



Lexicon Genetics Incorporated – Genentech Project Materials

Genentech ID:	UNQ655	Date of Submission:	11/18/03
Lexicon Contract Name:	DNA374	Mutation Type:	<input checked="" type="checkbox"/> Standard Knock out
LexVision Name:	PSC214N1		<input type="checkbox"/> Conditional
Reference accessions:	AV166990	Is this gene X-linked?	No

Required Materials: X pKOS clone DNA(s) __pKOS38_____
 X Target Vector DNA __KOS38TV_____
 X Targeted ES Cell DNA __1A9_____
 X Genomic Map

Southern Blot Analysis:
External/Internal Probe Strategies

	<u>5' External</u>	<u>3' External</u>
Name of Probe:	7+8	9+10
Restriction Enzyme for Genomic Digest:	BglII	BamHI
Predicted Wild-type Band (kb):	16.8 kb	14.6 kb
Predicted Mutant Band (kb):	7.8 kb	8.0 kb
Probe Size:	330 bp	232 bp

PCR Strategies:*For standard knockouts, give wildtype and mutant-specific strategies**For conditionals, give 5' loxP and cre-excision strategies*

Wild type-specific (absent in targeted allele)		Mutation-specific product (absent in wt)	
5' Primer Name:	DNA374-13	5' Primer Name:	PuroJA
3' Primer Name:	DNA374-12	3' Primer Name:	DNA374-12
Predicted Wild-type Band (bp):	400 bp	Predicted Wild-type Band (bp):	none
Predicted mutant band (bp)	none	Predicted mutant band (bp)	344 bp

5' loxP strategy		Distinguish Cre-excised and wt	
5' Primer Name:		5' Primer Name:	
3' Primer Name:		3' Primer Name:	
Predicted Wild-type Band (bp):		Predicted Wild-type Band (bp):	
Predicted mutant band (bp)		Predicted mutant band (bp)	

Primer sequences:**Southern probes**

DNA374-7	5' – ACAGCCGTTTCATTAACCTCC
DNA374-8	5' – AGGACAACGATGGATGTGGG
DNA374-9	5' – ATGGCTCCTCATCCTCCAGG
DNA374-10	5' –ATAGCATGCCCAAGGTGCTG

PCR Genotyping

DNA374-12	5' –GGCGATGTGCTCTTTAAAGG
DNA374-13	5' –AGAAGCAGTCGATGCTGCAG
PuroJA	5' –GAGGAAATTGCATCGCATTGTCT

Genomic Sequence Deleted:

GGAGGTGGCTCGTAAAGCACTTGTGGCAGTTGCAGTGCTAGGCGGGGGAGCTGGCGTGGGTTCTATTCTGTTTGCTCTT
GTGACCCAGGAGAACTACAGAAGCAGTCGATGCTGCAGGTA AAAACAACCGGACTCCCCGAGCTGGGTGTGCGTGG
GACGAGCCCCTGTCTTTTCGCCAGAAATGCAAACATCCTTCTTGCCTGCAGGAGATGCCGGAAAGGGACTCGCGGCGC
AGGGACGAAGCAGTCAGGACCACGGAACCTGGTGATGGCTACCCTGAAGGACGCCGCAGCCACGAAGGAGAACGTGGC
CTGGAGGAGAACTGGACAGTTAGCGGGGATGGCAGGTCAGCATGACACCAGAGCTCGCCCGTGGTACAGGGAA

**Genomic Locus: (The deleted sequence represents nt-8207 to 8591---in the sequence below. KOS 38 used to generate the TV
represents nt-3773 to 104773-- in the sequence below.)**

AAGAGGAAAATGCCGGGAAGCAAAGGGAAACAAAGACGCAGTTCCCACTCCCACAGTTCAGTCACCGTCCGGGGACG
ATTGATCTTTCTCCCGGAGGTGCCATGGCTACACTCCGCGGCTCATTCCAAAAGCCGCACTTCCGCTCCGCTCACAGG
TTCCGCCACACGCAAAGACCCCGCCCTCTGATGCCTCCGAACCAATCGCAGCTTGGAGGGCGGGCACCAGGGGTATAT
AAGGTTGTTCCGCGCGTTCGCGGGCCCTTCCAAGGGTGGTTTTACGTGAGTCTTGATTTTGTCTTTATATGCGAGGGAA
CTACTGGGAAGTGGCCTGACTTTGTAGATCCTCCTTTCTTGGCGGGGACCGGGCGTGCGGTCCCCTCCCCGTAATGT
ACGGAGGTAGAAGAAAGGGCTCTGGCCCTCTCGGCGTTATGTCTTCGGTGTCTTCCGCTTCCCGTTCGCGGGTCTATC
CTCAGACCGGGAACACTTAACCGTGCAGAAATGTAGCTAGTCCCAGTCCCCTCTGGTTACTCAACGCTTTTTAT
TTTATTTTAGTTCGACATTGACGCTCCCGGAGTGATGGTTAACATTTTCTTGGCTGTTTATTATTGAATCAATAAAGTCT
GTGAACCCTAAGGACCCTGTGTTTCGCTACCTTTTTTTTTCTGCGACTCGTAATTTGCAAATCTTTAGGACCAGAAAGCACAT
GTTGGGAGTGATAGTGACTATTTACTAAAGATCTCTGGTTCGATCTTGTGGGGGGACTTAATAAGCTAAATCTCAACCAG
GATGTAATCTTTATGAGTATAGAAAGTGCCTCCTAAAGGCATGGGAATCAAACCTGTAGTTATGGTAAAAAGCCTA
GCGTAATGGTGCGCACGTGTAATCAGCAGAACTAACCTGGGGTAGCATGCACCCTTATCTTCAAGCTTCCGTCATTTA
AACTGGCGGTAGGCACAGCTTTCTACTAAGATATTGGAAGTAAAACTAGGATCTCAATCCTCCACAGGCATGCCCTGT
GGATGTTCTCGGGGTGGACTTGTCTCCGTGCTGGGACCTACATAAACAGCCTTATACAAGGAGGCCATTGCCATTCCCA
GTGCAGAATCTGGGAGCCCTAGCATCCTTAGGTTCCCTCACAGCTCTCCAGGGATAATTGTTGCTAAGCGAGATTTGCC
GAGGATTCAAGGACCCTCCTTTTCAGCTGCCCTACTAGAAGTAAGAAAAAAAAAATCCAATGGCTGGACTGGGTATAA
AAATTAAGCCCTAAACCGGGCAATGGTGGCCACACATTTAATCCCAGCACTTGGCAGGCAGTGACAGGCAGATTTCT
GAGTTCAAGGCCGCGCTGGTCTACAGCGTGAGTTCCAGGACAGCCAGGGTGATACAGAGAAACCTTGTCTCGAAAGAC
CAAAGAATAAAAGTTAAGGCCCTTATAAGACATTCAGTTAAATCTCAAAGATTTCTGAGAGTTTCCATTCTGCTTTTGT
GGTCAAACATAGAGTTGGAATTTTGCCATTGTATGAATAGCTAGTAATTGAGAGTGTTTTCCCTGGTTTGCACAATTTGT
TCCTGGTTTATAAACCTGGAGCCTGAGGGTAATACTGGGTTACCAGGTGGGGAGACCTGACATCATTACTGGCTGGGCT
CAATCTGAACTGCAGAGCTGGTGTGAATTTGTGTCTCTGCAGCTTAGAGTAAGCCAAAGAGCTTTGAAAACAATAATA
ATGGAGATGAAATTTGGAGGAAAAAAAAAACCAATACTTACCCCAAAAGTACTGAGAGGTGGGAAATGGGGATA
TTCCATAAATCGTGTCTATAGATGCAGGACCCTGTTGGGTCCCAAAGAGGACAGAGATTGGGAGTTTCCGACCCTCT
GTATCTTCAGGAATCCAGAAGGCATCTTGTCTTGACCCAGCCAAGTCCAGGGTTTATTGTTCTTAAAGGAGATGTGG
GATCCTGTGGGATCCAGGCCAACCTGGGAGAAGAGTAAATATTCTTGATATGCTGTGTCTTTAATTGATTTGAGACAA
GGTCTCTCCATGTAGCCTTGGCTGGTCTTTAACATGTAACAGGACAAGCTGGCTACCATGCCTGACCCAGATAAATAAA
GATTTAGTTGTTTTAGTGTGCATAAATGTTTGCCATATGCATGTCTGGTACATGAGGATGTTAGAAGAAATCTGATCCCC
TAGACCTGGAGCTACAGATGCTTGTGAACCTACCACAAGAGTTCTAGAAAACAAATCTAGGCCCTCTGCAAAGGTAGC
AAGTTCTCTTAGAAGTCTGAGCCTCATTATTTGTGTGTGAGGCAATAGAGTTTTATTCTACCTTTAATCCAGTACCGG
TCAGTGGAAGTCAAAATTTCTATGAGATCCAAGCCAGCTTGTGGGATGAGGTTGGTAATTTGTGCATATTTGTAT
TAGAGGCAGAGACTGACATCAGGTATCTTCCAAATTGCCCTTCACTTGATATACGGAGAGCTTGCATATGAGGATTAG
TCTAGCTGGGTAGTTTGTCTCCAGGGATCTCAACCTCTAGAGTACACTGCGATTGCGGGTAAGCTGTGCATGCACAA
CTGGTCTGTCCATATAGATAACAGGGATCTGAGTTCAAGTGCACATGCTTTCAGAACAAGCACTACCTACTGAGCTGTC
CCTCTATCCCTATTCTCTCATTATAAAGGGAAATTTGTCTCCTTTAATTGAGTTGTTCTGAAAACCTTTAAAAGTATTTAG
CATTGTGACTGGAGCATAATGCACACACACACACAAAACCCAACAACCTTTTATGTTTTTGTTTTTTGTTTTTTCGAGAC
AGGGTTTCTCTGTGTAGCCCTGGCTGTCTGGAACCTCACTTTGTAGACCAGGCTGGCCTTGAACCTCAGAAATCCACCTG
CCTCTGCCTCCCAAGTGCTAGGATTAAGGCGTGTGCCACCACACCCGGCAACAACCTTTTTAATAACAACATACAGCCG
TTCATTAACCTCCAAAATGTTAATTACCTCTAGATAGATACAGGGTAATTACATCATCTTCCCTCCCCAGTAATGAGCCA
TTAAAATATTATTAGACACCAGCAAGATCCGAGCCATGCAAGATAAATAAATAAATCATATCTCCAGAACA AAAAGGGA
CAAAAGCAAATTAAGGC:TACAGGTGAAGCTCAGTAGCTGATAAATTACCTAACATGCAAAAAGGCCTTCATTTGTGGGG
CTGGTCAAACAGCTTAGCCAGCAAAAAGCTCAAGTGAAGCAAGTATCAGGGTGTCTAATTGCTAAGACCCACATCCATC
GTTGTCCTGCTTAACACAGGGTCTCAATGCATAGCTCTGGTTGTTCTGCAACTCGATGTGTGGAAACTCAGATCCTGCCT
CTGCCTCGAAGTGTGGGATTA AAAAGTGTGCACCACCAGTGGCCAGCCACATAAACATTTTTTAAAAAGTGTCTTAA
GCCCTGGGTTCAATCCTCAACAGTACAAACAAAGGAAAACAAAACCATGCACACAAATAGTAGAGAGAGAGTGTCA
CTCCACAGGTAAGATCACTCACTGGCAGTGAGTTCAGTGCCAGATCCCACAAGGTGGACTGACAGAACAAGCTCCCA
CGAGACAAGGACGAGCCATTATCCTCAGACATACATACACACCCATACTACAAGCACATAAAAATACTATTTTTA
ATGTTTGGAGTCACATGCACACTATGTAGATCAGTCTGGCCTCAGGTCTGCCCTGTCTGCCTCAGATCGGCCTGTCTGTC

