGTT TTCGGAAACG CTTTGAAGTT  
 CGAGCGCAAC GTAAAAGCCT TCGCGAGCAA AAGCCTTTGC GAAACTTCAA

2  $\mu$ m Ori

2051 CCTATTCCGA AGTTCCTATT CTCTAGAAAG TATAGGAACT TCAGAGCGCT  
 GGATAAGGCT TCAAGGATAA GAGATCTTTC ATATCCTTGA AGTCTCGCGA

2  $\mu$ m Ori

2101 TTTGAAAACC AAAAGCGCTC TGAAGACGCA CTTTCAAAAA ACCAAAAACG  
 AACTTTTTGG TTTTCGCGAG ACTTCTGCGT GAAAGTTTTT TGGTTTTTGC

2  $\mu$ m Ori

2151 CACCGGACTG TAACGAGCTA CTAAAATATT GCGAATACCG CTTCCACAAA  
 GTGGCCTGAC ATTGCTCGAT GATTTTATAA CGCTTATGGC GAAGGTGTTT

2  $\mu$ m Ori

2201 CATTGCTCAA AAGTATCTCT TTGCTATATA TCTCTGTGCT ATATCCCTAT  
 GTAACGAGTT TTCATAGAGA AACGATATAT AGAGACACGA TATAGGGATA

2  $\mu$ m Ori

2251 ATAACCTACC CATCCACCTT TCGCTCCTTG AACTTGCATC TAAACTCGAC  
 TATTGGATGG GTAGGTGGAA AGCGAGGAAC TTGAACGTAG ATTTGAGCTG

2  $\mu$ m Ori

2301 CTCTACATTT TTTATGTTTA TCTCTAGTAT TACTCTTTAG ACAAAAAAAT  
 GAGATGTAAA AAATACAAAT AGAGATCATA ATGAGAAATC TGTTTTTTTA

pJG4-5 (pB42AD)

