



Lexicon Genetics Incorporated – Genentech Project Materials

Genentech ID:	UNQ3079	Date of Submission:	12/20/04
Lexicon Contract Name:	DNA062	Mutation Type:	☒ Standard Knock out
LexVision Name:	SEC463N1		☐ Conditional
Reference accessions:	ENSMUST00000027582, AB041649	Is this gene X-linked?	No.

Required Materials: ☐ pKOS clone DNA(s) 23, 56
☐ Target Vector DNA 56-TV
☐ Targeted ES Cell DNA 1A1
☐ Genomic Map

Southern Blot Analysis:
External/Internal Probe Strategies

	<u>5' External</u>	<u>3' External</u>
Name of Probe:	20+21	24+25
Restriction Enzyme for Genomic Digest:	AvrII	HindIII
Predicted Wild-type Band (kb):	14.1	6.4
Predicted Mutant Band (kb):	10.1	10.6
Probe Size:	286 bp	219 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:	7	5' Primer Name:	Neo3A
3' Primer Name:	8	3' Primer Name:	17
Predicted Wild-type Band (bp):	425 bp	Predicted Wild-type Band (bp):	none
Predicted mutant band (bp)	none	Predicted mutant band (bp)	552 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**

20 5' – GGAGTGGCATCCATTTGAGA
 21 5' – CTAGTCCAGGTCCCATACAGT
 24 5' – GCTATAGACCAGTCAGCTTG
 25 5' – GCTGGTTGAAGTATAGGCTC

PCR Genotyping

7 5' – GAGCAGGGATACTTAGCATC
 8 5' – CTCTGCATCCTGATGTTTCAG
 17 5' – GACATTGCTCACAGGCTACTG
 Neo3A 5' – GCAGCGCATCGCCTTCTATC

Genomic Sequence Deleted:

GCCCGCTCCCGGCCCTGCCGATCCGGGAGGATGTGGGTTCTCGGCATCGCAGCAACTTTTTGCGGATTGTTCTGGCTTC
CAGGTAAGAAGATGAAGAGGCCAGCTGCCTGGCCAGACACGCTCCTGCTATCTCGCCAAGCGTCCCTGCTCTCAGCCC
CAGTGCGCCCAGCTGTGGTTCGCGCTGCGCTGGGGCTACCCAGCGGGAGTTTGGTGCTGGAACTGAGACCAAAGGCG
CTAGACTGGGACGCTCTCCAAGTCCCGCGCTGCAGGAGAGCCGAGAGCGGCAGATTGGCGCGACTCTTGGCTGCAGCT
GCGTGGGGTACACAGTCGGGGATACAGAGCTGGGATTGGGGAGGGTCCTTGAGTTGGGCGAGACAGGAAAAGGAGCG
ACAAGCCTCCAACCTAGTCAAGTTACCCAGTGTGTTGTGGCCACCCAAGGGAGCGGCGACGCTGACAGGTGAGCGACTC
GCCGGACAATCCTCTGCTGGGGGCGGGGGAGCAGCCCTYCCGGACTGAGTGAGCTAGCTGTGCTCTTCTGYGATCGG
TAGGGTGTAGGAAGGGGCATGCGGCCCAAAGAGAAGCTCCCAGATCAGAGGAGAGCAACCAGGAAAATATGGTAAG
TAACTGCTCCTGATCGCGGACTCTAAGCTATCAGAAATTTTTTCCAACAGCCATGTTTTTCAAAAAAAGGGGTAACA
AGACAGGTCTAAAAGGGCTGCATTGTGGCGGTCCCTAAGCAGACGCGCACATCCAATGCAGGCTCTCTCTCATTACACC
CTCTCCAACCCTCAGCAGCAGCTGCCCTGTGCTGATCACAGGGACCCTGAGCTGGAGGACTGAGCAGGGATACTTA
GCATCCAGCACCCTCCCCCAGGTTGCAGGGTGGTCTCCAGGAAGCATCAGAGCCTCAGCCCATGAACGCTGACTTACA
AGATTAAATAAATAAAACCGAAAACGCGTCAGCCAATGCAATTATGAACGGTGCCAAAATAGTAATTAACCAATTTGT
AGCCAATTAGTAATTAGGCTCAGACAGGAGCTGAAGCTTGTACCCCACTACTTTGATCTGGGATTTGAACTCTCACC GG
TCTCTTTGCAACTTCTTTCGGAAGGCCAGAGGGGTGTTACAGGAGCTGTTTGTGTCTAGAGAAGAAATGTAGGGTCTC
TGGCAGGGCTTTATCCTCCTAGACCCTGGGAACTGATGCCGCCGCCCTGCTGGCTTCAGGCACCTCCAGCCTTCCTG
AACATCAGGATGCAGAGCCAGAAGCCCTTGTGTCTGGGGCAGTACACGGTGATACCGGCCAGCCAGGATGTGCTCT
GTGCAAGCCAGATCTTAACCAAGTGTGTTCTGAACCCACCCGCATCTGTCCCACAGGGCTGGCGCTGCAATTCAGTGCTA
CCAGTGTGAAGAATTCCAGCTGAACAACGATTGCTCATCCCCTGAGTTCATCGTAAATTGCACCGTGAACGTTCAAGAC
ATGTGTCAGAAAGAAGTGATGGAGCAAAGTGCTGGTAAGATACTCTTTCCCCCTCCGACCCCCA

Genomic Locus: (The deleted sequence represents nt 4927-6478 in the sequence below. KOS56 used to generate the FTV represents nt 134-9034 in the contig below.)

CAACATTTTTGAAATGACCATGACAAAAAATGACCATTTTTTCCCTTTTTTACTCTGAAGGGGATAGA
TTTAACAGAAGAAATAAAAGCCACCACCAGCAGCAGCACAAAGCAAGCTTAACACCAGATCCCTCTCTCTG
CTGTGCAGGGAAGCTTCCGCCAGTAATTATTGAGCTGAGCCTCATCCTGAGCACTGGTCAGCAGGGACAA
TGTTTCGAGATACACAAGGAACGAGTTCTGACCTTGTATTCTGGAATCTTGTTAGCAGTATTGTTTCTGTTTT
GTATATTATATATCCAGATAGCTCTAGAGAAGTTTTGACTTCTGGCTACAGTGAATAAAGTCCGAGTCAATA
GACACATTAAATACCCTAAGTTGTGTATGTGTGCTGGTAGAGGCACGACGACAACCTTAGAATGTCATTCTGG
CACTGTCCGGTCCACGTCATTTATTTGTTTTGCTTTTGATTTGGAATATGCTCTTTCTCTAAAGACAGGTTCTC
TCTGGCCTGGGACTACCAAGTAGGCTGCACTGGCTGGCTACAGAGCCCAAAGAGCCTCTTTTTCTCTGCTT
CCACAGCACTTGCATTACTCTTGTGTACCACCACACTCATTTCTTTTAGATGGGTCTGAGGATCAAACCCA
GGTCTTATGCTTGCAACAAAGTAATATACTGACTGAACCATCTCCCCAGCTCTAGACACAAGTGTGAAAT
GACAGTGTGTGTTGTTTAGAACTAAGACTATTGTATACCAACTACAAGGAAATAAACTTAATAAAGTAAC
ACAAGGACCCAAAAGCTAAATCAAATGAAACATTCAGTTTTTTGAAAGCCTAACAGAGTCCCTTAAGTAC
CTTTGACCTAGTGGAGGATTAACCTAACCAACCGGTGGTTCCTTGTTATCATATTTAAGGCCCTGCTGCTGCTT
TTCCCTGAGATGGTGGGATTCATGCCTCTAGGGAGAATAGCTGATGGGGTCTGCTTTAGTGAAGTCTGATGGCC
CTCACTCTTCTCATTACCTCGGTGTCCCTGCCTCCCATTTGTCCTCTCCCCAACCTGAGCAGCTGCTTGATCCA
CTGAAGACACTCAAGCTCGCAGGGCACCTACAATGATTGCTTAGTATAACTACAGTATTTTATGAAATCCTG
AAGCGAAGTGTGAAGAAAATCACCTCCTTGAATAAAATTGGTATAGCTAGACCTTCTGGAAGGGAAGGTTT
CTAAAGTGCAAACCCGCTACTTGGTTTTAATGCCTCTAGCCCTTCTGCAATCTGTAGTCAATAGCTCTGAGCT
CTCCTTCAAATATCTCAGGTACCTAAAAGGGACAAAATTGAAACATGACAATATTCTTGACAAGCTTAATAT
GTACTTAAATTTTATGGCAATTTAACAGATTTTATGCCTTTTTTCTCCCAAAAGACTATAACTTCTGGCTGA
AACTCAAGACATATCCCTTTTAGAAAAAGTACAAGGAGTATTTATTGAGAAAACAGAGGACTTTGAACTTT
TGATAAAGAAAAATAAGACACATTACCTGGGTAAATTTCAAATGGATCCATTTAAATGAATTAAGTGGCA
CTTAAGTGGTTTGCAAATTGGGGTCTATTTATCTCACTAAAATGATTAAAGTCTTGATTTATCCCTAAAATTA
GCTTTATTATTGCATTTAATTACACTAAAAGATTGTTAAGGACTTGTAGGTTCTCTCTGTCCCTTTAAACTGT
ACTTTATTCAGACAATAATTGAATATCAGATAGGATAAATTGATTTTTTTCCAAAGAATTATGTTTCTAATAT
TTTCTCTTTTTTATTGCAGGAACCGAAACAAGTTGAAGAAACAAAAGAAGATCCTGAGAATAGATTATCTG
AAATTTCCCTGGAGTCATTCAATAAATTTAGCAGCAATACTGTGATTTTATTAGGAAAAGAGAAGTCTCCAA
GTGAGGTTGAAGGACAAAAGGAAGAGAAAGGCCAAAAGACAGAAGTGTCTTCGAGTAGCTCCGAACGGCC
TGGGGTGGACCGCGTGGAGTCTCTGAGTGACTCTCTGTATGACAGTTTCTCCTCTTGTGCAAGTCAAGCATC
CAACGAGGCCTAGAGGAGCATCCTTCAGTGAGACTCCTGCATGCATGGTGCCTAGGCAAACAGACTCCAG