TCCAAAGAGTCTGGATTAAGGCAGAAGCCACCAAGTTTAAAAACATTTTTTCTTCCAAGATAGGGTTTCTCTGTATG
GCCCTAGCTGTCTAGAACTTGACCTGTAGACCAGACTGGCCTCGAACTCAGAGATCTCCCTATCCCTGTCTCTTGAGTG
TTTGGATAAAAGGCATGTGACATCATCACTCACCTAGATTTTTTTTTAAAGGTGACGTCACTCATTCCAAGATCAGAATG
GCCCCGCTAAACCAGGCAGGGTGTAGAGCCTGTAGCTCTACTTTGTAATAATCTCAAGTACTCAGATGGCTGAAGTTAAA
GGAGTACAAGAGTTCAAGGCCAGCCAGGGCTACACAGTGAGCTCCAGGTCAGTCTGAGGTACAAGGTGAGCCTGTCTC
AAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTAATTA
TCTCTTCAGTGCTTAAATAAAGGTATAAACAACAAGCAAGCCAGGCATGGTGTTAGAGGCTTGTATCTACAGTTTGA
AGGCTGAAGCAGGAGGACCTTTAGTTTGGAGACGGTTTGAACATATAGTGAACACTTCTTTAAAAACAACAACAACA
AAACA
TGT
CAGGGTTCTGTGCATGCTATTATGCACCTTCTTCCTACACCACACCACACTCCTCTTTCTAACATTCTGGACATCTATT
GTGGGTCTAAAATATCTAAATGTCAATGGCCTGAACGAATCAGCCACCACCTTTACCTGGCTCTTCACTTTGATCCTGG
AAGAAAGCTTCTGCGTCTTCTTACCATCAGTGAGCACCAGCAACTCCTCATGTGGCCACTGGTGGTCTTCTGGTCTTC
CTCACTCCCCTCTGAGGCCTCTACCACAATAGAGGGCAGGCGGGCTTTTGGAGACACCTGCATAAGTACAGCAGGGGT
GTTGGGCACAATTCGAAGATGAGCCTGTACAGGACGTGGTATAGTAATACTGACCTCAACATCCTGATGATCTTCA
TCTGCCAGTCTCTTCTGTTTTTTGAAGGGGGTTGGCCAACTGAGGACTTTCTGGATGCCATGGAGAGTCTGGGTTAT
CTCCAGACCAAGATCCATCCTTGCTACTCTCTGGCACAAGGGCCATGATAGTAACTCTGTAAACGTGGAGATGGTTGA
TTCCAGGTCAAGTCCCTGTGTCCAGTGCCACACAGACTGTGCTTTAATCCTCTTTGGAGAGGGCCTCTTAATCACTGCT
GAGGAAAGCATGATGACATGCTGGGAGATTATGGGCCTCCATGGGAGGGAGATGCCAAAGAGGAAAGACAGAGCTT
TAGTCTGTGACTCCCTGAGACACTGGGGATGGCAGGCAAGGTAGGAGACAAGGGCATCTGGATTAAGCCCTATAAA
TAAAGAGCCGGGGTGACGATGGATTTCCCAACTCCTTTTTTTTTTTTTGATTTTTCAAGACAGGGTTTCTCTGTGTAGCC
CTGGCTGTCTGGCACTCACTTTGTAGACCAGGCTGGCCTCGAACTCAGAAATCCACCTGCCTCTGCCTCCAGAGTGCT
GGGATTAAGGCGTGCGCCACCACGCCAGCTTCCCAACTCCTTTTTACTGGTTTTCTCAAGTGGACTTGGTTTGGTTT
TGTTGTGTTGTTTGGGTTTTTGTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTG
GGTTTTCTCTGTATAGCCCTGGCTGTCTGGAAGTCACTCTGTAGACCAGGCTGACCTCGAACTCAGAAATCCACCTGC
CTTTGCCTCCCAAGTGCTGGGATTAAGGTGTGCGCCACCACGCCAGCTTGTGTTGTCTTAAATATATGTAATGTCTA
TTACTGTTTTCCGTGAATAATATCTGTATGAGGTATCAGAAGTTCTAGGCCTGAGTTACAAACAGAGCTGGCATGTGGG
TGCAGAAAATTGAACCCAGATCTTCTGGAAGAGCAGCTAGAATTCTCAACAGCTGAGCCATCTTTCCATTTCTGGGTCC
ATTTGTGTGTTATTTAATGAACATTTATGTGGCTTTTGCTATTTGCTAGGGACCCTTTTTATTACTTTAAAGGTATTTATT
TTTATGAGTACAGGTGTTTTGCCTGCAAGTATATCTTCTGCCATGGAGACCAGAAAAAGACACTGGATCTCTTAGGGCA
GGAGTTACAGATGGTTGTGAACACCATGAAGGTGATGGAATCAATCTGGACCCTCTTGGTACATAGTCAGTGCTCTTAA
CCACTGAGCCTCCTCCCCTAGCTTGGCAAGAACTCATTGTTTGGTGATAGTCGTTGTTATTGTTGTTTGGTTGTAGATTTT
TGTTTTGTTTTTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTTGTTTT
CACTCTGTAGATCAGGCTGAGCTCAAACCTCAGAAATCTGCCTGCCTCCCAAGTCTGGGATTAAGGTACTTA
ATCCCACTACCACCTATATCTGCATACCAGATGAATCTTTAAAAATATTCTACATATCAGTCAGGTGTTGGTGATAC
TGGCCTTCAATTGTAGCACTAGAGAAGTAGAGTTGGGCAGATCTCTGAGTCTGAGGCCAACCTGGTCAACAAGTGAA
TTCCAGGACAGCCAGGGCTACACAGAAAACTTTGAAACCGTGTCTCAAAGAGGGGGTAGGGGGAGTTAAGGCAGG
AGGTTGTAATAACAAGTTTTCTTAGACTACAGAGTATGCTCAAACCAGCGAAGAGAGCTAAGAACCTGCTTATGATG
ACAATGACAACAATGATGAAGAGGAGCCAGGTTTGGTAGCATAAGCCTTAAACTCCAGCTCTCTAGAAGAACAGGCAG
GCAAAACTCTGAGACCTCAATGCTAGCCTGGTCTACTTAGAAAGATCTAGGGCAATCAGGACTACAAAGTGAAATCCT
ACAAGCTCTTAAAAAAGAGGGGGGACCATATTAAGTAAAC
ACACACACACGGTTCGTACCAAGCTTGTCCAATACTCTGAAGAGAAAAACAATACTGTTTCTATTCTGTACACATGG
CTTTGAAGTGTTTGTCTAACCCCTATATGCTTTGTTTTGAAACAAGGTCTTCCAATGAAGACTTGATTGGCCTCCAAT
CAGAATCTTTCAGATTCACTTTTCTTAAATACTAAGATTTTCAAGATGTTAGCTGTTATATTACATTGTATACTTAAAACAG
TAGCTGAGCAGTCTTTATTAATTTGAAACTTCCAAGGGTTGAAAACAGGCAATGCGGGCTGGTGAGATGGTTCAGTGG
TTAAAAGCACTGACTGCTTCTCAGAAGTCTGAGTTCAATTCCCAGCAACCACATAGTGGCTCACAATCATCTGTAAT
AATAGGATCAGATGCCCTCTTCTGGTGTGTCTGAAGACAGCTACAGTGTATTTCATATACATAAAAACAAGTAAATAAATC
AGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAG
GAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAG
ATCGGGACAGGGTTTCTTTGTGTTGCCCCAGCTGTCTGGAACCTGTAGACCAAGCTGGCCCTGAACTCAGTGATCCA
CCTGCCTCTGCCTTCCAAGGCATGCACTATCATTACTCAGAAAAAATGGCAATTGAAATATCCATAGCAACCATGCAC
TCTTTGAAAGCAAAGGTGCTTAGCGCTATTTTTTTTTTTTTAATGTGCATTGGTTTTGCTTGCACGGATGCTGTATGAGA
GTGTCAGATTCCCTAGAAATGGATTTTCAGACAGTTGTGAGATACTGGGAAATTGAACCAAGGTCAATTTGGGAGAGCTT
AACCTTTGAGGCATCTCTCCAGCTCCAACTTTTAAAAAATTTCTGTGTGTGCACGTGCGCGTGTGTTTAGCCCTCTTA
GCCAGCTGTTTCTATGATTTGAGGCCCGGCCCGCCCTCTCCTAGGTGCTCTAGCCCGCATAGGGAGCGGTGAG
ATGTCATGGCTTCTTCTAGGCTGCGGGAGGAAGCGGACGGCACCTCTTTTGTAGTGAATCCGCCATGGAGGTGGCTC
GTAAAGCACTTGTGGCAGTTGCAGTGCTAGGCGGGGAGCTGGCGTGGGTTCTATTCTGTTTGTCTTGTGACCCAGG
AGAACTACAGAAGCAGTCGATGCTGCAGGTAAAAACAACCGGACTCCCCGAGCTGGGTGTGCGTGGGACGAGCCCTG
TCTTTTCGCCAGAATGCAAACATCCTTCTTGGCCGAGGAGATGCCGAAAGGGACTCGCGGCGCAGGGACGAAGCA

