Data S1. Rab1a Genomic DNA sequence is shown below. The DNA sequence for the exons (Ex) is highlighted in yellow. The exon-intron conjugation GT/AG rule is underlined. The ! symbol indicates the position of an mRNA splicing site or genomic DNA insertion site. The sequences to which genotyping primers bind are also underlined. The translation start codon ATG is highlighted in red and is underlined.

1 GTAGACCAGG CGAGCCTTGA ACTCAGAAAAT CTACCTGCTT CTGCCTCCCA AGTGCTGGGA
61 TAAAGGGCTT GTGCACCCAC TGCCTGGCAA AGACAGTTTT ATTATAGTTG AGGAGAAAAA
121 AGCATGGGAC AGGCAGGCTC AAGGCAGCAG ATGTACATTT ATGGCTAGTC AGCATCATAG
181 TGTGCACTGC TGCCCTCTTA GTGCTGAGTC ATAGCCCTGC ACATCTACG GCTTTCACAC
241 TTGTACTCTC ACAGACCTGC ACACTTGAGG CTTGCACACT CAGTCTTGCA CACATACAG
301 TATGCACTCA CACACACATT TGTCCTGATA GAGGATTCTA TTGTATTCCT AGCACCACAA
361 TGTAGCTGCA CAAACCATTAC TCGTGAGGGA ATTGGCTTTTA ATGCGCCATT TTATTTCAAGC
421 TCCCAAAAGCG CATGCTTCCA GACCTGAGGG TCTCTGCTTC TACGACCTTT CAGATTGATA
481 TAAAGAAATTT CTGTACAGCC GATGCGTGGG CAAGGAGACA GGGAGGACCT TTTATTTTT
541 GCAGGCGGAC AGCAGGAGCC GGGGCAGGCA GAGAAGAAAG ATACGCCATG ATAGGAGAGC
601 AGAAAGAATGA AACTAAAGGG CCCACCAACA TGTAAGAATC CAGGAAGTT GCCCTTTGGG
661 GCCACTTCCTC CAACTGGGTC TGGGGTACCA GAGATTTAAT ATAGATTTTAA AAAGATGTTA
721 TCTCAGATGG GAGAGAAGGC TGAGGAGACT GCTAGCTTCC AGAGGCTCTG
781 AGTTCAAAATC CCAGCAACCA CATGGTGAGC CACAACTCAT CGTAAATGAAA TCTGTAGGCC
841 TCTCTGAGG TGTCGTGAGA CAGCTGACAG TCTATTCATTT ATAAAATATT ATAAAATCTTT
901 TAAAAAAAATA ATGTTACAGA GAATACAGGG GAGTGCTTTG CACTGAGAG GGAGAAGTGT
961 CTCAACCTATT GGGCTAATCA AGGCATATCA AAATTAGGTG GTGTCGTTGTG GTGTCGTTGT G
1021 GTGTGTTCAT TCTCATGAAAC CAGAAGACTT TTAGGAGGGT GCGACTGCA GTGCGCTTGC
1081 CAGGAGCACA AGTGGTTTTA CTACCCGACT GTGCTGAGTC CACCATTTCTT C
1141 CACCTTCTCT TGCCCTCTAT GGCAGCAGCG ATGTACATTG GGTGAGAGG CACATGGGAG
1201 CAAACATATT GTAGGCATAA AAACAAATAA TCTTTTTAAA ATGGCAAGTT ATGGAGCGGC
1261 GCCTGGTTGG GCAGCCCTTT GATCCCGACA CGGAGGAGG GGAGTTCTGA
1321 GTTCGAGGCC AGGCTTGTCG CAGAGTGAGG TTCCAGGACA GCCAGGCTTA CAGAAAAACC
1381 CTGTCTTTGAA AACACAAAA AAAAAGAAAA AAAAAGAAA AAAGGAAATT TCATGATGTT
1441 GTGTCAATCC TTTATCCCTA GCATGTTTGGG GGCCAGGCGA GTCAAGATAC GGTGCTTTCA
1501 AGACCTAGCT GTGCTATATA ACAAGATTTG GGCTACCCAG GGCATCATAG TAGAACCCTA
1561 TTTCCTAAAAAT AAAAAATGAT TTATTATATT TATTAAGAG GGCGGCTGGG AGATGGCTCA
1621 GTGCTTTAAGA GCACCTGTGGT CTCTTTGGGG AGACCAAAGA GTGCCGCTTG TCCACAGGTT
1681 GGTTCATACC ATAGACAACT CCACACTTAG AGATCTAATT ATACCCCTTT TCAACCTAAA
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1921 TCTCTGTATG CCCAGGAAAA CTAATCTGTAT TGTCAGGAGA CACAGATTCT
1981 GATTCAGTGG CATGATGCCG TGTTAGTGCC CTGAGGATGA CCAACTGAAA
2041 GCACGCCACC CAGCCAGCAT CTCAGCCACC CAGCAAGCCT TCCTTTCAGC TTCTACCCAT