AGAAGCTGATAGCCAGTATAACCAGAGTTTACTTCTCTCGTGGACTGATAGAGATCGCCTCGACTTACTGTGT
TTTGAGAGGATTAAAAAGCAAAATATGATGGAGAATTCTCAATGTTTGCACTTTTTTGAGTATTTGTATAAA
AGCTGTACATTTTTT:GGGGGGG:AGAGAAATTATATTTGTAGGGGGAGAAAGATAGCAATAAAAAGAGTTG
GCGCCATGCTCTTGAAACGATGCATTAAGTTCTAGAAGTTGATAATATATTTTTTAAAAACCCAGCTGAAG
ATTTTGTGAACATAATCATCTTGGTCCTCAACTCATTTGTGCATATACTGTCAATGGAAGCGTGGGGCAGGC
AGGAAAGCCAGAGGGGTGGAGGTCACCTGTTCTGAAGGTCTCTCTCGATTGGGTGGTCCACTTGCCACATT
GTCTCGAGGAAGATGTGATGATATGGGTGTTCTGTTGAAGAATTAGAGTGTGAGCACTGATTAGATGGCAC
CAGATGATGCGGAAGGGAGCAGATCTTAGCAGGCTTCACTCCCAACCTCTTCTATCCTCTCCATTGTATTTT
TCACAATTCTGAGTGTTTGTCTGTTTTCTTTTTAAATTTCCCTGCTTTTTTATATTATTATTAACCTGGGTACT
CTTTGCCATATCTTAAAAATAAATGAATGGTTGGTGCTATGAAACTTTCTTACTTTTTAATATCCGTTTTTTCT
ATTAAAGACTGTTTATATGGGAGGATAAATTCTATTTTAAAGGTTATGTGTATTTTTTCTAGACGTGAACAT
TTATAATTCCTTCTGTACAGAAGCCTACAGACCAGGCAGACTAGAGCTATGTTTAGGATTTGTGTGGTTACC
TTAGAACACTTGTATCTTTATAGAGTATTGTATGACCAGTGTTATTGTATTTGTGCAATTTGTTGTATTTGGA
TTTCATTACCTTAAATTCAAGCTGCGTGTAAGTATCCTCCTTGTCTTTAGAAAAAATTCCTTTTGTTCATTTT
ATTTTGAATAAAGGTCTTATCACAATTACACCCTATAAGAGCAGAAAAGAACTTTGTTTCAGGGAGAGGTT
GGTCCCGTGATTATTATAATTACGTCTCACGCTTGCTCTGTGGAGAGGGTTCCCTGAAAGAATAAATAAGCC
AACCTCTTGCTACTGTAATAGTAATTGGAACAATTGTTAAGATCCACACTTCAGACAAGCGAGTAATGGTC
AAAGCATCCTCGTCTCCCCAAGGAGTTAACCAGCTAGAAATGAGGGGGAGGGGTGGGGGAGAATGAGCCT
GAGGCAGCTATGGAMSGATCTCTGCAAAGGAATTACAAGAAAGTCATTTATGCCTCTTTCAAACCTGCTCTG
CTGGCAGGGTAGGGACATAAATGATCACATCCAGCTGAGAGACCACTTCCCCTCGGGAGACCTCACAGGA
GAGGGGTGATGCTTAGCCACGGGTTTCCACCGAATCTCCCAAATCCCAAATCAGGGGTGGGGGTGGGTGGA
AATGCGCGGGGGTGTGGGCGGGGGCACCAAGAGCTGCGACTGCCTGCTCTGTGCACAGCACAGTCTTCCA
CAAAGCTCCACCAGGAAGGCAAAATAACACCGTGTTGTCCCGGAATACGCAAGGTGGGTCACTTAGAATT
GTYAGAAAGGGAGTAGTGGAGGAGGGAGGCAGCCTATGGCCRATTGGCCATGCTTTAGCGCTGTAAGGA
GTGTATACCCATAGCTGGTGGCTTGGGGGAGCAGTCAGACCCATTTGCTTTTTCAGTGAGAGCACAGATCCG
GGTGTCCACTCCCCCAAGTAGCTTTATTTCTGGGCTAGGAGACCGAGGCTGAGTCAATGCATCCCCCTGCGG
TGCATGCAAGCAGGTGAGGAGATGGTGGTTGGGCTAAGCGAGCTAGCTGCGGTAGGGTCACCACCGTACTC
GCAGGCATTCTGCCGGAAGACCCAGGTGGCCAGTGAGGTGGGTTTCTCTCAGGAAGAGGCGCGGCTGCGTC
GGACACCCAGGGAACCTCGCTGCGCCGCAACTTTGCCAGGTGCTCAGAAACAGCCCTTCGCTTTATCCAGG
GCAGTCACCCAGAGGGCCAGGGGGCAGCGAGTGATAGAAGACGCCAGGCTGGGTGGGCGAGACCCAATTG
CAAGGGTACTGTTAGCACCGAAAGGGAACATAAAACCTGGAAGGGAAGGGTATCGCAGCCTAGCACTCGG
GTCTCCGAGTTTCGCATAGGACAGGTCCTGATGGCACCTGCTGCGCCCTAGTCACCTCCTTATTCCTAACCTCT
GTCAACACTACTCCCGAGCCCAGCAGGCGCTCCTTTCCAAGGAACTAGAGGAGGTAGGCTAAAAGGGTGGC
AGAAAGGGGTGGGGACAGTAGAGAGACAGTCCCAGCCTTCCCCGCCCTCCACCCCCACCACAACCTCAGCAG
CCGTACAGTGGTACCCGGAGTGGGAGGGGTGGGGGCAGAAGAGGCGAGACTTTTTTGGGTGCTCCGGATCG
CCAGTAGTTCTTCAAGCCTCAGCAKCCAACCTCCTCCGAGGCGCTGCGCTCCGCCCCAGGGAGCGCGAATC
CAAGGAGCCTGGGACCAGCCTCTGGGAGCCCCCGCGCGGGCGATGCGGGCGCCGCGGGCGACACCTGCG
GCTCCTCTCGGTGGCAGCCGTCGCTTGGGCGGCAGCAGCGCGAGCCTCGGCAGCCTCGGCAGCTACTGTCTG
CCGCGGCCAGAACAGCCTCCGCTGCGGTCTGTTCTCTGATGCTCTTGGCCGCTCCCGGCCCTGCCGATCCG
GGAGGATGTGGGTTCTCGGCATCGCAGCAACTTTTTGCGGATTGTTCTGGCTTCCAGGTAAGAAGATGAAG
AGGCCAGCTGCCTGGCCAGACACGCTCCTGCTATCTCGCCAAGCGTCCCTGCTCTCAGCCCCAGTGCGCCCA
GCTGTGGTTTCGCGCTGCGCTGGGGCTACCCAGCGGGAGTTTGGTGCTGGAACTGAGACCAAAGGCGCTAG
ACTGGGACGCTCTCCAAGTCCCGCGCTGCAGGAGAGCCGAGAGCGGCAGATTGGCGCGACTCTTGGCTGCA
GCTGCGTGGGGTACACAGTCGGGGGATACAGAGCTGGGATTGGGGAGGGTCCCTGAGTTGGGCGAGACAGG
AAAAGGAGCGACAAGCCTCCAACCTAGTCAAGTTACCCAGTGTTTGTGGCCACCCAAGGGAGCGGCGACGC
TGACAGGTGAGCGACTCGCCGGACAATCCTCTGCTGGGGGCGGGGGAGCAGCCCTCCCGGACTGAGTGAGC
TAGCTGTGCTCTTCTGTGATCGGTAGGGTGTTAGGAAGGGGCATGCGGCCCAAAGAGAAGCTCCAGATC
AGAGGAGAGCAACCAGGAAAATATGGTAAGTAACTGCTCCTGATCGCGGACTCTAAGCTATCAGAATTTTT
TTCCAACAGCCATGTTTTTCAAAAAAAAAGGGGTAACAAGACAGGTCTAAAAGGGCTGCATTGTGGCGGTC
CCTAAGCAGACGCGCACATCCAATGCAGGCTCTCTCTCATTACACCCTCTCCAACCCTCAGCAGCAGCTGCC
CCTGTCTGCTGATCACAGGGACCTGAGCTGGAGGACTGAGCAGGGATACTTAGCATCCAGCACCTCCCCC
AGGTTGCAGGGTGGTCTCCAGGAAGCATCAGAGCCTCAGCCCATGAACGCTGACTTACAAGATTAAATAAA
TAAAACCGAAAACGCGTCAGCCAATGCAATTATGAACGGTGCCAAAATAGTAATTAACCAATTTGTAGCCA
ATTAGTAATTAGGCTCAGACAGGAGCTGAAGCTTGTACCCCACTACTTTGATCTGGGATTGAACTCTCACC