GTCAGGACCACGGAAC TGGT GATGGCT ACCCTGAAGGACGCCG CAGCCACGAAGGAGAACGTGGCCTGGAGGAGAAA
CTGGACAGTTAGCGGGGATGGCAGGTCAGCATGACACCAGAGCTCGCCCGTGGTCACGGGAACCTGTAAGGCTCCTTT
CTTGGTGCTCCGGACATGGAGTCGGGAGATACACCAGGACTCTCTCCAAGTCACTGGGAACCTGCGGTTGGGGGAACGC
CTTTAAAGAGCACATCGCCTGACAGGGTCGGATGTGTGGAACCAACGGAAC TAATAAATGCAGTTCATCCATTAAGTG
GATTTTCGCAGCTGGACATCTAATGCTTAGAGAGCTGTGAGAGAGCGCAATGTGCGCTGAAGACCTAGGCAACTGCATG
CCATCCTACCCCTGAGAGTTCTTAAGTCCAATAAGTTTTCTGACTATTCAAAATAGGT CATATGATCTAAGTTTTGCTTCT
GCAACTGTTGGGTAAAAGACTTTAGGAAAAAGTCTGGTTTTGTATGTCACAATGTGTGTTGTGTGAATGAAAAATGAAA
GTCGGAAGTCACCGAACACTTTGGAAAGACCATCTCTATTTATACACTCTATCCAGCTTGTAGGCAAAACGATTTCCACC
CACTGAGCCATGTTACCTAGACAAAATCTTCTTTGAGACAGCATCCTTCCCTCCACTCCCAAGTGCTGTGGATAAAGGAG
TGAAATCCCACGCCAGCTCCAAGCCACAGTCTTCAAATTAGAGTAGTCCTTGAATATTAGGTTGTCAGTGAATACTAA
CAGGACTTCTGTCTTTAAGCAAAGTTGGAGAAGGGTTTTCTTGACTGTTCCAATGCCTCCTTTACTATTTACTTTGGTT
CAAGCCTCTTAAGAGAATCCGACTTACTATTACTGGAAGTGCATGTCAATCCAACATAGCAGCACACACACCTATAAC
CCCAGGACTCAGGGAGGTGAGGTAAGAAGATAGCAATTTTAGCCTGGTGGTGGTGGCACACTCCTTTCACTCTAGACTT
TAATCTCAGCACTCAGAGGTGGTGACATAGGCAAATGGATGTCTGTGAGTTC AAGGCCAGCCTGGTCTACAGAGCAGA
GTTCCAGGACAGTCAAGGACACACAGAGAAACCTATCTCAAAAAGAATAGCAGGAAAAAAAAAAAAAGATAGCAAGTTC
AAGACAAGGCTGGGCTCCTATACAAGGAGACAACCTGAAAAGGAAAAATAAATACTACATGATACAAAACCTCTG
AGTTAGGTGGGTGGTGCACACGCTTAATCCCAGCACTTGGGAGGCAGAGGCAGGCGGATTTCTGAGTTCGAGGCCAGC
CTGGTCTACAGAGTGAGTTCAGGACAGCCAGCTCTACACAGAGAAACCTGTCTCGGGAAAAAAAAACAAAAACAAAA
CCCTCTTTGAGCTGAGTATGAATATTGTACATCTTTAGCCCCAGCACTTGGGAGACAGAAGCAAGCAGGCAGGTATCTG
TAAGAGGCCAGCTTGGTCTACACAGTACATTCCAGACCTGCCAAGAGAGTGAAACCCCTCTGAAGAACAACCAAGG
TCTCGTTCTGTCCATTAGAGGTCTTAAGTACCAGGGGGACCTCAGGAGGCAGAGGCAGGCATATATCTGAGCTCAAG
GCCAGCTGGTGTACTAAGGGAGGAGTTCATGACAGCTAAGATTACACAGTGAACCCCTGCTTCAAAAAACAAACAGA
AAGAAACTATCTCAAAACGGGTAAAGAAAAAAAAAAAAAGCTGAAAAATGGAGCAGTACATGGTAGCTTCTGCCTCAGTCT
CAGCACTTGGAGTCTGAGTCAGAATTTTAACATGTTCAAAGCTATAGAGTATGTCTCAG:GCTGTCTTAGATTAGAGTGG
AGACCCTACCACCGCAGCTGTGAATGACTGTGTGGTGAAGTGATGGGCTGTTGAATGGCTATAGGTAAAAACTTCTTAA
GCTAAGCCTGAAGACATAAATCCTAAATCCAGCCCCTGGAAGCCGTATGGTGGATGGAGAGATCTGACTTCTGTTTCAT
CTAACCTCCACAGGCATAGCCATAAAACAAACAAACAAACAAATGGCTCCTCATCCTCCAGGATTTCACTATAGTATTAT
TCTTTCAAGTGTCTGAACCAGTTAAAGTATATTTTGGAAATGTCACTGAGAGCACAAACCATTGAAGCAGGCCTGGTGGC
ACAAAAGCCAAGCAAGCAAGTCATAGCAGCTGGAACCTACAGGGATTAACCATGTCACAAATCTTTTTTTTTGGTTTTGT
ACTGAGAATTAAGCCCCAGCACCTTGGGCATGCTATTAACATTATCCATCAGCCAGGCATGGTGGCACACACCTTTAA
TCCCAGCACTTGGGAGGCAGAGGCAGACGGATTTCTGAGTTCAAAGGCCAGCCTGGTCTACAGAGTGAGTTCAGGACA
GCCAGGGCTATACAGAGAAACCTGTCTCAAAAAACAAAAACAAAAACAAAAAGAAAAACATTACCCATCGATGAGA
CCCACCTTACCACATATACATATATATGTGTGTGTGTGAATATGGATTTATGTATATTTTTACAACACATTTTTTATT
GAAGGTTCTTTCTATGTCTATGTAGCCCAGGCTGGCTTTGAACCTTGAAGCAGTCATCTGATCTCAGCCTCTCAAATGCT
GGTAGGATTACAGGCTGTGTCTACTACTAGCTTCATTTTTGTATTCTAGAACTTGAATTTTTCAAACAGTAGCAGTGA
AAATATCTTTGTGGCTAGAGATAGGACTACCTGCTTGAATACTCAGCTATCATACATCAAATTTGCAAGTCTGATTCCC
CATAATTTAGGAATGGTATGCTGGTAATGCCAGCACTGGGGATAGTGGAAAGCAGCAGCAGACAACAAGCAGGGTCCAA
CATGGTAGTACACACTTGGGAGAAAGAGGCCTAGTCTCCACAGAACATTCCAGGACAGCCAGGGCTATACATTGAGAC
CCAGTCTGCGAAAACCAGGGGGGAAAAAAAAAATCAAAAAGTTCAAAAAGTATATGGCTGCATAGCAGGTCCAAAAGTCA
GTTTGGGATACATTTGTCTGTCTCATAACACTTAATGTTTCTGTGGTGC AAACCCAGAAGTGAACACCAGAGTTTGTCT
AGCTGCTAGTGCAACTTATATTTACCCGIGTATGTTTTTTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTGTTTGTG
GTAGCCCTGGCTGCTCCTGGAACCTCACTCTGTAGACCAGGCTGGCCACGAACTCAGAAATCCGCCTGCCTCTGCCTCCCA
AGTGCTGGGATTAAGGCTTGCGCCACCAAGCCAGCTCCGTGTATGTTTTTAAAGGCAAGGTCTCTGTGTAACCTTGTG
CGCCTGCCTCTGCTGTGTGCCAGGTTTAAAGGCATGCACCACCACAGCCTGGCCTATTTATTTACTTTCTTTACACAGG
TGTTATTAACGGCCTCTTATGAATTGTGGCTCTTCTCTGCACCAGGAATAAGGACAAGTCAGCAGAGATTTGACAGA
CACTAGGGCAGTGGA AAAACACACCATAAATCTGGCAGATAAGGTCTTGAGCCAAGCAGGGCATGGAGACACACACCTT
TAATCCCAGCTCTCAGGAGACGGTATGACTACAGAGAGGCCCTTTCTCAACAAAACAAAAACACCCGACCTAGGCTTC
CCAAGTGGGTGTAAGGTTCTTATATTTGTGACCAATGTCAGACTGGACCACACCTGTAATGTGCTGGTCTGATCTAA
AATATTAACCTGACCACAATAGTCTTTATATCTTAATATATACACATGAAGCACTTTTACTATAGGACCTGGAATCCC
AGCAGGCCAAGGCAGAAACAGAAGTTCAAAGGCCAGCCTGAGAAATACAGTTAAGACCCTACATGAAAAAGTAACTTG
GGGATACAGCTAAGTGCTTTCTCAACAAGCATCAAGCCCTGGGTTCAATCCCAATACTGCAAAAAGTGTGGTATGTAT
ACAGTACTCATTTTTTCAAGCCAGGGTCTCTCTG