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2161 CATCCCTAGG TCAGGTTTCA AAAACAAAGG TGGAAAGACT TAGGAAACTT TGGGAGATTAG
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2281 ATAACTGACCA GAGGCGTGTAT TAGAATCTTC TTGTATGTGT GTGGCTGAGG
2341 GTTTGAATAGA AAAAGGGGCT ATAGACTCTA TTAGGAGATG CATTATAGA ATGGTCGAC
2401 TATGAGAACAG TGCCTTTAAGA TGTCAGGAGA CTGTGCAGGGA CACAGCTCAG
2461 CTGTTGTCTTG CAGACTCCAG TATAATCTTCT TAATGTAAGG GCACAGTGC
2521 GCATACACCC ATGCACTGAG CATGACTTAA TGGACCTAAT GTCGAGGATG TAAACCAAGT
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2641 AAAACCCGACT AGTCCGACAG CACTCTCTCT TTAGATAGAA AAGGACAAAA
2701 TAACACAAAA CTTGTTTTTCT ATGATCATTT TGTAATCTTAA GAAACAGGCA GCCATGATG
2761 CACGCTCTTG TTTGAGACAG TCCATGCTAC CCAGTCTTG TGTGGTTCGA CACATCAATA
2821 AGAAGAAGAA GACACGTGCA AAAAAAGAAC GGGGGCTGAGG GAGATACATG TGGTTGGCGA
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3001 GTGATAATAC CGGCCCGAGC CAGGCGATGT GGGGCGAGC GGGGGGCGG GCCAGAGGGG
3061 AGCAACTGCA TTTATTGAAA CAGAGTCAAC GCAAGTCCC AACACGAAGG GCCGAGAGG
3121 AGGCTGCTCA GGGGGGAAAG GTGCTGTAGA GAGAGCAGGT TTTAGGAGCC TGGGACGCTC
3181 ATACAGCTAG AATAGCAAGG TGGCCTGAGG GAGGCGAGC GGGGCGAGC GCCAGAGGGG
3241 GGGAAAAACG AAGCCTAAGG TGACTTACCT TAATGTGAGG TTTTTCTTGA TGGACTGCGAG
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3361 TTGGGAGAAG TGCTCTGTTCT AGGGCTGAGC TATGTAATGTC TTGGTGCTCT TGGGACCCCA
3421 CACAGGAGTG TATCCTTTAT ATTACCTTGA CCAAGATTAG ATTACACTAG GAGACCAAGG
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4621 TTTTTTTGAAG GGGGGGGGAG GGGGGGGGAG GGGGGGGGAG GGGGGGGGAG
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5521 GAAGAGAGGT TGGGATCTGT CACCCACAGG CCGGACGAGG CCAATACTTA
5581 GTTGATCTGT CACATGTCTG CACCTCTCTG CCGGACGAGG CCAATACTTA
5641 ACCGCTCTCT TGTCCCTCTCT CCGGACGAGG CCAATACTTA TAGCTTTCTCT
5701 CATAGTATAG ACTACATTTT TCTCAATATAG AAGGAATGAG GGTAGTTCTCT
5761 TTACTACTAC TAAATATACG GGTCAAGGCT CACACTATAC AATGATTTTT
5821 CTTGATCTTC AAAGCTTCTG CACACTATAC AATGATTTTT
5881 CTAGGCTAGT ATATCATCTA CTTGATCTTC AAAGCTTCTG CACACTATAC
5941 GAGCAAAATAA CACCCAGACTA ACCGAAACTA GAACTTTTTG GTCTATGGATG CTGCAAAAGG
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6121 ATTCCTATTTG TTTGTTTGGG TTTTTGTTTT TTTTTTTTTT TACGACAGGG
6181 TTTCTCGTGA TAAACCTGCG TCTCCTGAAA CTACCTGGTG AGACCCAGGC GCCCTCAAC
6241 TCAGGGATTC GCCGGCCTCCT GCCCTCAAG TTGTTTGATCA CACTGCGGAG GCTGGAGATA
6301 CACCATATTT ATTTATTTTT ATTTATTTGT GTTTTTACAC ATATTTTTAA
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7861 TTTCTGCATC AGAGTTGAGT CAGTTTGTTT GAGATATGT AGGAGCTGAC CATCCTGTTC
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7981 CCTACACAG CACTTTGAGT GCCCTCCTGT ACTGACTGGC TCTCTCTGCC AAAAGGCTGAG