GGTCTCTTTGCAACTTCTTGCGGAAAGGCCAGAGGGGTGTTACAGGAGCTGTTTGTGTCTAGAGAAGAAAT
GTAGGGTCTCTGGCAGGGCTTTATCCTCCTAGACCCTGGGAAGTATGCCGCCGCCCTGCTGGCTTCAGG
CACCTCCAGCCTTCTGAACATCAGGATGCAGAGCCCAGAAGCCCTTGTTGTCTGGGGCAGTACACGGTGA
TACCGGCCAGCCAGGATGTGCTCTGTGCAAGCCAGATCTTAACCAGTGTCTGAACCCCACCGCATCTGTC
CCACAGGGCTGGCGCTGCAAATTCAGTGCTACCAGTGTGAAGAATTCAGCTGAACAACGATTGCTCATCC
CCTGAGTTCATCGTAAATTGCACCGTGAACGTTCAAGACATGTGTTCAGAAAGAAGTGATGGAGCAAAGTGC
TGGTAAGATACTCTTTCCCCCTCCGACCCCCATGGAAGGCTGGGAAAGGAGGGTATTAAATTACAGTTAAA
GATCCTGACTGATGTAACACACATGCTACTGTGTGTTACACATGCACTTGGGCACACACACACACACAC
ACACACACACACACACACATATACACTACTGGTTAGCACAGATGTACTTTTTTACAGTTCTGGGGAAATG
AAGAGTTGGAAGTTACTTTAAACTCATTAGGGTTAATTGCCAGGGCTTCTTCCAGGGGACTCCTGAGAAGT
TATTATAAATCAGTAGCTTTCCTTTATTTTTATTTTTATTTTTATTTACGCCTTTCACCTTCCTGGACTAAA
AGCTGATGGGGCAGTGAAAACAATATATGGATAACTGCCCCGGCTCCAGCAGCTTGACAGTAGCCTGTGAG
CAATGTCAGACTGAAATATGAAGCTACTTGAAGTCCCAGAGGTCAGAACTTGAAAAATGTGTTTTGTGATA
GCGCCACACCATATTTCTTTGAAGAACGCTATAGGATCTTTATTTAATTTTAGAACTAATGCATCAAATTCC
AAGCACAAATTGCCAAGATCTTCCACAGGAAGGATACCCCCACCCCCACCCCATACCCTAGCTATTTAGCTA
CTAGCTAGCCAAGTCAAGAGACTGTATGTCGTACAGCTGAAGAAGGGAGTTAGCTGGAACCGACTTCACTC
TAGCTAGTAAGTCTTGAAAGGTAGAATCCCATCCACTCAGGAGTTAAAATTAAAAACTCACCCCAAAGTGG
CACCAGACATTTGAGAAAATAAATGAGCTGCTGCTTCAATTCCAAGGTCAAATAGAGACTTGGCTATTTAA
AGGTTGCTGAAAGCAAAGGAAATACCATCTTGGGGATGAATGACATTGGGTGAGTCTTATTACTTTTTAGTC
CAACAAGGTGCCCATGGAGCTCCACAGCTCATTAGAGCAATCGAGTCCCCTTAACCTCCCTGGCAGAACAA
AATGGATAGAAGCTAGCACTGAAGACAGAACCATGGAGAAGCAACTTCTCCTGGTTAGGGAATGGAAGTA
TATTGTTGTTAACTTCTTAGTTGCTTAAGGAACCTATCTGACAGCTCTCTATAGGACTGAGCAATGATGTGA
GGGGGTGTGTGATTCTTTTTTTCATGTGTATGTGTGTGTGATATGCATGTATGTATGCAAACATGTTTCATAGT
TGTTGGTACATGAGTATATATAGGTACCTGTTATGTGTACATGATATTCATGCCAATATAAGATGCACCTTT
GCATGTGTAGAGACAAGAGGTTGATATCCATATCTTCTTGGCTTATATATATTGAGGCAGAGTCTTTTACTT
GAACCCGGAGAACTCACCAATTCTAACTAGACAACCTTGGTCC:AAAAAATCTCAGATCTCTGCCTCCAAGGC
TGAGCTTATAAGCAGGCATCGCCTCATCAATCCTGCTGACATTTACATGTGTGCTTGGCATCCAGACTCTAG
TCCTCACACTTACCTGGAAGCACTTCCCCCGCCGTGCTATCTCTCCAGACCCTTTGTATGTGGCTGTTCTTTG
TAGTACATTATTGGCTGGAGTGTATTTTTTAAAAAATGCTATTCTGGGAAGTCTAAGATGTAAGTCTCTCAA
ACATAATGTATCCTCCAAAACCTAGAGAGCATTGTTGGAGCATCTGCTACTCCTGTTATTTAATGCAGGAGG
ACAACACAAAACCTTAGTGATGATACTGTAACCAAGATGGATGTGAATGGTTTTGATGAGTGATTTTCTTTGC
ACTGTATTTTAACTGAGCCAAACATCTTCTGGCCTTCCAATACCTTCCATGAAATAGGCTTGAAGCAGACAC
GATGGAAGGTGTTAGCACGCCTTCAGAACTTCTCAGAACTCCTCAAGGCCACCGCTCACCTGGAGGCTGGG
CTTCACAACCAGGGCTGTTGTGATCAAGGAAAGGAGTTACTCGGGAGAACACTTCCAAGAAACACTGCTTT
TTGTCCATGTGTTTCATCCAAGATGACAGCCACAAACTCCCTTTTCGTCTTACTGTAGCCTCTTCTCCAAACTA
TACTGTAGAAAAGACCTCATAACTTCCACATTACCCACAGAAAGCATCCAGACAGGCAATCCTGAAGCAAG
TCTTTGGTTTAGGTTGCTTGTCTTCTAGTGACACATGTCACTAGAAAGGTGTCGATGGCCACAGGTTAGAGG
ACATAAGCCGCAGGTCAAAGGTGAGGAAAAACTATCACACAGCAATGCCAACCTTTTTTCTTCTTTTGGT
GAGAACGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGTGAAGACAGAGAGAGAGAGAAAGGAAATGCAT
GTGATATATATCTATATCTATATCATCTATATCTATATCTATATCTATATCTAT::CTATATCTGCATGTGTGTATA
TACACAACACAGATACATATGCAAAGGTGCACACACTCAAGCAGGAGCAGGTGGGGGCCAGGAAGGCATC
CAGCTCTCTCTCCCCATTTCCCTTTAAGACATGGATTCTCACTGATCCTGGCCAGCAGCAAGCCCCAGAGAT
CCTCTTGCTCCTCTATCCTCCATAGTGTGTGGCCATACCTAACTTTTTTTTTTTTAAACATGGATGAATGCTGG
GATTCTTCATGATTGTTCTGCAAACGCTTTTATTCATCTATTCTCTAGTATTTWCAATGGACTGACCACCTAGG
CAAACTGGCTGTCTTCAGTCTGTGTCCATGACCTCTGCTTGCAACAACTGCAGCTGTGCAGTGCCTGCTTG
TGACACTGGGCATCTGTACTCACCAGCCACCTAGGAACGCCGGGATCAAGTAAATGGCCACTCTAACTCAC
TTGCTAAATAGCCCAAACCTGAGTTTTAGTTTCATCCTTTGTATAAACTTCTAAAAGCTACATTTATTTATTTG
AGGTGGGGGTGGTGATTGCACACATAGCACAGCTTACATGTGGAGGTCAGAGGTCAGAGGACAACCTTCAA
GAACTGGTTTTCCATCATTCTCCATTCCATCATTCTCCATTCCATCATTTCCTTGGGAATGTGGGTCCAGG
ACATAACCTTAACCTTGGTATCAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAACAAAC
CAAAGGGAAAACAGTTAAGAGGTGTTTCTTAGTTTCTCTTTGTTTCTTCTGTTGCTGTAACAAAGTAGTC
TAACAAAAGGAACTTCATGGCGAGTTTAGTTTCTAGCTCAAAGTTCAAGGCTCTGTCAAGAAGGACATAGTC
CCAGCAGCAGGAGCCTGAGGGAACCGGTATTATCACACGAACCTCAGGAACAAAGTAAGGCTGCAAGCTCC
AGTGTCCATAGCCCCCTCTCTGTAAAGACTCCAGTCAGAGAACAGCCGTGCACATGACAAAGGTGAGTCTGC