Selection Cassette:

GGCGCGCCGGATCCGAATTCCTCGAGGCTAGAACTAGCGATAAGCTTCGAGCGGGATCAATTCGCCCCCCCCCTAAC
GTTACTGGCCGAAGCCGCTTGGAAATAAGGCCGGTGTGCGTTTGTCTATATGTTATTTTCCACCATATTGCCGTCTTTTGG
CAATGTGAGGGCCCCGAAACCTGGCCCTGTCTTCTTGACGAGCATTCCTAGGGGTCTTCCCTCTCGCCAAAGGAATG

CAAGGTCTGTTGAATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTTGAAGACAAACAACGTCTGTAGCGACCCTTT
GCAGGCAGCGGAACCCCCACCTGGCGACAGGTGCCTCTGCGGCCAAAAGCCACGTGTATAAGATACACCTGCAAAGG
CGGCACAACCCACAGTGCCACGTTGTGAGTTGGATAGTTGTGGAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAA
GGGGCTGAAGGATGCCCAGAAGGTACCCATTGTATGGGATCTGATCTGGGGCCTCGGTGCACATGCTTTACATGTGTT
TAGTCGAGGTTAAAAAACGTCTAGGCCCCCCGAACCACGGGGACGTGGTTTTCTTTGAAAAACACGATAATACCAT
GGGGGATCCCGTCGTTTTACAACGTCGTGACTGGGAAAACCTGGCGTTACCCAACCTTAATCGCCTTGCAGCACATCCC
CCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTCCCAACAGTTGCGCAGCCTGAATGGCGAA
TGCGCTTTGCCTGGTTTTCCGGCACCAAGAAGCGGTGCCGAAAGCTGGCTGGAGTGCATCTTCTGAGGCCGATACTG
TCGTCGTCCCCTCAAACCTGGCAGATGCACGGTTACGATGCGCCCATCTACACCAACGTGACCTATCCCATTACGGTCAA
TCCGCCGTTTGTCCACGGAGAATCCGACGGTTGTTACTCGCTCACATTTAATGTTGATGAAAGCTGGCTACAGGAA
GGCAGACGCGAATTTATTTTGTAGTGGCGTTAACTCGGCTTTCATCTGTGGTGCAACGGGGCGTGGGTACGGCC
AGGACAGTCGTTTGCCTGCTGAATTTGACCTGAGCGCATTTTTACGCGCCGGAGAAAACCGCCTCGCGGTGATGGTGCT
GCGCTGGAGTGACGGCAGTTATCTGGAAGATCAGGATATGTGGCGGATGAGCGGCATTTTCCGTGACGTCTCGTTGCTG
CATAAACCGACTACACAAATCAGCGATTTCCATGTTGCCACTCGCTTAAATGATGATTTACGCCGCGCTGTACTGGAGG
CTGAAGTTCAGATGTGCGGCGAGTTGCGTGACTACCTACGGGTAACAGTTTCTTTATGGCAGGGTGAAACGCAGGTGCG
CAGCGGCACCGCGCCTTTCGGCGGTGAAATTATCGATGAGCGTGGTGGTTATGCCGATCGCGTCACACTACGTCTGAAC
GTCGAAAACCCGAAACTGTGGAGCGCCGAAATCCCGAATCTCTATCGTGCGGTGGTTGAACTGCACACCGCCGACGGC
ACGCTGATTGAAGCAGAAGCCTGCGATGTGCGTTTTCCGCGAGGTGCGGATTGAAAATGGTCTGCTGCTGCTGAACGGC
AAGCCGTTGCTGATTTCGAGGCGTTAACCGTACAGGATCATCCTCTGCATGGTCAGGTCATGGATGAGCAGACGATGG
TGCAGGATATCCTGCTGATGAAGCAGAACAACTTTAAACGCCGTGCGCTGTTTCGATTATCCGAACCATCCGCTGTGGTA
CACGCTGTGCGACCGCTACGGCCTGTATGTGGTGGATGAAGCCAATATTGAAACCCACGGCATGGTGCCAATGAATCG
TCTGACCGATGATCCGCGCTGGCTACCGCGATGAGCGAACCGGTAACCGCAATGGTGCAGCGCGATCGTAATCACCC
GAGTGTGATCATCTGGTCGCTGGGGAATGAATCAGGCCACGGCGCTAATCACGACGCGCTGTATCGCTGGATCAAATCT
GTCGATCCTTCCCGCCCGGTGCAGTATGAAGGCGGCGGAGCCGACACCACGGCCACCGATATTATTTGCCCGATGTACG
CGCGCGTGGATGAAGACCAGCCCTTCCCGGCTGTGCCGAAATGGTCCATCAAAAAATGGCTTTCGCTACCTGGAGAGA
CGCGCCCGCTGATCCTTTCGGAATACGCCACCGGATGGGTAACAGTCTTGGCGGTTTCGCTAAATACTGGCAGGCGTT
TCGTCAGTATCCCCGTTTACAGGGCGGCTTCGTCTGGGACTGGGTGGATCAGTCGCTGATTAAATATGATGAAAACGGC
AACCCGTGGTTCGGCTTACGGCGGTGATTTTGGCGATACGCCGAACGATCGCCAGTTCTGTATGAACGGTCTGGTCTTTG
CCGACCGCACGCCGCATCCAGCGCTGACGGAAGCAAAACACCAGCAGCAGTTTTTCCAGTTCCGTTTATCCGGGCAAA
CCATCGAAGTGACCAGCGAATACCTGTTCCGTCATAGCGATAACGAGCTCCTGCACTGGATGGTGGCGCTGGATGGTA
AGCCGCTGGCAAGCGGTGAAGTGCCTCTGGATGTGCTCCACAAGGTAACAGTTGATTGAACTGCCTGAACTACCGC
AGCCGGAGAGCGCCGGGCAACTCTGGCTCACAGTACGCGTAGTGCAACCGAACCGGACCGCATGGTCAGAAGCCGGG
CACATCAGCGCCTGGCAGCAGTGGCGTCTGGCGGAAAACCTCAGTGTGACGCTCCCCGCCGCTCCACGCCATCCCG
CATCTGACCACCAGCGAATGGATTTTTGTCATCGAGCTGGGTAATAAGCCGTTGGCAATTTAACCCGAGTCAGGCTTTC
TTTACAGATGTGGATTGGCGATAAAAAACAACCTGCTGACGCCGCTGCGCGATCAGTTACCCGTCACCCGCTGGATAA
CGACATTGGCGTAAGTGAAGCGACCCGATTTGACCCTAACGCCTGGGTGCAACGCTGGAAGGCGGCGGGCCATTACCA
GGCCGAAGCAGCGTTGTTGCAAGTGCACGGCAGATACACTTGTGATGCGGTTGCTGATTACGACCGCTCACGCGTGGCA
GCATCAGGGGAAAACCTTATTTATCAGCCGGAAAACCTACCGGATTGATGGTAGTGGTCAAATGGCGATTACCGTTGAT
GTTGAAGTGGCGAGCGATAACCCGCATCCGGCGCGGATTGGCCTGAACTGCCAGCTGGCGCAGGTAGCAGAGCGGGTA
AACTGGCTCGGATTAGGGCCGCAAGAAAACCTATCCCGACCGCCTTACTGCCGCTGTTTTGACCGCTGGGATCTGCCAT
TGTCAGACATGTATAACCCGTACGTCTTCCCGAGCGAAAACGGTCTGCGCTGCGGGACGCGCAATTGAATTATGGCCC
ACACCAGTGGCGCGGCGACTTCCAGTTCAACATCAGCCGCTACAGTCAACAGCAACTGATGGAAACAGCCATCGCCA
TCTGCTGCACGCGGAAGAAGGCACATGGCTGAATATCGACGGTTTCCATATGGGGATTGGTGGCGACGACTCCTGGAG
CCCGTCAGTATCGGCGGAATTCCAGCTGAGCGCCGGTCTGCTACCATTACCAGTTGGTCTGGTGTGAGGGGATCCCCCG
GCTGCAGCCAATATGGGATCGGCCATTGAACAAGATGGATTGCACGCAGGTTCTCCGGCCGCTTGGGTGGAGAGGCTA
TTCGGCTATGACTGGGCACAACAGACAATCGGCTGCTCTGATGCCGCCGTTTCCGGCTGTGACGCGAGGGGCGCCCG
GTTCTTTTTGTCAAGACCGACCTGTCCGGTGCCCTGAATGAACTGCAGGACGAGGCAGCGCGGCTATCGTGGCTGGCCA
CGACGGGCGTTCTTGCAGCTGTGCTCGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAAGTGC
CGGGGAGGATCTCCTGTCATCTCACCTTGCTCCTGCCGAGAAAGTATCCATCATGGCTGATGCAATGCGGCGGCTGCA
TACGCTTGATCCGGCTACCTGCCATTGACCACCAAGCGAAACATCGCATCGAGCGAGCACGTACTCGGATGGAAGC
CGGTCTTGTCGATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCCGAACTGTTCCGCCAGGCTCAAGGC
GCGCATGCCCGACGGCGAGGATCTCGTCTGACCCATGGCGATGCCCTGTTGCCGAATATCATGGTGGAAAATGGCCG
CTTTTCTGGATTACGACTGTGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATT
GCTGAAGAGCTTGGCGGCGAATGGGCTGACCGCTTCTCGTGTCTTACGGTATCGCCGCTCCCGATTGCGAGCGCATCG
CCTTCTATCGCCTTCTTGACGAGTTCTTCTGAGGGGATCAATTCTCTAGAGCTCGCTGATCAGCCTCGACTGTGCCTTCT
AGTTGCCAGCCATCTGTTGTTTGGCCCTCCCCGTACCTTCTTGACCCTGGAAGGTGCCACTCCCACTGTCTTCTCTA
ATAAAATGAGGAAATTGCATCGCATTGTCTGAGTAGGTGTCATTCTATTCTGGGGGTGGGGTGGGGCAGGACAGCAA
GGGGGAGGATTGGGAAGACAATAGCAGGCATGCTGGGGATGCGGTGGGCTCTATGGCTTCTGAGGCGGAAAGAACA
GCTGGGGCTCGATCCTCTAGAGTCGAGTACCGGGTAGGGGAGGCGTTTTTCCCAAGGCAGTCTGGAGCATGCGCTTTAG