2  $\mu$ m Ori

2351 TGTAGTAAGA ACTATTCATA GAGTGAATCG AAAACAATAC GAAAATGTAA  
ACATCATTCT TGATAAGTAT CTCACTTAGC TTTTGTTATG CTTTTACATT

2  $\mu$ m Ori

2401 ACATTTCCCTA TACGTAGTAT ATAGAGACAA AATAGAAGAA ACCGTTTCATA  
TGTAAGGAT ATGCATCATA TATCTCTGTT TTATCTTCTT TGGCAAGTAT

2  $\mu$ m Ori

2451 ATTTTCTGAC CAATGAAGAA TCATCAACGC TATCACTTTC TGTTACACAAA  
TAAAAGACTG GTTACTTCTT AGTAGTTGCG ATAGTGAAAG ACAAGTGTTT

2  $\mu$ m Ori

2501 GTATGCGCAA TCCACATCGG TATAGAATAT AATCGGGGAT GCCTTTATCT  
CATACGCGTT AGGTGTAGCC ATATCTTATA TTAGCCCCTA CGGAAATAGA

2  $\mu$ m Ori

2551 TGAAAAAATG CACCCGCAGC TTCGCTAGTA ATCAGTAAAC GCGGGAAGTG  
ACTTTTTTAC GTGGGCGTCG AAGCGATCAT TAGTCATTTG CGCCCTTCAC

2  $\mu$ m Ori

2601 GAGTCAGGCT TTTTTTATGG AAGAGAAAAT AGACACCAAA GTAGCCTTCT  
CTCAGTCCGA AAAAAATACC TTCTCTTTTA TCTGTGGTTT CATCGGAAGA

2  $\mu$ m Ori

2651 TCTAACCTTA ACGGACCTAC AGTGCAAAAA GTTATCAAGA GACTGCATTA  
AGATTGGAAT TGCCTGGATG TCACGTTTTT CAATAGTTCT CTGACGTAAT

2  $\mu$ m Ori

2701 TAGAGCGCAC AAAGGAGAAA AAAAGTAATC TAAGATGCTT TGTTAGAAAA  
ATCTCGCGTG TTTCCTCTTT TTTTCATTAG ATTCTACGAA ACAATCTTTT

2  $\mu$ m Ori

2751 ATAGCGCTCT CGGGATGCAT TTTTGTAGAA CAAAAAAGAA GTATAGATTC  
TATCGCGAGA GCCCTACGTA AAAACATCTT GTTTTTTCTT CATATCTAAG

2  $\mu$ m Ori

2801 TTTGTTGGTA AAATAGCGCT CTCGCGTTGC ATTTCTGTTC TGTA AAAAATG  
AAACAACCAT TTTATCGCGA GAGCGCAACG TAAAGACAAG ACATTTTTTAC

2  $\mu$ m Ori

2851 CAGCTCAGAT TCTTTGTTTG AAAAATTAGC GCTCTCGCGT TGCATTTTTTG  
GTCGAGTCTA AGAAACAAAC TTTTAAATCG CGAGAGCGCA ACGTAAAAAC

2  $\mu$ m Ori

2901 TTTTACAAAA ATGAAGCACA GATTCTTCGT TGGTAAAATA GCGCTTTCGC  
AAAATGTTTT TACTTCGTGT CTAAGAAGCA ACCATTTTAT CGCGAAAGCG

2  $\mu$ m Ori

2951 GTTGCATTTT TGTTCTGTAA AAATGCAGCT CAGATTCTTT GTTTGAAAAA  
CAACGTAAAG ACAAGACATT TTTACGTCGA GTCTAAGAAA CAAACTTTTT

pJG4-5 (pB42AD)

2  $\mu$ m Ori

3001 TTAGCGCTCT CGCGTTGCAT TTTTGTTCCTA CAAAATGAAG CACAGATGCT  
AATCGCGAGA GCGCAACGTA AAAACAAGAT GTTTTACTTC GTGTCTACGA

2  $\mu$ m Ori

3051 TCGTTAACAA AGATATGCTA TTGAAGTGCA AGATGGAAAC GCAGAAAATG  
AGCAATTGTT TCTATACGAT AACTTCACGT TCTACCTTTG CGTCTTTTAC

2  $\mu$ m Ori

3101 AACCGGGGAT GCGACGTGCA AGATTACCTA TGCAATAGAT GCAATAGTTT  
TTGGCCCCTA CGCTGCACGT TCTAATGGAT ACGTTATCTA CGTTATCAAA

2  $\mu$ m Ori

3151 CTCCAGGAAC CGAAATACAT ACATTGTCTT CCGTAAAGCG CTAGACTATA  
GAGGTCCTTG GCTTTATGTA TGTAACAGAA GGCATTTTCG CATTCTGATAT

2  $\mu$ m Ori

3201 TATTATTATA CAGGTTCAAA TATACTATCT GTTTCAGGGA AACTCCCAG  
ATAATAATAT GTCCAAGTTT ATATGATAGA CAAAGTCCCT TTTGAGGGTC

2  $\mu$ m Ori

3251 GTTCGGATGT TCAAATTCA ATGATGGGTA ACAAGTACGA TCGTAAATCT  
CAAGCCTACA AGTTTTAAGT TACTACCCAT TGTTTCATGCT AGCATTTAGA

2  $\mu$ m Ori

3301 GTAAAACAGT TTGTCGGATA TTAGGCTGTA TCTCCTCAAA GCGTATTCGA  
CATTTTGTCA AACAGCCTAT AATCCGACAT AGAGGAGTTT CGCATAAGCT

2  $\mu$ m Ori

3351 ATATCATTGA GAAGCTGCAG GCAAGTGCAC AAACAATACT TAAATAAATA  
TATAGTAACT CTTCGACGTC CGTTCACGTG TTTGTTATGA ATTTATTTAT

TRP1 Gene

3401 CTA~~CT~~CAGTA ATAACCTATT TCTTAGCATT TTTGACGAAA TTTGCTATTT  
GATGAGTCAT TATTGGATAA AGAATCGTAA AA~~CT~~GCTTT AAACGATAAA