CCATGTAAAGTAAGGCCAAAGATAATTCCCGCACAGACATGCCCTTTTTCTCCTGGTGTCAAGTTGGCAACAC
TAACCATCATACTAGCTGTAAATAGATGCAAGGCCAAATGTGCTCACTGTTGATCGTGGTGGTTTTGTTTGCT
TGTTTGGTTGTTTGGTCACTTGGTTGAGTTCTTTTTACTTTGTTTCGTTATTCATTTTGTTTTCTTGGGTTTTGG
GTTTATTTGATTTGGTTTTGGTGTTTTTGCTTTGTTTCGTTTTTGTTTTCCACAGCAGAAAGCAATGTCCTGGG
ACTGAAATCTTGAAGACATCTCATATTAATTTTCGTGTAATTGCTATAGACCAGTCAGCTTGATTTTTTTTTT
TTAACCAACAAGGATGGAGAGGAAGTTTGGTTGCTAAGTGACCACAATATAATAAAAAATCCTGGCAGCATG
AGCTAACTTTCACTGTATGCACTATCTGGCTCATCCCTTAGCACTAGCCTCATAGTATCTCATGAAATGTAAT
AGCTCTATTTCATAATGACCAATTATGAGCCTATACTTCAACCAGCTGACTCCGGTTCCACTCTTTGTCAACTT
CACCTCAAGAAAGAACATAGTGCCTGTTAGGTGGTGCCGACAGGAATCAAAGGCCAAACTGGTTCAGAATG
TAGCCTGTGCTGAGATTCTTGGTGCAGCAGAGCTGAAAATGCCCGTCTTTCCTAAGAGCATCTAGGTATCTT
CCTGAAGTTCTGCTGAATGTGATAGCCCTCTTCCCCTTGAGGATGCTTATTCTGTGTATCCCTGTTCTGTGAG
GCCATGAGTCTTGTCTCAGCTCTCCGAGAGGCTCTGGGATGCTCCCCACTGAATTGCTAATTTGGAGCATCC
TTTGTATGTTATAGAGATACAGAGGAAGATCTTTAAAAAGTTATATGCCTGACCCCAAGTCCACTAACCCAT
TGTTACCAGGTGGCTCTCACTTCCCTGGCCAAACACATTTGCTGCAGTGCCACCTGCCAGCCTCTGGCAGAG
GGAAATGTAAAAACACGCACTCCCAGAGAGCTGACACTGGGAAAGTTCTAAGGACTAAGATGATTTTTTTTT
TTTTTAATGTCTGT

Selection Cassette:

GGCGCGCCGGATCCCGGGCCGCTCTAGCTAGACTAGTCTAGCTAGAGAATTCCGCCCCCCCCCCCCCCCCCCC
CTCTCCCTCCCCCCCCCCTAACGTTACTGGCCGAAGCCGCTTGAATAAAGGCCGGTGTGCGTTTGTCTATAT
GTTATTTTCCACCATATTGCCGTCTTTTGGCAATGTGAGGGCCCGGAAACCTGGCCCTGTCTTCTTGACGAGC
ATTCTAGGGGTCTTTCCCCTCTCGCCAAAGGAATGCAAGGTCTGTTGAATGTCGTGAAGGAAGCAGTTCTCT
CTGGAAGCTTCTTGAAGACAAACAACGTCTGTAGCGACCCTTTGCAGGCAGCGGAACCCCCACCTGGCGA
CAGGTGCCTCTGCGGCCAAAAGCCACGTGTATAAGATACACCTGCAAAGGCGGCACAACCCCAGTGCCACG
TTGTGAGTTGGATAGTTGTGGAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTGAAGGAT
GCCCAGAAGGTACCCCATTTGTATGGGATCTGATCTGGGGCCTCGGTGCACATGCTTTACATGTGTTTAGTCG
AGGTTAAAAAACGTCTAGGCCCCCGAACCACGGGGACGTGGTTTTCTTTGAAAAACACGATGATAAGC
TTGCCACAACCATGGAAGATCCCGTCGTTTTACAACGTCTGTGACTGGGAAAACCTGGCGTTACCCAACTTA
ATCGCCTTGCAGCACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCC
AACAGTTGCGCAGCCTGAATGGCGAATGGCGCTTTGCCTGGTTTCCGGCACCAAGAAGCGGTGCCGGAAAGC
TGGCTGGAGTGCGATCTTCTGAGGCCGATACTGTCGTCTGCCCTCAAACCTGGCAGATGCACGGTTACGAT
GCGCCCATCTACACCAACGTGACCTATCCCATACGGTCAATCCGCCGTTTGTTCACCGGAGAATCCGACG
GGTTGTTACTCGCTCACATTTAATGTTGATGAAAGCTGGCTACAGGAAGGCCAGACGCGAATTATTTTTGAT
GGCGTTAACTCGGCGTTTCATCTGTGGTGCAACGGGCGCTGGGTTCGGTTACGGCCAGGACAGTCGTTTGCCG
TCTGAATTTGACCTGAGCGCATTTTTACGCGCCGGAGAAAACCGCCTCGCGGTGATGGTGCTGCGCTGGAGT
GACGGCAGTTATCTGGAAGATCAGGATATGTGGCGGATGAGCGGCATTTTCCGTGACGTCTCGTTGCTGCAT
AAACCGACTACACAAATCAGCGATTTCCATGTTGCCACTCGCTTTAATGATGATTTTCAGCCGCGCTGTACTG
GAGGCTGAAGTTCAGATGTGCGGCGAGTTGCGTGACTACCTACGGGTAACAGTTTCTTTATGGCAGGGTGA
AACGCAGGTGCGCCAGCGGCACCGCGCCTTTCGGCGGTGAAATTATCGATGAGCGTGTTGTTATGCCGATC
GCGTCACACTACGTCTGAACGTGCAAAACCCGAAACTGTGGAGCGCCGAAATCCCGAATCTCTATCGTGCG
GTGGTTGAACTGCACACCGCCGACGGCACGCTGATTGAAGCAGAAGCCTGCGATGTCGGTTTCCGCGAGGT
GCGGATTGAAAATGGTCTGCTGCTGCTGAACGGCAAGCCGTTGCTGATTTCGAGGCGTTAACCGTCACGAGC
ATCATCCTCTGCATGGTCAGGTCATGGATGAGCAGACGATGGTGCAGGATATCCTGCTGATGAAGCAGAAC
AACTTTAACGCCGTGCGCTGTTTCGCATTATCCGAACCATCCGCTGTGGTACACGCTGTGCGACCGCTACGGC
CTGTATGTGGTGGATGAAGCCAATATTGAAACCCACGGCATGGTGCCAATGAATCGTCTGACCGATGATCC
GCGCTGGCTACCGGCGATGAGCGAACGCGTAACGCGAATGGTGCAGCGCGATCGTAATCACCCGAGTGTGA
TCATCTGGTCGCTGGGAATGAATCAGGCCACGGCGCTAATCACGACGCGCTGTATCGCTGGATCAAATCT
GTCGATCCTTCCCGCCCGGTGCAGTATGAAGGCGGCGGAGCCGACACCACGGCCACCGATATTATTTGCC
GATGTACGCGCGCGTGATGAAGACCAGCCCTTCCCGGCTGTGCCGAAATGGTCCATCAAAAAATGGCTTT
CGCTACCTGGAGAGACGCGCCCGCTGATCCTTTGCGAATACGCCACGCGATGGGTAACAGTCTTGGCGGT
TTCGCTAAATACTGGCAGGCGTTTCGTGAGTATCCCCGTTTACAGGGCGGCTTCGTCTGGGACTGGGTGGAT
CAGTCGCTGATTAAATATGATGAAAACGGCAACCCGTTGGTCGGCTTACGGCGGTGATTTTGGCGATACGCC
GAACGATCGCCAGTTCTGTATGAACGGTCTGGTCTTTGCCGACCGCACGCGCATCCAGCGCTGACGGAAG