CAGCCCCGCTGGGCACTTGGCGCTACACAAGTGGCCTCTGGCCTCGCACACATTCCACATCCACCGGTAGGCGCCAACC
GGCTCCGTTCTTTGGTGGCCCTTCGCGCCACCTTCTACTCCTCCCCTAGTCAGGAAGTTCCCCCGCCCGCAGCTCG
CGTCGTGCAGGACGTGACAAATGGAAGTAGCACGTCTACTAGTCTCGTGCAGATGGACAGCACCGCTGAGCAATGGA
AGCGGGTAGGCCTTTGGGGCAGCGGCCAATAGCAGCTTTGCTCCTTCGCTTTCTGGGCTCAGAGGCTGGGAAGGGGTG
GGTCCGGGGGCGGGCTCAGGGGCGGGCTCAGGGGCGGGGCGGGCGCCGAAGGTCTCCGGAGGCCCCGGCATTCTGC
ACGTTCAAAGCGCACGTCTGCCGCGCTGTTCTCTCTTCTCATCTCCGGGCTTTTCGACCTGCACTGCGCGCCAGCT
TACCATGACCGAGTACAAGCCACGGTGCGCCTCGCCACCCGCGACGACGTCCCCAGGGCCGTACGCACCCTCGCCGC
CGGTTCCGGACTACCCCGCCACGCGCCACACCGTGCATCCAGACCGCCACATCGAGCGGGTACCAGCTGCAAGA
ACTTCTCTCACGCGCTCGGGCTCGACATCGGCAAGGTGTGGTTCGCGGACGACGGCGCAGAGTGGCCGTTCCCGCT
CAGCGCGAGAGCGTGAAGCGGGGCGGTTCGCGGAGATCGGCCCGCATGGCCGAGTTGAGCGGTTCCCGCT
GGCCCGCAGCAACAGATGGAAGGCTCCTGGCGCCGACCGGCCAAGGAGCCCGCTGGTTCTGGCCACCGCTCGG
TGTCTCGCCGACCACCAGGGCAAGGGTCTGGGACGCGCCGTCTGTCTCCCGGAGTGGAGGCGGCCGAGCGCGCCGG
GGTGCCCGCTTCTGGAGACCTCCGCGCCCGCAACCTCCCCTTCTACGAGCGGCTCGGCTTACCAGTACCGCCGAC
GTCGAGGTGCCGAAGGACCGCGCACCTGGTGCATGACCCGCAAGCCGGTGCCTGACGCCCGCCACGACCCGAG
CGCCGACCGAAAGGAGCGCACGACCCCATGCATCGATGATCTAGAGCTCGCTGATCAGCCTCGACTGTGCCTTCTAGT
TGCCAGCCATCTGTTGTTTGGCCCTCCCCGTCCTTCTTACCCTGGAAGGTGCCACTCCACTGTCCTTTCTAATA
AAATGAGGAAATTGCATCGATTGTCTGAGTAGGTGTCAATTCTATTCTGGGGGTGGGGTGGGGCAGGACAGCAAGGG
GGAGGATTGGGAAGACAATAGCAGGCATGCTGGGGATGCGGTGGGCTCTATGGCTTCTGAGGCGGAAAGAACCAGCT
GATTACCCTGTTATCCCTACTCGACCTCGAGGGCGCGCC

Targeted Locus:

GATCAGTCTGGCCTCAGGTCTGCCTTGTCTGCCTCAGATCGGCCTGTCTGTCTCCAAGAGTCTGGATTAAGGCAGAA
GCCACCAAGTTTAAAAACATTTTTTTCTTCCAAGATAGGGTTTCTCTGTATGGCCCTAGCTGTCTAGAACTTGACCTGT
AGACCAGACTGGCCTCGAACTCAGAGATCTCCCTATCCCTGTCTCTTGAGTCTTTGGATAAAAGGCATGTGACATCATC
ACTCACCTAGATTTTTTTTTAAAGTGACGTCATCTCAAGATCAGAATGGCCCGCTAAACCAGGCAGGGTGTAGAG
CCTGTAGCTCTACTTTGTAATAATCTCAAGTACTCAGATGGCTGAAGTTAAAGGAGTACAAGAGTTCAAGGCCAGCCAG
GGCTACACAGTGAGCTCCAGGTGAGTCTGAGGTACAAGGTGAGCCTGTCTCAAATTAATTAATTAATTAATTAATTTAA
TTAAAAAAGGACTGGAATATAGTGAAGCAGTGCAGTATCTCTTAGGCTCTCTTTCAGTGCTTAAATAAAGGTATAA
ACAAACAAGCAAGCCAGGCATGGTGTAGAGGCTTGTATCTACAGTTTGAAGGCTGAAGCAGGAGGACCTTTAGTTT
GAGGACGGTTTGAATATATAGTGAAACTTCTTTAAAAACAAAACAAAACAAAACAAAAAACAACCTCTAATTG
TCCACTAGTGTTCATCAATGATATCAGCTGCCTAGACTTCTCTCATCCAGTGTGTGTGTGTGTGTGTGTGTGTGTGTG
TGTGTGTGTGCACGCACGCCCGCACACATGTGTGGTACAAGGATTGGGACCCAGGGTCTGTGCATGCTATTATGCACC
TTCTTCTACACCACACCACCTCCTTTTCTAACATTCCTGGACATCTATTGTGGGTCTAAAATATCTAAATGTCAAT
GGCCTGAACGAATCAGCCACCACTTTCACCTGGCTTTCACTTTGATCCTGGAAGAAAGCTTCTGCGTCTTCTCACCAT
CAGTGAGCACCAGCAACTCCTCATGTGGCCACTGGTGGTCTTCCCTGGTCTTCCCTACTCCCCTCTGAGGCCTTACCACA
ATAGAGGGCAGGCGGGGCTTTTGGAGACCTGCATAAGTACAGCAGGGGTGTTGGGCACAATTCGAAGATGAGCCTGT
CACAGGACGTGGTATAGTAATACTGACCTCAACATCCTGATGATCTTACATCTGCCAGTCTTCTCTGTTTTTTTGAAA
GGGGGTTGGCCAACTGAGGACTTCTGGATGCCATGGAGAGTCTGGGTTATCTCCAGACCAAGATCCATCCTTGCTACT
CTCTGGCACAAGGGCCATGATAGTAACTCTGTAAACGTGGAGATGGTTGGATTCCAGGTCAAGTCCCTGTGTCCAGTGC
CCACACAGACTGTGCTTAAATCCTCTTTGGAGAGGGCCTCTTAACTACTGCTGAGGAAAGCATGATGACATGCTGGGAG
ATTATGGGCCTTCCATGGGAGGGAGATGCCAAAGAGGAAAGACAGAGCTTTAGTCTGTGTACTCCCTGAGACACTGGG
GATGGCAGGCAAGGTAGGAGACAAGGCATCTGGATTAAGCCCTATAAATAAAGAGCCGGGGTGACGATGGATTTT
CCAACCTTTTTTTTTTTTTGATTTTTCAAGACAGGGTTTCTCTGTGTAGCCCTGGCTGTCTGCACTCACTTTGTAGA
CCAGGCTGGCCTCGAACTCAGAAATCCACCTGCCTCTGCCTCCAGAGTGTGGGATTAAGGCGTGCGCCACCACGCC
AGCTTCCCAACTCCTTTTTTACTGGTTTTCTCAAGTGGACTTGGTTTGGTTTTGTGTTGTTGTTTGGGTTTTTTGTTTTGT
TT
GGAAAGTCACTCTGTAGACCAGGCTGACCTCGAACTCAGAAATCCACCTGCCTTTGCCCTCCAAGTGTGGGATTAAGG
TGTGCGCCACCACGCCAGCTTGTGTTGTCTTAAATATATGTAATGTCTATTACTGTTTTCCGTGAATAATATCTGTAT
GAGGTATCAGAAGTTCTAGGCCTGAGTTACAAACAGAGCTGGCATGTGGGTGCAGAAAATTGAACCCAGATCTTCTGG
AAGAGCAGCTAGAATTCTCAACAGCTGAGCCATCTTTCCATTTCTGGGTCCATTTGTGTGTTATTTAATGAACATTTATG
TGGCTTTTTGCTATTTGCTAGGGACCCTTTTTATTACTTTAAAGGTATTTATTTTTATGAGTACAGGTGTTTTGCCTGCAAG
TATATCTTCTGCCATGGAGACCAGAAAAAGACACTGGATCTCTTAGGGCAGGAGTTACAGATGGTTGTGAACACCATG
AAGGTGATGGAATCAATCTGGACCCTCTGGTACATAGTCAGTGTCTTAACTACTGAGCCTCCTCCCCTAGCTTGCCA
AGAACTCATTGTTTGGTGATAGTCGTTGTTATTGTTGTTTGGTTGTAGATTTTTGTTTTGTTTTTTTTGTTTGTGTTTGT
TGTTTGTGTTTTTTTTAGACAGTTTTCTGTATAGCTTTGGCTGTCCAGGAACTCACTCTGTAGATCAGGCTGAGCTCAA
CTCAGAAATCTGCCTGCCTCTGCCTCCAAGTGTGGGATTAAGGTACTTAACTCCACTACCACCTATATATCTGCAT
ACCAGATGAATCTTTAAAAATATTCTACATATCAGTCAGGTGTTGGTGATACTGGCCTTCAATTGTAGCACTAGAGAAG