TRP1 Gene

3451 TGTTAGAGTC TTTTACACCA TTTGTCTCCA CACCTCCGCT TACATCAACA  
ACAATCTCAG AAAATGTGGT AAACAGAGGT GTGGAGGCGA ATGTAGTTGT

TRP1 Gene

3501 CCAATAACGC CATTTAATCT AAGCGCATCA CCAACATTTT CTGGCGTCAG  
GGTTATTGCG GTAAATTAGA TTCGCGTAGT GGTTGTAAAA GACCGCAGTC

TRP1 Gene

HindIII

3551 TCCACCAGCT AACATAAAAT GTAAGCTTTC GGGGCTCTCT TGCCTTCCAA  
AGGTGGTCGA TTGTATTTTA CATTGAAAG CCCCAGAGAGA ACGGAAGGTT

TRP1 Gene

pJG4-5 (pB42AD)

3601 CCCAGTCAGA AATCGAGTTC CAATCCAAA GTTCACCTGT CCCACCTGCT  
GGGTCAGTCT TTAGCTCAAG GTTAGGTTTT CAAGTGGACA GGGTGGACGA

TRP1 Gene

3651 TCTGAATCAA ACAAGGGAAT AAACGAATGA GGTTTCTGTG AAGCTGCACT  
AGACTTAGTT TGTTCCCTTA TTTGCTTACT CCAAAGACAC TTCGACGTGA

TRP1 Gene

3701 GAGTAGTATG TTGCAGTCTT TTGGAAATAC GAGTCTTTTA ATAACTGGCA  
CTCATCATAAC AACGTCAGAA AACCTTTATG CTCAGAAAAT TATTGACCGT

TRP1 Gene

3751 AACCGAGGAA CTCTTGGTAT TCTTGCCACG ACTCATCTCC ATGCAGTTGG  
TTGGCTCCTT GAGAACCATA AGAACGGTGC TGAGTAGAGG TACGTCAACC

TRP1 Gene

3801 ACGATATCAA TGCCGTAATC ATTGACCAGA GCCAAAACAT CCTCCTTAGG  
TGCTATAGTT ACGGCATTAG TAACTGGTCT CGGTTTTGTA GGAGGAATCC

TRP1 Gene

3851 TTGATTACGA AACACGCCAA CCAAGTATTT CGGAGTGCCT GAACTATTTT  
AACTAATGCT TTGTGCGGTT GGTTCATAAA GCCTCACGGA CTTGATAAAA

TRP1 Gene

3901 TATATGCTTT TACAAGACTT GAAATTTTCC TTGCAATAAC CGGGTCAATT  
ATATACGAAA ATGTTCTGAA CTTTAAAAGG AACGTTATTG GCCCAGTTAA

TRP1 Gene

3951 GTTCTCTTTC TATTGGGCAC ACATATAATA CCCAGCAAGT CAGCATCGGA  
CAAGAGAAAG ATAACCCGTG TGTATATTAT GGGTCGTTCA GTCGTAGCCT

TRP1 Gene

4001 ATCTAGAGCA CATTCTGCGG CCTCTGTGCT CTGCAAGCCG CAAACTTTCA  
TAGATCTCGT GTAAGACGCC GGAGACACGA GACGTTCCGC GTTTGAAAGT

TRP1 Gene

4051 CCAATGGACC AGAACTACCT GTGAAATTAA TAACAGACAT ACTCCAAGCT  
GGTTACCTGG TCTTGATGGA CACTTTAATT ATTGTCTGTA TGAGGTTCGA

TRP1 Gene

4101 GCCTTTGTGT GCTTAATCAC GTATACTCAC GTGCTCAATA GTCACCAATG  
CGGAAACACA CGAATTAGTG CATATGAGTG CACGAGTTAT CAGTGTTAC

TRP1 Gene

4151 CCCTCCCTCT TGGCCCTCTC CTTTTCTTTT TTCGACCGAA TTTCTTGAAG  
GGGAGGGAGA ACCGGGAGAG GAAAAGAAA AAGCTGGCTT AAAGAACTTC

TRP1 Gene