CAAAACACCAGCAGCAGTTTTTCCAGTTCCGTTTATCCGGGCAAACCATCGAAGTGACCAGCGAATACCTGT
TCCGTCATAGCGATAACGAGCTCCTGCACTGGATGGTGGCGCTGGATGGTAAGCCGCTGGCAAGCGGTGAA
GTGCCTCTGGATGTCGCTCCACAAGGTAAACAGTTGATTGAACTGCCTGAACTACCGCAGCCGGAGAGCGC
CGGGCAACTCTGGCTCACAGTACGCGTAGTGCAACCGAACGCGACCGCATGGTCAGAAGCCGGGCACATCA
GCGCCTGGCAGCAGTGGCGTCTGGCGGAAAACCTCAGTGTGACGCTCCCCGCCGCTCCACGCCATCCCC
CATCTGACCACCAGCGAAATGGATTTTTGTCATCGAGCTGGGTAATAAGCGTTGGCAATTTAACGCCAGTCA
GGCTTTCTTTACAGATGTGGATTGGCGATAAAAAACAACCTGCTGACGCCGCTGCGCGATCAGTTCACCCGT
GCACCGCTGGATAACGACATTGGCGTAAGTGAAGCGACCCGCATTGACCCTAACGCCTGGGTGCAACGCTG
GAAGGCGGCGGGCCATTACCAGGCCGAAGCAGCGTTGTTGTCAGTGCACGGCAGATACACTTGCTGATGCGG
TGCTGATTACGACCGCTCACGCGTGGCAGCATCAGGGGAAAACCTTATTTATCAGCCGGAAAACCTACCGG
ATTGATGGTAGTGGTCAAATGGCGATTACCGTTGATGTTGAAGTGGCGAGCGATAACCCGCATCCGGCGCG
GATTGGCCTGAACTGCCAGCTGGCGCAGGTAGCAGAGCGGGTAACTGGCTCGGATTAGGGCCGCAAGAA
AACTATCCCGACCGCCTTACTGCCGCCTGTTTTGACCGCTGGGATCTGCCATTGTCAGACATGTATACCCG
TACGTCTTCCCGAGCGAAAACGGTCTGCGCTGCGGGACGCGCGAATTGAATTATGGCCACACCAGTGGCG
CGGCGACTTCCAGTTCAACATCAGCCGCTACAGTCAACAGCAACTGATGGAAACCAGCCATCGCCATCTGC
TGCACGCGGAAGAAGGCACATGGCTGAATATCGACGGTTTCCATATGGGGATTGGTGGCGACGACTCCTGG
AGCCCGTCAGTATCGGCGGAATTCCAGCTGAGCGCCGGTCGCTACCATTACCAGTTGGTCTGGTGTCAAAA
ATAATAATAACCGGGCAGGCCATGTCTGCCCCGATTTCGCGTAAGGAAATCCATTATGTACTATTTAAAAAA
CACAACTTTTGGATGTTCCGGTTTATTCTTTTTCTTTTACTTTTTTATCATGGGAGCCTACTTCCCGTTTTTC
CGATTTGGCTACATGACATCAACCATATCAGCAAAAGTGATACGGGTATTATTTTTGCCGCTATTTCTCTGT
CTCGCTATTATTCCAACCGCTGTTTGGTCTGCTTTCTGACAACTCGGAACTTGTTTATTGCAGCTTATAATG
GTTACAAATAAAGCAATAGCATCACAAATTTACAAATTTAATTAAGGCCGCGGGATCGATCCCGTCGAGC
AGTGTGGTTTTTCAAGAGGAAGCAAAAAGCCTCTCCACCCAGGCCTGGAATGTTTCCACCCAATGTCGAGCA
GTGTGGTTTTTGCAAGAGGAAGCAAAAAGCCTCTCCACCCAGGCCTGGAATGTTTCCACCCAATGTCGAGCA
AACCCCGCCCAGCGTCTTGTCAATTGGCGAATTCGAACACGCAGATGCAGTCGGGGCGGCGCGGTCCCAGGT
CCACTTCGCATATTAAGGTGACGCGTGTGGCCTCGAACACCGAGCGACCTGTCAGCCAATATGGGATCGGC
CATTGAACAAGATGGATTGCACGCAGGTTCTCCGGCCGCTTGGGTGGAGAGGCTATTTCGGCTATGACTGGG
CACAACAGACAATCGGCTGCTCTGATGCCGCCGTGTTCCGGCTGTCAGCGCAGGGGCGCCCCGTTCTTTTTG
TCAAGACCGACCTGTCCGGTGCCCTGAATGAACTGCAGGACGAGGCAGCGCGGCTATCGTGGCTGGCCACG
ACGGGCGTTTCTTGCGCAGCTGTGCTCGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGA
AGTGCCGGGGCAGGATCTCCTGTCATCTCACCTTGCTCCTGCCGAGAAAGTATCCATCATGGCTGATGCAAT
GCGGCGGCTGCATACGCTTGATCCGGCTACCTGCCCATTCGACCACCAAGCGAAACATCGCATCGAGCGAG
CACGTACTCGGATGGAAGCCGGTCTTGTGATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCA
GCCGAACTGTTTCGCCAGGCTCAAGGCGCGCATGCCCGACGGCGAGGATCTCGTCGTGACCCATGGCGATGC
CTGCTTGCCGAATATCATGGTGGAAAATGGCCGCTTTTCTGGATTTCATCGACTGTGGCCGGCTGGGTGTGGC
GGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTGAAGAGCTTGGCGGCGAATGGGCTGACC
GCTTCCTCGTGCTTTACGGTATCGCCGCTCCCGATTCCGAGCGCATCGCCTTCTATCGCCTTCTTGACGAGTT
CTTCTGAGGGGATCGGCAATAAAAAGACAGAATAAAACGCACGGGTGTTGGGTGCTTTGTTTCGGATCCGAA
TTCCTCGAGGGCGCGCC

Targeted Locus:

CAACATTTTTGAAATGACCATGACAAAAAAAATGACCATTTTTTCCCTTTTTTACTCTGAAGGGGATAGA
TTTAACAGAAGAAATAAAAGCCACCACCAGCAGCAGCACAAAGCAAGCTTAACACCAGATCCCTCTCTCTG
CTGTGCAGGGAAGCTTCCGCCAGTAATTATTGAGCTGAGCCTCATCCTGAGCACTGGTCAGCAGGGACAA
TGTTTCGAGATACACAAGGAACGAGTTCTGACCTTGTATTCTTGAATCTTGTTAGCAGTATTGTTTCTGTTTT
GTATATTATATATCCAGATAGCTCTAGAGAAGTTTTGACTTCTGGCTACAGTGAATAAAGTCCGAGTCAATA
GACACATTAAATACCCTAAGTTGTGTATGTGTGCTGGTAGAGGCACGACGACAACCTAGAATGTCATTCTGG
CACTGTCCGGTCCACGTCATTTATTTGTTTTGCTTTTGATTTGGAATATGCTCTTTCTCTAAAGACAGGTTCTC
TCTGGCCTGGGACTACCAAGTAGGCTGCACTGGCTGGCTACAGAGCCCAAAGAGCCTCTTTTTCTCTGCTT
CCACAGCACTTGCACTTACTCTTGTGTACCACCACACTCATTTCTTTTAGATGGGTCTGAGGATCAAACCCA
GGTCTTATGCTTGCAACAAAGTAATACTGACTGAACCATCTCCCCAGCTCTAGACACAAGTGTGAAAAT
GACAGTGTGTGTTGTTTAGAACTAAGACTATTGTATACCAACTACAAGGAAATAAACTTAATAAAGTAAC
ACAAGGACCCAAAAGCTAAATCAAATGAAACATTCAGTTTTTTGAAAGCCTAACAGAGTCCCTTAAGTAC