TAGAGTTGGGCAGATCTCTGAGTCTGAGGCCAACCTGGTCAACAAAGTGAATTCCAGGACAGCCAGGGCTACACAGAA
AACTTTGAAACCGTGTCTCAAAGAGGGGGTAGGGGGAGTTAAGGCAGGAGGTTGTAATAACAAGTTTCTTAGACT
ACAGAGTATGCTCAAACCCAGCGAAGAGAGCTAAGAACCTGCTTATGATGACAATGACAACAATGATGAAGAGGAGC
CAGGTTTGGTAGCATAAGCCTTAAACTCCAGCTCTCTAGAAGAACAGGCAGGCAAACTCTGAGACCTCAATGCTAGC
CTGGTCTACTTAGAAAGATCTAGGGCAATCAGGACTACAAAGTGAAATCCTACAAGCTCTTAAAAAAGAGGGG
GGACCATATTAAGTAAACAGGTCGTACCAAGCTTGT
CAATACTCTGAAGAGAAAAACAAAATCTGTTTCTATTCTGTACACATGGCTTTGAAGTGTTTGTCTAACCCCTATAT
GCTTTGTTTTGAAACAAGGCTTCCAATGAAGACTTGATTGGCCTCAAATCAGAATCTTTCAGATTCACTTTTCTTAAA
TACTAAGATTTAGATGTTAGCTGTTATATTACATTGTATACTTAAAAACAGTAGCTGAGCAGTCTTTATTAATTTGAAA
CTTCCAAGGGTTGAAAACAGGCAATGCGGGCTGGTGAGATGGTTCAAGTAAAGCACTGACTGCTTCCAGAAG
TCTGAGTTCAATCCCAGCAACCACATAGTGGCTCACAATCATCTGTAATAATAGGATCAGATGCCCTCTTCTGGTGT
GTCTGAAGACAGCTACAGTGTATTCATATACATAAAACAAGTAAATAAATCAGAAAAGAAAGAAAGAAAGAAAG
AAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAGAAAG
AGGAAGGAAGGAAGAAAACCTGGCAATGCTTTTTGGTTTGGTTTGGTTTCTTTATCGGGACAGGGTTTCTTTGTGTGCC
CAGCTGTCCTGGAACCTCTGTAGACCAAGCTGGCCCTGAACTCAGTGATCCACCTGCCCTGCTTCCAAGGCATGCACT
ATCATTACTCAGAAAAAATGGCAATTGAAATATCCATAGCAACCATGCACTCTTTGAAAGCAAAGGTGCTTAGCGCT
ATTTTTTTTTTTAATGTGCATTGGTTTTGCTTGCACGGATGTCTGTATGAGAGTGTGAGATTCCCTAGAATTGGATTTTC
AGACAGTTGTGAGATACTGGGAAATTGAACCAAGGTCATTTGGGAGAGCTTAACTTTGAGGCATCTCTCCAGCTCCAA
CTTTTAAAAAATTTCTGTGTGTGCACGTGCGCGTGTGTTTAGCCCTCTCTAGCCCAGCTGTTTCTCTATGATTTGAGGC
CCGGCCCCGCCCCCTCTCTAGGTCTGCTCTAGCCCGCATAGGGAGCGGTGAGATGTCATGGCTTCTTCTAGGCTGCGGG
AGGAAGCGGACGGCACCTCTTTGTAGTGAATCCGCCATGGCCGCTCTAGAGGCCATAGCGGCCATTTAAATGGCGCG
CCGGATCCGAATTCCTCGAGGCTAGAAGTACGATAAGCTTCGAGCGGGATCAATTCGCCCCCCCCCTAACGTTACTG
GCCGAAGCCGCTTGAATAAGGCCGGTGTGCGTTTTGTCTATATGTTATTTCCACCATATTGCCGTCTTTTGGCAATGTG
AGGGCCCCGAAACCTGGCCCTGTCTTCTGACGAGCATTCTAGGGGTCTTTCCCCTCTCGCCAAAGGAATGCAAGGTC
TGTTGAATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTGAAGACAAACAACGCTCTGTAGCGACCCCTTGCAGGCA
GCGGAACCCCCACCTGGCGACAGGTGCCTCTGCGGCCAAAAGCCACGTGTATAAGATACACCTGCAAAGGCCGGCACA
ACCCAGTGCCACGTTGTGAGTTGGATAGTTGTGGAAAGAGTCAAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTG
AAGGATGCCCAGAAGGTACCCCATTTGATGGGATCTGATCTGGGGCCTCGGTGCACATGCTTTACATGTGTTTAGTCGA
GGTAAAAAACGTCTAGGCCCCCCGAACCACGGGGACGTGGTTTTCTTTGAAAAACACGATAATACCATGGGGGAT
CCCGTCGTTTTACAACGTCGTGACTGGGAAAACCTGGCGTTACCCAATTAATCGCCTTGCAGCACATCCCCCTTCGC
CAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCAGATGGCGCTT
TGCTTCCCGTCCCGCACCAGAAGCGGTGCCGAAAGCTGGCTGGAGTGCATCTTCTGAGGCCGATACTGTCGTGCT
CCCTCAAACCTGGCAGATGCACGGTTACGATGCGCCCATCTACACCAACGTGACCTATCCCATTACGGTCAATCCGCGT
TTGTTCCACGGAGAATCCGACGGGTTGTTACTCGCTCACATTTAATGTTGATGAAAGCTGGCTACAGGAAGGCCAGAC
GCGAATTTTGTGATGGCGTTAACTCGCGTTTTATCTGTGGTGCAACGGCGCTGGTTCGGTTACGGCCAGGACAGT
CGTTGCGCTGTGAATTTGACCTGAGCGCATTTTTACCGCGCGGAGAAAACCGCCTCGCGGTGATGGTCTGCGCTGGA
GTGACGGCAGTTATCTGGAAGATCAGGATATGTGGCGATGAGCGGCATTTCCGTGACGTCTCGTTGCTGCATAAAC
GACTACAAAAATCAGCGATTTCCATGTTGCCACTCGCTTTAATGATGATTTACAGCCGCGCTGTACTGGAGGCTGAAGTT
CAGATGTGCGGCGAGTTGCGTGACTACCTACGGGTAACAGTTTCTTTATGGCAGGGTGAAACGCAGGTCGCCAGCGGC
ACCGCGCCTTTCCGGCGGTGAAATTATCGATGAGCGTGGTGGTTATGCCGATCGCGTCACACTACGTCTGAACGTCGAAA
ACCCGAAACTGTGGAGCGCCGAAATCCCGAATCTCTATCGTGCGGTGGTTGAACTGCACACCGCCGACGGCAGCTGA
TTGAAGCAGAAGCCTGCGATGTCGTTTTCCGCGAGGTGCGGATTGAAAATGGTCTGCTGCTGTAACGGCAAGCCGTT
GCTGATTCGAGGCGTTAACCGTCACGAGCATCATCCTCTGCATGGTCAAGTCAATGGATGAGCAGACGATGGTGCAGGA
TATCCTGCTGATGAAGCAGAACAATTTAACGCCGTGCGCTGTTCCGATTATCCGAACCATCCGCTGTGGTACACGCTG
TGCGACCGCTACGGCCTGTATGTGGTGGATGAAGCCAATATTGAAACCCACGGCATGGTGCCAATGAATCGTCTGACC
GATGATCCGCGCTGGCTACCGCGATGAGCGAACGCGTAACGCGAATGGTGCAGCGCGATCGTAATCACCCGAGTGTG
ATCATCTGGTCTGCTGGGGAATGAATCAGGCCACGGCGTAATCACGACGCGCTGTATCGCTGGATCAAATCTGTGATC
CTTCCC GCCCGGTGAGTATGAAGGCCGGCGGAGCCGACACCACGGCCACCGATATTATTGCCCGATGTACGCGCGCG
TGGATGAAGACCAGCCCTTCCCGCTGTGCCGAAATGGTCCATCAAAAAATGGCTTTCCGTACCTGGAGAGACCGGCC
CGCTGATCCTTTGCGAATACGCCACCGCATGGGTAACAGTCTTGGCGGTTTCCGCTAAATACTGGCAGGCGTTTCGTCA
GTATCCCCGTTTACAGGGCGGCTTCTGCTGGGACTGGGTGGATCAGTCTGCTGATTAATAATGATGAAAACGGCAACCCG
TGGTCCGGCTTACGGCGGTGATTTTGGCGATACGCCGAACGATCGCCAGTTCTGTATGAACGGTCTGGTCTTTGCCGACC
GCACGCCGATCCAGCGCTGACGGAAGCAAAACACCAGCAGCAGTTTTTCCAGTTCCGTTTATCCGGGCAAACCATCG
AAGTGACCAGCGAATACCTGTTCCGTCATAGCGATAACGAGCTCCTGCACTGGATGGTGGCGCTGGATGGTAAGCCGC
TGGCAAGCGGTGAAGTGCCTCTGGATGTCGCTCCACAAGGTAAACAGTTGATTGAACTGCCTGAACTACCGCAGCCGG
AGAGCGCCGGGCAACTCTGGCTCACAGTACGCGTAGTGCAACCGAACGCGACCGCATGGTCAAGCCGGGCACATCA
GCGCCTGGCAGCAGTGGCGTCTGGCGGAAAACCTCAGTGTGACGCTCCCCGCCGCTCCACGCCATCCCGCATCTGAC
CACCAGCGAAATGGATTTTTGCATCGAGCTGGGTAATAAGCGTTGGCAATTTAACCGCCAGTCAGGCTTTCTTTCACAG
ATGTGGATTGGCGATAAAAAACAACCTGCTGACGCCGCTGCGCGATCAGTTCACCCGTGCACCGCTGGATAACGCATT