4201 ACGAAAGGC CTCGTGATAC GCCTATTTTT ATAGGTTAAT GTCATGATAA  
TGCTTTCCCG GAGCACTATG CGGATAAAA TATCCAATTA CAGTACTATT

4251 TAATGGTTTC TTAGACGTCA GGTGGCACTT TTCGGGGAAA TGTGCGCGGA  
ATTACCAAAG AATCTGCAGT CCACCGTGAA AAGCCCTTT ACACGCGCCT

pJG4-5 (pB42AD)

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4301 ACCCCTATTT GTTTATTTTT CTAAATACAT TCAAATATGT ATCCGCTCAT
      TGGGGATAAA CAAATAAAAA GATTTATGTA AGTTTATAACA TAGGCGAGTA
      ampR
4351 GAGACAATAA CCCTGATAAA TGCTTCAATA ATATTGAAAA AGGAAGAGTA
      CTCTGTTATT GGGACTATTT ACGAAGTTAT TATAACTTTT TCCTTCTCAT
      ampR
4401 TGAGTATTCA ACATTTCCGT GTCGCCCTTA TTCCCTTTTT TGCGGCATT
      ACTCATAAGT TGTAAGGCA CAGCGGGAAT AAGGGAAAAA ACGCCGTAAA
      ampR
4451 TGCCTTCCTG TTTTTGCTCA CCCAGAAACG CTGGTGAAAG TAAAAGATGC
      ACGGAAGGAC AAAAACGAGT GGGTCTTTGC GACCACTTTC ATTTTCTACG
      ampR
4501 TGAAGATCAG TTGGGTGCAC GAGTGGGTTA CATCGAACTG GATCTCAACA
      ACTTCTAGTC AACCCACGTG CTCACCCAAT GTAGCTTGAC CTAGAGTTGT
      ampR
4551 GCGGTAAGAT CCTTGAGAGT TTTTCGCCCCG AAGAACGTTT TCCAATGATG
      CGCCATTCTA GGAACCTCTA AAAGCGGGGC TTCTTGCAAA AGGTTACTAC
      ampR
4601 AGCACTTTTA AAGTTCTGCT ATGTGGCGCG GTATTATCCC GTGTTGACGC
      TCGTGAAAAT TTCAAGACGA TACACCGCGC CATAATAGGG CACAACCTGCG
      ampR
4651 CGGGCAAGAG CAACTCGGTC GCCGCATACA CTATTCTCAG AATGACTTGG
      GCCCGTTCTC GTTGAGCCAG CGGCGTATGT GATAAGAGTC TTACTGAACC
      ampR
4701 TTGAGTACTC ACCAGTCACA GAAAAGCATC TTACGGATGG CATGACAGTA
      AACTCATGAG TGGTCAGTGT CTTTTCGTAG AATGCCTACC GTACTGTCAT
      ampR
4751 AGAGAATTAT GCAGTGCTGC CATAACCATG AGTGATAACA CTGCGGCCAA
      TCTCTTAATA CGTCACGACG GTATTGGTAC TCACTATTGT GACGCCGGTT
      ampR
4801 CTTACTTCTG ACAACGATCG GAGGACCGAA GGAGCTAACC GCTTTTTTGC
      GAATGAAGAC TGTTGCTAGC CTCCTGGCTT CCTCGATTGG CGAAAAACG
      ampR
4851 ACAACATGGG GGATCATGTA ACTCGCCTTG ATCGTTGGGA ACCGGAGCTG
      TGTTGTACCC CTTAGTACAT TGAGCGGAAC TAGCAACCCT TGGCCTCGAC
      ampR
4901 AATGAAGCCA TACCAAACGA CGAGCGTGAC ACCACGATGC CTGTAGCAAT
      TTAATTTCGGT ATGGTTTGCT GCTCGCACTG TGGTGCTACG GACATCGTTA
  