CTTTGACCTAGTGGAGGATTAACCTAACCAACCGGTGGTTCCTTGTTATCATATTTAAGGCCCTGCTGCTGCTT
TTCCCTGAGATGGTGGGATTTCATGCCTCTAGGGAGAATAGCTGATGGGGTCTGCTTTAGTGAAGCTGATGGCC
CTCACTCTTCTCATTACCTCGGTGTCCCTGCCTCCCATTTGTCCTCTCCCCAACCTGAGCAGCTGCTTGATCCA
CTGAAGACACTCAAGCTCGCAGGGCACCTACAATGATTGCTTAGTATAACTACAGTATTTTATGAAATCCTG
AAGCGAAGTGTGAAGAAAATCACCTCCTTGAATAAAATTGGTATAGCTAGACCTTCTGGAAGGGAAGGTTT
CTAAAGTGCAAACCCGCTACTTGGTTTTAATGCCTCTAGCCCTTCTGCAATCTGTAGTCAATAGCTCTGAGCT
CTCCTTCAAATATCTCAGGTACCTAAAAGGGACAAAATTGAAACATGACAATATTCTTGACAAGCTTAATAT
GTACTTAAATTTTATGGCAATTTAACAGATTTTATGCCTTTTTTCTCCCAAAAGACTATAACTTCTGGCTGA
AACTCAAGACATATCCCTTTTAGAAAAAGTACAAGGAGTATTTATTGAGAAAACAGAGGACTTTGAACTTT
TGATAAAGAAAAATAAGACACATTACCTGGGTAAATTTCAAATGGATCCATTTAAATGAATTAAGTGCCA
CTTAAGTGGTTTGCAAATTGGGGTCTATTTATCTCACTAAAATGATTAAAGTCTTGATTTATCCCTAAAATTA
GCTTTATTATTGCATTTAATTACACTAAAAGATTGTTAAGGACTTGTAGGTTCTCTCTGTCCCTTTAACTGT
ACTTTATTCAGACAATAATTGAATATCAGATAGGATAAATTGATTTTTTCCAAAGAATTATGTTTCTAATAT
TTTCTCTTTTTTATTGCAGGAACCGAAACAAGTTGAAGAAACAAAAGAAGATCCTGAGAATAGATTATCTG
AAATTTCCCTGGAGTCATTCAATAAATTTAGCAGCAATACTGTGATTTTATTAGGAAAAGAGAAGTCTCCAA
GTGAGGTTGAAGGACAAAAGGAAGAGAAAGGCAAAAAGACAGAAGTGTCTTCGAGTAGCTCCGAACGGCC
TGGGGTGGACCGCGTGGAGTCTCTGAGTGACTCTCTGTATGACAGTTTCTCCTCTTGTGCAAGTCAAGCATC
CAACGAGGCCTAGAGGAGCATCCTTCAGTGAGACTCCTGCATGCATGGTGCAGTGGCAAAACAGACTCCAG
AGAAGCTGATAGCCAGTATAACCAGAGTTTACTTCTCTCGTGGACTGATAGAGATCGCCTCGACTTACTGTGT
TTTGAGAGGATTA AAAAGCAAATATGATGGAGAATTCTCAATGTTTGCAGTTTTTTGAGTATTTGTATAAA
AGCTGTACATTTTTT:GGGGGGG:AGAGAAATTATATTTGTAGGGGGAGAAAGATAGCAATAAAAAGAGTTG
GCGCCATGCTCTTGAAACGATGCATTAAGTTCTAGAAGTTGATAATATATTTTTTAAAAACCCAGCTGAAG
ATTTTGTGAACATAATCATCTTGGTCCTCACTCATTTGTGCATATACTGTCAATGGAAGCGTGGGGCAGGC
AGGAAAGCCAGAGGGGTGGAGGTCACCTGTTCTGAAGGTCTCTCTCGATTGGGTGGTCCACTTGCCACATT
GTCTCGAGGAAGATGTGATGATATGGGTGTTCTGTTGAAGAATTAGAGTGTGAGCACTGATTAGATGGCAC
CAGATGATGCGGAAGGGAGCAGATCTTAGCAGGCTTCACTCCCAACCTCTTCTATCCTCTCCATTGTATTTCT
TCACAATTCTGAGTGTTTGCTGTTTTCTTTTTAAATTTCCCTGCTTTTTTATATTATTATTA AAAACCTGGGTACT
CTTTGCCATATCTTAAAAATAAATGAATGGTTGGTGCTATGAACTTTTCTTACTTTTTAATATCCGTTTTTTCT
ATTAAAGACTGTTTATATGGGAGGATAAATTCTATTTTAAAGGTTATGTGTATTTTTTCTAGACGTGAACAT
TTATAATTCCTTCTGTACAGAAGCCTACAGACCAGGCAGACTAGAGCTATGTTTAGGATTTGTGTGGTTACC
TTAGAACACTTGTATCTTTATAGAGTATTGTATGACCAGTGTTATTGTATTTGTGCAATTTGTTGTATTTGGA
TTTCATTACCTTAAATTCAAGCTGCGTGTAAGTATCCTCCTTGTCTTTAGAAAAAATTCCTTTTGTTCATTTCT
ATTTTGAATAAAGGTCTTATCACAATTACACCCTATAAGAGCAGAAAAGAACTTTGTTTCAGGGAGAGGTT
GGTCCCGTGATTATTATAATTACGTCTCACGCTTGCTCTGTGGAGAGGGTTCCCTGAAAGAATAAATAAGCC
AACCTCTTGCTACTGTAATAGTAATTGGAACAATTGTTAAGATCCACACTTCAGACAAGCGAGTAATGGTC
AAAGCATCCTCGTCTCCCCAAGGAGTTAACAGCTAGAAATGAGGGGGAGGGGTGGGGGAGAATGAGCCT
GAGGCAGCTATGGAMSGATCTCTGCAAAGGAATTACAAGAAAGTCATTTATGCCTCTTTCAAACCTGCTCTG
CTGGCAGGGTAGGGACATAAATGATCACATCCAGCTGAGAGACCACTTCCCTCGGGAGACCTCACAGGA
GAGGGGTGATGCTTAGCCACGGGTTTCCACCGAATCTCCCAAATCCCAAATCAGGGGTGGGGGTGGGTGGA
AATGCGCGGGGGTTGTGGGCGGGGGCACCAAGAGCTGCGACTGCCTGCTCTGTGCACAGCACAGTCTTCCA
CAAAGCTCCACCAGGAAGGCAAAATAACACCGTGGTGTCCCGGAATACGCAAGGTGGGTCACTTAGAATT
GTYAGAAAGGGGAGTAGTGGAGGAGGGAGGCAGCCTATGGCCRATTGGCCATGCTTTAGCGCTGTAAGGA
GTGTATACCCATAGCTGGTGGCTTGGGGGAGCAGTCAGACCCATTTGCTTTTTCAGTGAGAGCACAGATCCG
GGTGTCCACTCCCCAAGTAGCTTTATTTCTGGGCTAGGAGACCGAGGCTGAGTCAATGCATCCCCCTGCGG
TGCATGCAAGCAGGTGAGGAGATGGTGGTTGGGCTAAGCGAGCTAGCTGCGGTAGGGTCACCACCGTACTC
GCAGGCATTCTGCCGGAAGACCCAGGTGGCCAGTGAGGTGGGTTTCTCTCAGGAAGAGGCGCGGCTGCGTC
GGACACCCAGGGAACCTCGCTGCGCCGCAACTTTGCCAGGTGCTCAGAAACAGCCCTTCGCTTTATCCAGG
GCAGTCACCCAGAGGGCCAGGGGGCAGCGAGTGATAGAAGACGCCAGGCTGGGTGGGCGAGACCCAATTG
CAAGGGTACTGTTAGCACCGAAAGGGAACATAAAACCTGGAAGGGAAGGGTATCGCAGCCTAGCACTCGG
GTCTCCGAGTTTCGCATAGGACAGGTCCTGATGGCACCTGCTGCGCCCTAGTCACCTCCTTATTCCTAACCTCT
GTCAACACTACTCCCGAGCCCAGCAGGCGCTCCTTTCCAAGGAAGTATAGAGGAGGTAGGCTAAAAGGGTGGC
AGAAAGGGGTGGGGACAGTAGAGAGACAGTCCCAGCCTTCCCCGCCCTCCACCCCCACCACAACTCAGCAG
CCGTACAGTGGTACCCGGAGTGGGAGGGGTGGGGGCAGAAGAGGCGAGACTTTTTTGGGTGCTCCGGATCG
CCAGTAGTTCTTCAAGCCTCAGCAKCCAACCTCCTCCGGAGGCGCTGCGCTCCGCCCCAGGGAGCGCGAATC