GGCGTAAAGTGAAGCGACCCGCATTGACCCTAACGCCTGGGTGCAACGCTGGAAGGCGGCGGGCCATTACCAGGCCGAA
GCAGCGTTGTTGCAGTGCACGGCAGATACACTTGCTGATGCGGTGCTGATTACGACCGCTCACGCGTGGCAGCATCAGG
GGAAAACCTTATTTATCAGCCGGAAAACCTACCGGATTGATGGTAGTGGTCAAATGGCGATTACCGTTGATGTTGAAGT
GGCGAGCGATACACCGCATCCGGCGCGGATTGGCCTGAACTGCCAGCTGGCGCAGGTAGCAGAGCGGGTAAACTGGCT
CGGATTAGGGCCGCAAGAAAATATCCCAGCCGCTTACTGCCGCTGTTTTGACCGCTGGGATCTGCCATTGTCAGAC
ATGTATACCCCGTACGTCTTCCCGAGCGAAAACGGTCTGCGCTGCGGGACGCGGAATTGAATTATGGCCACACCAGT
GGCGCGGCGACTTCCAGTTCAACATCAGCCGCTACAGTCAACAGCAACTGATGGAACACAGCCATCGCCATCTGCTGC
ACGCGGAAGAAGGCACATGGCTGAATATCGACGGTTTCCATATGGGGATTGGTGGCGACGACTCCTGGAGCCCGTCAG
TATCGGCGGAATCCAGCTGAGCGCCGGTTCGTACCATTACCAGTTGGTCTGGTGTGAGGGGATCCCCCGGGCTGCAGC
CAATATGGGATCGGCCATTGAACAAGATGGATTGCACGCAGGTTCTCCGGCCGCTGGGTGGAGAGGCTATTCCGGCTAT
GACTGGGCACAACAGACAATCGGCTGCTGTGATGCCCGGTGTTCCGGCTGTGAGCGCAGGGGCGCCGGTTCTTTTTG
TCAAGACCGACCTGTCCGGTGCCTGAATGAACTGCAGGACGAGGCGAGCGCGGCTATCGTGGCTGGCCACGACGGGCG
TTCTTGCAGCTGTGCTCGACGTTGCTACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAAGTGCCGGGGCAGG
ATCTCCTGTCTATCTCACCTTGTCTCTGCCGAGAAAAGTATCCATCATGGCTGATGCAATGCGGCGGCTGCATACGCTTGT
CCGGCTACCTGCCCATTCGACCACCAAGCGAAAACATCGCATCGAGCGAGCAGTACTCGGATGGAAGCCGGTCTTGTCT
GATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCCGAACTGTTCCGAGGCTCAAGGCGCGCATGCC
GACGGCGAGGATCTCGTCGTGACCCATGGCGATGCCTGCTTGCCGAATATCATGGTGGAAAATGGCCGTTTTCTGGAT
TCATCGACTGTGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTGAAGAGCT
TGGCGGCGAATGGGCTGACCGCTTCTCGTGTCTTACGGTATCGCCGCTCCCGATTTCGACGCGCATCGCCTTCTATCGCC
TTCTTGACGAGTTCTTCTGAGGGGATCAATTCTCTAGAGCTCGCTGATCAGCCTCGACTGTGCCTTCTAGTTGCCAGCCA
TCTGTTGTTTGGCCCTCCCCGTACCTTCTTGACCTGGAAGGTGCCACTCCACTGTCTTTCTTAATAAAAATGAGGA
AATTGCATCGCATTGTCTGAGTAGGTGTCATTCTATTCTGGGGGTGGGGTGGGGCAGGACAGCAAGGGGGAGGATTG
GGAAGACAATAGCAGGCATGCTGGGGATGCGGTGGGCTCTATGGCTTCTGAGGCGGAAAGAACCAGCTGGGGCTCGAT
CCTCTAGAGTCGAGTACCGGGTAGGGGAGGCGCTTTTCCCAAGGCAGTCTGGAGCATGCGCTTTAGCAGCCCCGCTGG
GCACTTGGCGCTACACAAGTGGCCTCTGGCCTCGCACACATCCACATCCACCGGTAGGCGCCAACCGGCTCCGTTCTT
TGGTGGCCCCCTTCGCGCCACCTTCTACTCCTCCCTAGTCAGGAAGTTCCCCCCGCCCCGAGCTCGCGTCTGTCAGG
ACGTGACAAATGGAAGTAGCACGTCTCACTAGTCTCGTGCAGATGGACAGCACCGCTGAGCAATGGAAGCGGGTAGGC
CTTTGGGGCAGCGGCAATAGCAGCTTTGCTCCTTCGTTTTCTGGGCTCAGAGGCTGGGAAGGGGTGGGTCCGGGGGCG
GGCTCAGGGGCGGGCTCAGGGGCGGGGCGGGCGCCGAAGGTCTCCGGAGGCCCCGGCATTCTGCACGCTTCAAAAGC
GCACGTCTGCCGCGCTGTTCTCTCTTCTCATCTCCGGGCTTTTCGACCTGCACTGCGCGCCAGCTTACCATGACCGAG
TACAAGCCCACGGTGCCTCGCCACCCGCGACGACGTCCCCAGGGCCGTACGCACCTCGCCGCCGCTTCGCCGACT
ACCCCGCCACGCGCCACACCGTGCATCCAGACCGCCACATCGAGCGGGTACCCGAGCTGCAAGAACTTCTCTCACGC
GCGTCGGGCTCGACATCGGCAAGGTGTGGGTGCGGGACGACGGCGCAGCAGTGGCGGTCTGGACCACGCCGGAGAGC
GTCGAAGCGGGGCGGTGTTTCGCCGAGATCGGCCCGCGCATGCGCCGAGTTGAGCGGTTCCCGGCTGGCCGCGCAGCAA
CAGATGGAAGGCCTCTGGCGCCGACCCGCCCCAAGGAGCCCGCTGGTCTCTGGCCACCGTCCGTTCTCGCCGAC
CACCAGGGCAAGGGTCTGGGACGCGCCGTGCTCCCCGGAGTGGAGGCGGCGGAGCGCGCCGGGTGCCCGCCCTTC
CTGGAGACCTCCGCGCCCCGCAACCTCCCTTCTACGAGCGGCTCGGTTTACCCTGACCCGCGACGTCGAGGTGCCCG
AAGGACCGCGCACCTGGTGCATGACCCGCAAGCCCGGTGCCTGACGCCCCGCCACGACCCGACGCGCCCCGACCGAAA
GGAGCGCACGACCCATGCATCGATGATCTAGAGCTCGCTGATCAGCCTCGACTGTGCCTTCTAGTTGCCAGCCATCTG
TTGTTTGGCCCTCCCCGTGCCTTCTTGACCCTGGAAGGTGCCACTCCACTGTCTTTCTTAATAAAAATGAGGAAATT
GCATCGCATTGCTGAGTAGGTGTCATTCTATTCTGGGGGTGGGGTGGGGCAGGACAGCAAGGGGGAGGATTGGGAA
GACAATAGCAGGCATGCTGGGGATGCGGTGGGCTCTATGGCTTCTGAGGCGGAAAGAACCAGCTGATTACCTGTTAT
CCCTACTCGACCTCGAGGGCGCGCCATTTAATGGCCAGCGAGGCCGGTACCCAATTCGCCCTATAGCCTGTAAGGCTCC
TTTCTTGGTGTCTCCGACATGGAGTCGGGAGATACACCAGGACTCTCTCCAAGTCACTGGGAACTGCGGTTGGGGGAA
GCCTTTAAAGAGCACATCGCCTGACAGGGTCCGATGTGTGGAACCAACGGAACATAATAATGCAGTTCATCCATTAAG
TGGATTTGCGAGCTGGACATCTAATGCTTAGAGAGCTGTGAGAGAGCGCAATGTGCGCTGAAGACCTAGGCAACTGCA
TGCCATCCTACCCCTGAGAGTTCTTAAGTCCAATAAGTTTTCTGACTATTCAAAATAGGTTCATATGATCTAAGTTTGTCT
CTGCAACTGTTGGGTAAAAGACTTTAGGAAAAGTCTGGTTTTGTATGTCACAATGTGTGTTGTGTGAATGAAAATGA
AAGTCCGAAGTACCGAACACTTTGGAAAGACCATCTCTATTTATACACTCTATCCAGCTTGTAGGCAAAACGATTTCA
CCCCTGAGCCATGTTACCTAGACAAATTCTTCTTTGAGACAGCATCCTTCTCCACTCCCAAGTGTGTGGATAAAGG
AGTGAAATCCCACGCCCAGCTCCAAGCCACAGTCTTCAAATTAGAGTAGTCCTTGAATATTAGGTTTGCAGTGAATACT
AACAGGACTTCTGTCTTTAAGCAAAGTTGGAGAAGGGTTTCTTACTGTTCCAATGCCCTCTTTACTATTTACTTTG
GTTCAAGCCTCTTAAGAGAATCCGACTTACTATTACTGGAAGTGCATGTCAATCCAAACATAGCACGACACACACCTAT
AACCCAGGACTCAGGGAGGTGAGGTAAGAAGATAGCAATTTTAGCCTGGTGGTGGTGGCACACTCCTTTACTCTAG
ACTTTAATCTCAGCACTCAGAGGTGGTGCATAGGCAAAATGGATGTCTGTGAGTTCAAGGCCAGCCTGGTCTACAGAGC
AGAGTTCCAGGACAGTCAAGGACACACAGAGAAAACCTATCTCAAAGAATAGCAGGAAAAAAGATAGCAAG
TTCAAGACAAGGCTGGGCTCTATAACAAGGAGACAACCTGAAAAGGAAAATAAATACTACATGATACAAAACCTC
TGAGTTAGGTGGGTGGTGCACACGCTTAATCCAGCACTTGGGAGGCAGAGGCAGGCGGATTTCTGAGTTCGAGGCCA
GCCTGGTCTACAGAGTGAGTTCCAGGACAGCCAGCTCTACACAGAGAAAACCTGTCTCGGGAAAAAACAACAAA

AACCCTCTTTGAGCTGAGTATGAATATTGTACATCTTTAGCCCCAGCACTTGGGAGACAGAAGCAAGCAGGCAGGTATC
TGTAAGAGGCCAGCTTGGTCTACACAGTACATTCCAGACCTGCCAAGAGAGTGAAACCCCCTCTGAAGAACAAACCAA
GGTCTCGTTCTGTCCATTAGAGGTCTTAACTGACCAGGGGGACCTCAGGAGGCAGAGGCAGGCATATATCTGAGCTCA
AGGCCAGCTGGTGTACTAAGGGAGGAGTTCCATGACAGCTAAGATTACACAGTGAAACCCTGCTTCAAAAAACAAACA
GAAAGAACTATCTCAAAACGGGTAAGAAAAAAAAAAAAAGCTGAAAAATGGAGCAGTACATGGTAGCTTCTGCCTCAG
TCTCAGCACTTGGAGTCTGAGTCAGAAATTTAACATGTTCAAAGCTATAGAGTATGTCTCAGGCTGTCCTAGATTAGAG
TGGAGACCCTACCACCGCAGCTGTGAATGACTGTGTGGTGAAGTGATGGGCTGTTGAATGGCTATAGGTAAAACTTCT
TAAGCTAAGCCTGAAGACATAAATCCT:AATCCAGCCCCTGGAAGCCGTATGGTGGATGGAGAGATC