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pJG4-5 (pB42AD)

ampR

4951 GGCAACAACG TTGCGCAAAC TATTAACTGG CGAACTACTT ACTCTAGCTT  
CCGTTGTTGC AACGCGTTTG ATAATTGACC GCTTGATGAA TGAGATCGAA

ampR

5001 CCCGGCAACA ATTAATAGAC TGGATGGAGG CGGATAAAGT TGCAGGACCA  
GGGCCGTTGT TAATTATCTG ACCTACCTCC GCCTATTTC ACGTCCTGGT

ampR

5051 CTTCTGCGCT CGGCCCTTCC GGCTGGCTGG TTTATTGCTG ATAAATCTGG  
GAAGACGCGA GCCGGGAAGG CCGACCGACC AAATAACGAC TATTTAGACC

ampR

5101 AGCCGGTGAG CGTGGGTCTC GCGGTATCAT TGCAGCACTG GGGCCAGATG  
TCGGCCACTC GCACCCAGAG CGCCATAGTA ACGTCGTGAC CCCGGTCTAC

ampR

5151 GTAAGCCCTC CCGTATCGTA GTTATCTACA CGACGGGGAG TCAGGCAACT  
CATTCGGGAG GGCATAGCAT CAATAGATGT GCTGCCCTC AGTCCGTTGA

ampR

5201 ATGGATGAAC GAAATAGACA GATCGCTGAG ATAGGTGCCT CACTGATTAA  
TACCTACTTG CTTTATCTGT CTAGCGACTC TATCCACGGA GTGACTAATT

ampR

5251 GCATTGGTAA CTGTCAGACC AAGTTTACTC ATATATACTT TAGATTGATT  
CGTAACCATT GACAGTCTGG TTCAAATGAG TATATATGAA ATCTAACTAA

5301 TAAAACCTCA TTTTAAATTT AAAAGGATCT AGGTGAAGAT CCTTTTTGAT  
ATTTTGAAGT AAAAATTA AATTTCTAGA TCCACTTCTA GGAAAACTA

5351 AATCTCATGA CAAAATCCC TTAACGTGAG TTTTCGTTCC ACTGAGCGTC  
TTAGAGTACT GGTTTTAGGG AATTGCACTC AAAAGCAAGG TGA CTGCGCAG

5401 AGACCCCGTA GAAAAGATCA AAGGATCTTC TTGAGATCCT TTTTTTCTGC  
TCTGGGGCAT CTTTTCTAGT TTCCTAGAAG AACTCTAGGA AAAAAAGACG

5451 GCGTAATCTG CTGCTTGCAA ACAAAAAAAC CACCGCTACC AGCGGTGGTT  
CGCATTAGAC GACGAACGTT TGTTTTTTTTG GTGGCGATGG TCGCCACCAA

pUC ori

5501 TGTTTGCCGG ATCAAGAGCT ACCAACTCTT TTTCCGAAGG TAACTGGCTT  
ACAAACGGCC TAGTTCTCGA TGGTTGAGAA AAAGGCTTCC ATTGACCGAA

pUC ori

5551 CAGCAGAGCG CAGATACCAA ATACTGTCCT TCTAGTGTAG CCGTAGTTAG  
GTCGTCTCGC GTCTATGGTT TATGACAGGA AGATCACATC GGCATCAATC

pUC ori

5601 GCCACCACTT CAAGA ACTCT GTAGCACC GC CTACATACTT CGCTCTGCTA  
CGGTGGTGAA GTTCTTGAGA CATCGTGGCG GATGTATGGA GCGAGACGAT

pUC ori

5651 ATCCTGTTAC CAGTGGCTGC TGCCAGTGGC GATAAGTCGT GTCTTACCGG  
TAGGACAATG GTCACCGACG ACGGTCACCG CTATTCAGCA CAGAATGGCC

pJG4-5 (pB42AD)