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8

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13
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19

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3871  AGATTCAATC CAGATTTACCA TGCTCTGTGT ATGTATATTG AGTATACCTC TGCTCTTTCA
Exon II

mRNA splicing site

Genomic DNA insertion site

23
47461 CTGCCTATCC CTGCCCTCTGT AGTGCTGAGGA TTAAAAGTGTA GTCGCCATCAT GCCCACTTA
47521 ATAAAGGAAT ATATTTAAAA AAAAACTAAT CTTATTAATCT TGAGTAAGAT GTGGTGTCGCC
47581 TGAAATCTCCA GTATTTGAAAAG GCTCGTGATGAG GAGGCTCTCAT TTGGAGCACAA AGCTAGGACG
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| 49681 | 50821 | TGTTTTAAGT TGAGTTTTAG TTTTTAACAA TCAGTATGTT ATAGGCAAGG TTAGTTAAAG |
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| 49801 | 51061 | GAACACTGAA GGCTGACCAT TGCTCTTTTC ATGATATTGG GTATTGCTCT CTGCTGAGGT |
| 50041 | 51241 | GAACACTGAA GGCTGACCAT TGCTCTTTTC ATGATATTGG GTATTGCTCT CTGCTGAGGT |
| 50101 | 51361 | GAACACTGAA GGCTGACCAT TGCTCTTTTC ATGATATTGG GTATTGCTCT CTGCTGAGGT |
| 50161 | 51481 | GAACACTGAA GGCTGACCAT TGCTCTTTTC ATGATATTGG GTATTGCTCT CTGCTGAGGT |
| 50221 | 51541 | GAACACTGAA GGCTGACCAT TGCTCTTTTC ATGATATTGG GTATTGCTCT CTGCTGAGGT |
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| 50341 | 51661 | GAACACTGAA GGCTGACCAT TGCTCTTTTC ATGATATTGG GTATTGCTCT CTGCTGAGGT |
| 50401 | 51721 | GAACACTGAA GGCTGACCAT TGCTCTTTTC ATGATATTGG GTATTGCTCT CTGCTGAGGT |
| Index | Sequence |
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| 51841 | AAGAGCAAGTC GGCTGCTCTTT ACCACCTGAG CCATCCTACC AGCCCCCTCT TTTGAGTTTTT |
| 51901 | ATGGTTTGTAT CATATGGGCC AGGCTTCCAC TGATTCTTTAT GTTTGAAAGA GGCTCTCCTCA |
| 51961 | CTATATAGCC CTAGTTTGCAG TGAACCTTGG TGTATAGATA AGGACAGTCT CACCTTCCCA |
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| 52081 | TGCCAGAGG ACAACCTTTT ATAGTTCTCTT CTCCTTCATA TTGGTTCTAG GGATGGACTT |
| 52141 | CTGGTGTGCA GGTGTCATA GCTTCTCTTG CTTGCTTTTC CCCATTAAAA |
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| 52621 | TTAGTACTAC CTGCTAAACC GTAGGCATTA TCTTCTCTTC TGGATTTTTA ACATATTTGA |
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| 88621      | TATCTAGACA AGTCTTTTTA ATAGTGCCCA CCATGAATTT TCAGGTCTCC TAAATTGAG |
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| 88741      | AAGCTCGCTT GAGAAACTCA TCCTTTAAAT TCTGTTTTCTC CAGAATCAT TTTTGTACCA |
| 88801      | ACTATATTATA GTGAGGTCTT ATAGAGGGA AGAATCAAGG GGAAGGATAT ATATCATATAT |
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| 88921      | TATATATATA TAAAATATTAT AATGTTTTTT TTTTTTGTGG TTTTCAAGA CAGGATTCTT |
| 88981      | CTGACATGCTG CTTGTGTGCTC TTGGAATCTAC CTTGTAGCAAC CAAGTGGCTC CAAATCGAGA |