CAAGGAGCCTGGGACCAGCCTCTGGGAGCCCCGGCGCGGGCGATGCGGGCGCCGCGGGCGACACCTGCG
GCTCCTCTCGGTGGCAGCCGTCGCTTGGGCGGCAGCAGCGGAGCCTCGGCAGCCTCGGCAGCTACTGTCTG
CCGCGGCCAGAACAGCCTCCGCTGCGGTCTGTTCTCTGATGCTCTTGGCGCGCCGGATCCCGGGCCGCTCT
AGCTAGACTAGTCTAGCTAGAGAATTCCGCCCCCCCCCCCCCCCCCTCTCCCTCCCCCCCCCCTAACGTTA
CTGGCCGAAGCCGCTTGAATAAGGCCGGTGTGCGTTTGTCTATATGTTATTTTCCACCATATTGCCGTCTTT
TGGCAATGTGAGGGCCCGGAAACCTGGCCCTGTCTTCTTGACGAGCATTCTAGGGGTCTTTCCCCTCTCGC
CAAAGGAATGCAAGGTCTGTTGAATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTTGAAGACAAACAA
CGTCTGTAGCGACCCTTTGCAGGCAGCGGAACCCCCACCTGGCGACAGGTGCCTCTGCGGCCAAAAGCCA
CGTGTATAAGATACACCTGCAAAGGCGGCACAACCCAGTGCCACGTTGTGAGTTGGATAGTTGTGGAAAG
AGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTGAAGGATGCCAGAAGGTACCCCATTTGTATGG
GATCTGATCTGGGGCCTCGGTGCACATGCTTTACATGTGTTTAGTCGAGGTTAAAAAACGTCTAGGCCCC
CGAACCACGGGGACGTGGTTTTCTTTGAAAAACACGATGATAAGCTTGCCACAACCATGGAAGATCCCGT
CGTTTTACAACGTCTGACTGGGAAAACCTGGCGTTACCCAACTTAATCGCCTTGACGACATCCCCCTTT
CGCCAGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCG
AATGGCGCTTTGCCTGGTTTTCCGGCACCAAGAGCGGTGCCGGAAGCTGGCTGGAGTGCGATCTTCCTGAG
GCCGATACTGTCGTCTGCTCCCTCAAACCTGGCAGATGCACGGTTACGATGCGCCCATCTACACCAACGTGACC
TATCCCATTAACGGTCAATCCGCCGTTTGTTCACCGGAGAATCCGACGGGTGTTACTCGCTCACATTTAAT
GTTGATGAAAGCTGGCTACAGGAAGGCCAGACGCGAATTATTTTTGATGGCGTTAACTCGGCGTTTCATCTG
TGGTGCAACGGGCGCTGGGTTCGTTACGGCCAGGACAGTCGTTTGCCGTCTGAATTTGACCTGAGCGCATTT
TTACGCGCCGGAGAAAACCGCCTCGCGGTGATGGTGCTGCGCTGGAGTGACGGCAGTTATCTGGAAGATCA
GGATATGTGGCGGATGAGCGGCATTTTCCGTGACGTCTCGTTGCTGCATAAACCGACTACACAAATCAGCG
ATTTCCATGTTGCCACTCGCTTTAATGATGATTTTCAGCCGCGCTGTACTGGAGGCTGAAGTTCAGATGTGCG
GCGAGTTGCGTGACTACCTACGGGTAACAGTTTCTTTATGGCAGGGTGAAACGCAGGTGCCAGCGGCACC
GCGCCTTTCGGCGGTGAAATTATCGATGAGCGTGGTGGTTATGCCGATCGCGTCACACTACGTCTGAACGTC
GAAAACCCGAAACTGTGGAGCGCCGAAATCCCGAATCTCTATCGTGCGGTGGTTGAACTGCACACCGCCGA
CGGCACGCTGATTGAAGCAGAAGCCTGCGATGTCGGTTTCCGCGAGGTGCGGATTGAAAATGGTCTGCTGC
TGCTGAACGGCAAGCCGTTGCTGATTCGAGGCGTTAACCGTCACGAGCATCATCCTCTGCATGGTCAGGTCA
TGGATGAGCAGACGATGGTGACAGGATATCCTGCTGATGAAGCAGAACAACCTTTAACGCCGTGCGCTGTTCC
CATTATCCGAACCATCCGCTGTGGTACACGCTGTGCGACCGCTACGGCCTGTATGTGGTGGATGAAGCCAAT
ATTGAAACCCACGGCATGGTGCCAATGAATCGTCTGACCGATGATCCGCGCTGGCTACCGGCGATGAGCGA
ACGCGTAACGCGAATGGTGACGCGCATCGTAATACCCGAGTGTGATCATCTGGTCGCTGGGGAATGAAT
CAGGCCACGGCGCTAATCACGACGCGCTGTATCGCTGGATCAAATCTGTGATCCTTCCCGCCCGGTGCAGT
ATGAAGGCGGCGGAGCCGACACCACGGCCACCGATATTATTTGCCCGATGTACGCGCGCGTGGATGAAGAC
CAGCCCTTCCCGGCTGTGCCGAAATGGTCCATCAAAAAATGGCTTTCGCTACCTGGAGAGACGCGCCCGCT
GATCCTTTGCGAATACGCCCACGCGATGGGTAACAGTCTTGGCGGTTTCGCTAAATACTGGCAGGCGTTTCG
TCAGTATCCCCGTTTACAGGGCGGCTTCGTCTGGGACTGGGTGGATCAGTCGCTGATTAAATATGATGAAAA
CGGCAACCCGTGGTCGGCTTACGGCGGTGATTTTGGCGATACGCCGAACGATCGCCAGTTCTGTATGAACG
GTCTGGTCTTTGCCGACCGCACGCCGCATCCAGCGCTGACGGAAGCAAAACACCAGCAGCAGTTTTCAG
TTCCGTTTATCCGGGCAAACCATCGAAGTGACCAGCGAATACCTGTTCCGTCATAGCGATAACGAGCTCCTG
CACTGGATGGTGGCGCTGGATGGTAAGCCGCTGGCAAGCGGTGAAGTGCTCTGGATGTCGCTCCACAAGG
TAAACAGTTGATTGAACTGCCTGAACTACCGCAGCCGGAGAGCGCCGGGCAACTCTGGCTCACAGTACGCG
TAGTGCAACCGAACGCGACCGCATGGTCAGAAGCCGGGCACATCAGCGCCTGGCAGCAGTGGCGTCTGGCG
GAAAACCTCAGTGTGACGCTCCCCGCGCGTCCCACGCCATCCCGCATCTGACCACCAGCGAAATGGATTTT
TGCATCGAGCTGGGTAATAAGCGTTGGCAATTTAACCGCCAGTCAGGCTTTCTTTTACAGATGTGGATTGGC
GATAAAAAACAACCTGCTGACGCCGCTGCGCGATCAGTTACCCCGTGACCCGCTGGATAACGACATTGGCGT
AAGTGAAGCGACCCGCATTGACCCTAACGCCTGGGTGCAACGCTGGAAGGCGGCGGGCCATTACCAGGCCG
AAGCAGCGTTGTTGCAGTGCACGGCAGATACACTTGCTGATGCGGTGCTGATTACGACCGCTCACGCGTGG
CAGCATCAGGGGAAAACCTTATTTATCAGCCGGAAAACCTACCGGATTGATGGTAGTGGTCAAATGGCGAT
TACCGTTGATGTTGAAGTGGCGAGCGATACACCGCATCCGGCGCGGATTGGCCTGAACTGCCAGCTGGCGC
AGGTAGCAGAGCGGGTAAACTGGCTCGGATTAGGGCCGCAAGAAAACCTATCCCGACCGCCTTACTGCCGCC
TGTTTTGACCGCTGGGATCTGCCATTGTCAGACATGTATACCCCGTACGTCTTCCCGAGCGAAAACGGTCTG
CGCTGCGGGACGCGCGAATTGAATTATGGCCACACCAAGTGGCGCGGCGACTTCCAGTTCAACATCAGCCG
CTACAGTCAACAGCAACTGATGGAAACCAGCCATCGCCATCTGCTGCACGCGGAAGAAGGCACATGGCTGA
ATATCGACGGTTTCCATATGGGGATTGGTGGCGACGACTCCTGGAGCCCGTCAGTATCGGCGGAATTCAG