pUC ori

5701 GTTGGACTCA AGACGATAGT TACCGGATAA GGCGCAGCGG TCGGGCTGAA  
CAACCTGAGT TCTGCTATCA ATGGCCTATT CCGCGTCGCC AGCCCGACTT

pUC ori

5751 CGGGGGGTTT GTGCACACAG CCCAGCTTGG AGCGAACGAC CTACACCGAA  
GCCCCCAAG CACGTGTGTC GGGTCGAACC TCGCTTGCTG GATGTGGCTT

pUC ori

5801 CTGAGATACC TACAGCGTGA GCTATGAGAA AGCGCCACGC TTCCCGAAGG  
GACTCTATGG ATGTCGCACT CGATACTCTT TCGCGGTGCG AAGGGCTTCC

pUC ori

5851 GAGAAAGGCG GACAGGTATC CGGTAAGCGG CAGGGTCGGA ACAGGAGAGC  
CTCTTTCCGC CTGTCCATAG GCCATTGCC GTCCCAGCCT TGTCTCTCG

pUC ori

5901 GCACGAGGGA GCTTCCAGGG GGAAACGCCT GGTATCTTTA TAGTCCTGTC  
CGTGCTCCCT CGAAGGTCCC CCTTTGCGGA CCATAGAAAT ATCAGGACAG

pUC ori

5951 GGGTTTCGCC ACCTCTGACT TGAGCGTCGA TTTTTGTGAT GCTCGTCAGG  
CCCAAAGCGG TGGAGACTGA ACTCGCAGCT AAAAACTA CGAGCAGTCC

pUC ori

6001 GGGGCGGAGC CTATGGAAAA ACGCCAGCAA CGCGGCCTTT TTACGGTTCC  
CCCCGCTCG GATACCTTTT TGCGGTCGTT GCGCCGAAA AATGCCAAGG

6051 TGGCCTTTTG CTGGCCTTTT GCTCACATGT TCTTTCCTGC GTTATCCCCT  
ACCGAAAAC GACCGAAAA CGAGTGTACA AGAAAGGACG CAATAGGGGA

6101 GATTCTGTGG ATAACCGTAT TACCGCCTTT GAGTGAGCTG ATACCGCTCG  
CTAAGACACC TATTGGCATA ATGGCGGAAA CTCACTCGAC TATGGCGAGC

6151 CCGCAGCCGA ACGACCGAGC GCAGCGAGTC AGTGAGCGAG GAAGCGGAAG  
GGCGTCGGCT TGCTGGCTCG CGTCGCTCAG TCACTCGCTC CTTCGCCTTC

6201 AGCGCCCAAT ACGCAAACCG CCTCTCCCCG CGCGTTGGCC GATTCATTAA  
TCGCGGGTTA TCGGTTTGGC GGAGAGGGGC GCGCAACCGG CTAAGTAATT

6251 TGCAGCTGGC ACGACAGGTT TCCCGACTGG AAAGCGGGCA GTGAGCGCAA  
ACGTCGACCG TGCTGTCCAA AGGGCTGACC TTTCGCCCGT CACTCGCGTT

6301 CGCAATTAAT GTGAGTTAGC TCACTCATTA GGCACCCAG GCTTTACTACT  
GCGTTAATTA CACTCAATCG AGTGAGTAAT CCGTGGGGTC CGAAATGTGA

6351 TTATGCTTCC GGCTCGTATG TTGTGTGGAA TTGTGAGCGG ATAACAATTT  
AATACGAAGG CCGAGCATA AACACACCTT AACACTCGCC TATTGTTAAA

6401 CACACAGGAA ACAGCTATGA CATGATTACG AATTAATTTCG AGCTCGGTA  
GTGTGTCCTT TGTCGATACT GACTAATGC TTAATTAAGC TCGAGCCAT