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| 89101      | AACATATATG AATTTATATTAG GCATTAAAAA TAGTAACGGG TACAGTGGAAA |
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| 89221      | ATGGGGGAGA GGATGGGGTT TCACAACCGG TAGTCACTTA GTCCACAAGA CTTCTTAGT |
| 89281      | CCCAGGACAA GCCCATGAAG TTTCTAAAGA TATGTTAGGA CAGGGAGGCA AGATTACCT |
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| 89521      | CAGAATACAT TTCTCTGAAA TATATTGCTC TATCTGCTGC GCTGCTGGCTC |
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| 89821      | CAACAATAC AAAGAAAAA GAAATTTGGA CAAATTTGGA CATGCGCCCC AGGAGTTTCT |
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95461 ATACATTAAG ATATTCAAG CAAATGGTATA TGACAAAAAG AAAACACAG CACTAGAACA
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95641 TAGAGTGTCC ACAAATATG ATGATAGACG AGAGGCTGAC AATTCAGCTC
95701 CCCTACCTCA TTGTCAGTATT TTGTATATGA CCAATGAAAG ATGAAATGAC
95761 TATAATACCT ATTTATAGAT ATGAAATGAC AAGGCTGACTG AATTCAGCTC
95821 CTAAAGATG ATGTGACAA AAGAGATC TGAAATGCTA ATGGAGGGT
95881 TAAGAGCAGT GACCTGTCTT CGAGAGGCTT TGCAGTCT ATGGAGGGT
95941 CTCACACACCG TCAATTTATT GATGAAAGAT AAGGCTGACTG AATTCAGCTC
96001 GTGACTGTCT TAAATAGAC AATAATGACT AAGAGATC TGAAATGCTA ATGGAGGGT
96061 ACCCTTCTCA AAAATCCCTG CATTGACTT CTGTAATTTT TAAATCATCC CTGAAAGAC
96121 ACAAGAGAGG ATACACCTAAT TATGATGCA ATGAAATGAC AAGGCTGACTG AATTCAGCTC
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96841 TAAATTTGCT CACTGTTTAT TGCGCCACAA CAAATATACA AGACTAGGAG TCTCCACATC
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97801 TGTTCTCACA GAAGACAAAA AGGTATGGGT AGCTCGCTCTA TCACTTTGG GACACCACTG
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97981 TAATCTTATA GCAAGACTTT CTTATGTCGA ACAAAAAATTC TACAGACATG
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98221 TTATGGGGCT GCAAGACTTT CTTATGTCGA ACAAAAAATTC TACAGACATG
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98761 GTGTTTTTGA GTAATGCGTTT CTAATATAGA AGAATTTACC TATAGTTTCAA TATAGTCTCA
98821 CAGATATCAG TAGTGCCCTAG TTTTTTAAAAT TGTGAATATT TATAGTTTCAA TATAGTCTCA
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99061 TCAAGCCCGG CCTTCTTTATC TCTTCTTTAAAT CTAATTTTTAAAA CTAGTACACAT CTGAGTCAG
99121 TTACGCGCTCC TTTTAAATAG TTTTTTTTAA GATAGTTTCAA TATAGTCTCA
99181 TCCCGGATTT CACGCTATTG CAGCAACTCG GGCACACTTG AGGGTCAGAT TTGTTTCTCT
99241 ACCCCTAGGG TCCCCTCTCGG GCGAACAGAAA ACGTGTATCA CTGTTCTCTCA
Data S2. The pGT0pfs vector sequence is shown below. The vector DNA sequence fused with *Rab1a* is highlighted in yellow. The coding DNA sequence for LacZ is highlighted in red. The ! symbol indicates the position of an mRNA splicing site or genomic DNA connection site. The sequences to which genotyping primers bind are also underlined.

```
1 gtcgacccag cttggaatcc atgggaagag gaaacgaaag tatgtttttc atatgttcttt
61 tctcagaaat agaggtttgc gagggttgga gttgatgttg taggcacag taacccagggat
121 ggagagact gggagcagca cccctcttttt ccagggaggg aagggagaga gtttgagatca
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301 ttacatcctca gcctgagatt aaagagagggtct gttggtgttg tggagtcttgc cgtccgctgc
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1501 cccacacaaca cccatcctttt cttcctggcag gtggccagac gcacacccacct cttgctttat
1561 ccaacccccc aatgttggac acaccttttag gcctaagagc tggggggtttt ccggcccccc
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!: genomic DNA connection site
1621 agtatctgca acctcaagct agcttggtgct gctggtctgct ggtataagtagct tagaactcaca
1681 gcaccaagta acctctgccc tttcttccct atgcaacgcc gttcccaggt ccggaaaaacc
1741 mRna splicing site

1801 TAGGAACTTC TCAGATCTGG ACTCTAGAGG ATCCCGTCTG TTTACAAGCT CGTGACTGGG

1861 5' AACCCCTCCG GTTAAACCCT CCAGACCGCA GAGCCCTCCT CCGCTCCCT GGTAGGG
1921 5' GAAAGAAGAAG AACGCAGATCG CAGAAGTTCC TATTCCGAAG TTTACAAGCT CGTGACTGGG
2041 5' CTTCTGCTGC TGGTCTGGCG CTGCTACGTCG CGTAGTCCAT CGTAGTCCAT

2161 5' GCACCGCTCG AGTCTTACAG TAGCAGTCCA ATGAAATCG TTTACAAGCT CGTGACTGGG
2221 5' CCAAAGGAC ATGTTTATGG GTAGGGTGTA CGCTGCTGCTG CGTAGTCCAT CGTAGTCCAT
2281 5' GCCTGGCTGC ATCGGCGGAG CAGACCGCTG TAGGACTCA CTGCTACGTCG CGTAGTCCAT
2341 5' TGGGCGGAG 5' CGTAGTCCAT CGTAGTCCAT CGTAGTCCAT

2401 5' GCAGATAC GCAAGGAGCT CGCTGCTGCTG CGTAGTCCAT CGTAGTCCAT
2461 5' GCACCGCTCG AGTCTTACAG TAGCAGTCCA ATGAAATCG TTTACAAGCT CGTGACTGGG
2521 5' CCAAAGGAC ATGTTTATGG GTAGGGTGTA CGCTGCTGCTG CGTAGTCCAT CGTAGTCCAT
2581 5' GCAGATAC GCAAGGAGCT CGCTGCTGCTG CGTAGTCCAT CGTAGTCCAT
2641 5' GCACCGCTCG AGTCTTACAG TAGCAGTCCA ATGAAATCG TTTACAAGCT CGTGACTGGG
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LacZ
| Line | Sequence                  |
|------|--------------------------|
| 5941 | AAAGTATAGG AACTTCTAAG GACGAGCTG TGTATGAATTC CGCCCCCCCC CCCCCCCCCCT |
| 6001 | CTCCCCCTCCCC CCCCCCTAAC GTTACTGGCC GAAGCCCGTTT GGAATAAGGC CGGTTGCGGT |
| 6061 | TTGCTCATAT GTTATTTTTCC ACCATATTGC GCTGTTTTTG AGATGTTGAG GCCCCGAACC |
| 6121 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 6181 | TGAGTTGCCG AATTGTTGAG GAGGAAGCAG ACAACCTCTG TGGACAGTGG GCTACACGGGA |
| 6241 | TTGTCTATAT GTTATTTTCC ACCATATTGC GCTGTTTTTG AGATGTTGAG GCCCCGAACC |
| 6301 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 6361 | TGAGTTGCCG AATTGTTGAG GAGGAAGCAG ACAACCTCTG TGGACAGTGG GCTACACGGGA |
| 6421 | TTGTCTATAT GTTATTTTCC ACCATATTGC GCTGTTTTTG AGATGTTGAG GCCCCGAACC |
| 6481 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 6541 | TTGTCTATAT GTTATTTTCC ACCATATTGC GCTGTTTTTG AGATGTTGAG GCCCCGAACC |
| 6601 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 6661 | TTGTCTATAT GTTATTTTCC ACCATATTGC GCTGTTTTTG AGATGTTGAG GCCCCGAACC |
| 6721 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 6781 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
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| 6961 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 7021 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
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| 7201 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 7261 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 7321 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 7381 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
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| 7501 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 7561 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
| 7621 | CTGGCCCTGT CTTCTTGACG AGCATTCCTA GGGGTTTTCG CCCCTCTCGCC AAAGGAATGC |
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