CTGAGCGCCGGTCGCTACCATTACCAGTTGGTCTGGTGTCAAAAATAATAATAACCGGGCAGGCCATGTCT
GCCCCGATTTTCGCGTAAGGAAATCCATTATGTACTATTTAAAAAACACAACTTTTGGATGTTTCGGTTTATT
CTTTTTCTTTTACTTTTTTATCATGGGAGCCTACTTCCCGTTTTTCCCGATTTGGCTACATGACATCAACCATA
TCAGCAAAAGTGATACGGGTATTATTTTTGCGCTATTTCTCTGTTCTCGCTATTATTCCAACCGCTGTTTGG
TCTGCTTTCTGACAACTCGGAACTTGTTTATTGCAGCTTATAATGGTTACAAATAAAGCAATAGCATCACA
AATTTACAAATTTAATTAAGGCCGCGGGATCGATCCCGTCGAGCAGTGTGGTTTTCAAGAGGAAGCAAAA
AGCCTCTCCACCCAGGCCTGGAATGTTTCCACCCAATGTGCGAGCAGTGTGGTTTTGCAAGAGGAAGCAAAA
AGCCTCTCCACCCAGGCCTGGAATGTTTCCACCCAATGTGCGAGCAAAACCCCGCCCAGCGTCTTGTTCATTGGC
GAATTCGAACACGCAGATGCAGTCGGGGCGGCGCGGTCCCAGGTCCACTTCGCATATTAAGGTGACGCGTG
TGGCCTCGAACACCGAGCGACCCTGCAGCCAATATGGGATCGGCCATTGAACAAGATGGATTGCACGCAGG
TTCTCCGGCCGCTTGGGTGGAGAGGCTATTCCGGCTATGACTGGGCACAACAGACAATCGGCTGCTCTGATGC
CGCCGTGTTCCGGCTGTCAGCGCAGGGGCGCCCGGTTCTTTTTGTCAAGACCGACCTGTCCGGTGCCCTGAA
TGAAGTGCAGGACGAGGCAGCGCGGCTATCGTGGCTGGCCACGACGGGCGTTCCTTGCGCAGCTGTGCTCG
ACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAAGTGCCGGGGCAGGATCTCCTGTCTATCT
CACCTTGCTCCTGCCGAGAAAGTATCCATCATGGCTGATGCAATGCGGCGGCTGCATACGCTTGATCCGGCT
ACCTGCCCATTTCGACCACCAAGCGAAACATCGCATCGAGCGAGCACGTACTCGGATGGAAGCCGGTCTTGT
CGATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCCGAACCTGTTCCGCCAGGCTCAAGGCGC
GCATGCCCCGACGGCGAGGATCTCGTCGTGACCCATGGCGATGCCTGCTTGCCGAATATCATGGTGGAAAAT
GGCCGCTTTTTCTGGATTTCATCGACTGTGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCT
ACCCGTGATATTGCTGAAGAGCTTGGCGGCGAATGGGCTGACCGCTTCCTCGTGCTTTACGGTATCGCCGCT
CCCGATTTCGAGCGCATCGCCTTCTATCGCCTTCTTGACGAGTTCTTCTGAGGGGATCGGCAATAAAAAGAC
AGAATAAAACGCACGGGTGTTGGGTGCTTTGTTTCGGATCCGAATTCCTCGAGGGCGCGCCTGGAAGGCTGG
GAAAGGAGGGTATTAAATTACAGTTAAAGATCCTGACTGATGTAACACACATGCTACTGTGTGTTACACAT
GCACTTGGGCACACACACACACACACACACACACACACACATATACACTCACTGGTTAGCACA
GATGTACTTTTTACAGTTCTGGGGAAATGAAGAGTTGGAAGTTACTTTAAACTCATTAGGGTTAATTGCCAG
GGCTTCTTCCAGGGGACTCCTGAGAAGTTATTATAAATCAGTAGCTTTTCTTTATTTTTATTTTTATTTTTA
TTTACGCCTTTCACCTTCCTGGACTAAAAAGCTGATGGGGCAGTGAAAACAATATATGGATAACTGCCCCGG
CTCCAGCAGCTTGACAGTAGCCTGTGAGCAATGTCAGACTGAAATATGAAGCTACTTGAAGTTCCCAGAGG
TCAGAACTTGAAAAATGTGTTTTGTCATAGCGCCACACCATATTTCTTTGAAGAACGCTATAGGATCTTTAT
TTAATTTTAGAACTAATGCATCAAATTCCAAGCACAAATTGCCAAGATCTTCCACAGGAAGGATACCCCCAC
CCCCACCCCATACCCTAGCTATTTAGCTACTAGCTAGCCAAGTCAAGAGACTGTATGTCGTACAGCTGAAGA
AGGGAGTTAGCTGGAACCGACTTCACTCTAGCTAGTAAGTCTTGAAAGGTAGAATCCCATCCACTCAGGAG
TTAAAATTA AAAACTCACCCCAAAGTGGCACCAGACATTTGAGAAAATAAATGAGCTGCTGCTTCAATTCC
AAGGTCAAATAGAGACTTGGCTATTTAAAGGTTGCTGAAAGCAAAGGAAATACCATCTTGGGGATGAATGA
CATTGGGTGAGTCTTATTACTTTTTAGTCCAACAAGGTGCCCATGGAGCTCCACAGCTCATTAGAGCAATCG
AGTCCCCTTAACTCCCTGGCAGAACAACAATGGATAGAAGCTAGCACTGAAGACAGAACCATGGAGAAGC
AACTTCTCCTGGTTAGGGAATGGAAGTATATTGTTGTTAACTTCTTAGTTGCTTAAGGAACCTATCTGACAG
CTCTCTATAGGACTGAGCAATGATGTGAGGGGGTGTGTGTATTCTTTTTTCATGTGTATGTGTGTGTGATG
CATGTATGTATGCAAACATGTTTCATAGTTGTTGGTACATGAGTATATATAGGTACCTGTTATGTGTACATGA
TATTCATGCCAATATAAGATGCACCTTTGCATGTGTAGAGACAAGAGGTTGATATCCATATCTTCCTTGCTT
ATATATATTGAGGCAGAGTCTTTTACTTGAACCCGGGAGAACTACCAATTCTAACTAGACAACCTTGGTCC:A
AAAAATCTCAGATCTCTGCCTCCAAGGCTGAGCTTATAAGCAGGCATCGCCTCATCAATCCTGCTGACATTT
ACATGTGTGCTTGGCATCCAGACTCTAGTCCTCACACTTACCTGGAAGCACTTCCCCCGCCGTGCTATCTCTC
CAGACCCTTTGTATGTGGCTGTTCTTTGTAGTACATTATTGGCTGGAGTGTATTTTTAAAAAATGCTATTCTG
GGAAGTCTAAGATGTAAGTCTCTCAAACATAATGTATCCTCCAAAACCTAGAGAGCATTGTTGGAGCATCT
GCTACTCCTGTTATTTAATGCAGGAGGACAACACAAAACCTTAGTGATGATACTGTAACCAAGATGGATGTG
AATGGTTTTGATGAGTGATTTTCTTTGCACTGTATTTTAACTGAGCCAAACATCTTCTGGCCTTCCAATACCT
TCCATGAAATAGGCTTGAAGCAGACACGATGGAAGGTGTTAGCACGCCTTCAGAACTTCCTCAGAATCCTC
AAGGCCACCGCTCACCTGGAGGCTGGGCTTCACAACCAGGGCTGTTGTGATCAAGGAAAGGAGTTACTCGG
GAGAACACTTCCAAGAAACACTGCTTTTTGTCCATGTGTTTCATCCAAGATGACAGCCACAACTCCCTTTTC
GTCTTACTGTAGCCTCTTCTCCAAACTATACTGTAGAAAAGACCTCATAACTTCCACATTACCCACAGAAAG
CATCCAGACAGGCAATCCTGAAGCAAGTCTTTGGTTTAGGTTGCTTGTCTTCTAGTGACACATGTCACTAGA
AAGGTGTGATGGCCACAGGTTAGAGGACATAAGCCGCAGGTCAAAGGTGAGGAAAAACTATCACACAG
CAATGCCAACCTTTTTTCTTCTTTTGGTGAGAACGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGAGT

ACAGAGAGACAGAGAAAGGAAATGCATGTGATATATATCTATATCTATATCATCTATATCTATATCTATCTA
TATCTAT::CTATATCTGCATGTGTGTATATACACAACACAGATACATATGCAAAGGTGCACACACTCAAGCA
GGAGCAGGTGGGGGCCAGGAAGGCATCCAGCTCTCTCTCCCCATTTCCCTTTAAGACATGGATTCTCACTGA
TCCTGGCCAGCAGCAAGCCCCAGAGATCCTCTTGTCTCCTCTATCCTCCATAGTGTTGTGGCCATACCTAACT
TTTTTTTTTTAACATGGATGAATGCTGGGATTCTTCATGATTGTTCTGCAAACGCTTTTATTCACTATTCTCTA
GTATTTWCAATGGACTGACCACCTAGGCAAACTGGCTGTCTTCAGTCTGTGTCCATGACCTCTGCTTGCAA
CAACTGCAGCTGTGCAGTGCCTGCTTGTGACACTGGGCATCTGTACTCACCAGCCACCTAGGAACGCCGGG
ATCAAGTAAATGGCCACTCTAACTCACTTGCTAAATAGCCCCAACTGAGTTTTAGTTTCATCCTTTGTATAA
ACTTCTAAAAGCTACATTTATTTATTTGAGGTGGGGGTGGTGATTGCACACATAGCACAGCTTACATGTGGA
GGTCAGAGGTCAGAGGACAACCTTTCAAGAAGTGGTTTTCCATCATTCTCCATTCCATCATTCTCCATTCCATC
ATTTTCCCCTGGGAATGTGGGTCCAGGACATAACCTTAACCTTGGTATCAAAACAAACAAACAAACAAACA
AACAAACCAGAAGCAATTAATGAATCCAAAGGGGAAAACCAGTTAAGAGGTGTTTCTTAGTTTCTCTTTGTTT
GTTTCCTGTTGCTGTAACAAAGTAGTCTAACAAAAGGAACTTCATGGCGAGTTTAGTTTTAGCTCAAAGTTC
AAGGCTCTGTCAAGAAGGACATAGTCCCAGCAGCAGGAGCCTGAGGGAACCGGTATTATCACACGAACTCA
GGAACAAAGTAAGGCTGCAAGCTCCAGTGTCCATAGCCCCCTCTCCTGTAAGACTCCAGTCAGAGAACAGCC
GTGCACATGACAAAGGTGAGTCTGCCCATGTAAAGTAAGGCAAAGATAATTCCCGCACAGACATGCCCTTT
TTCTCCTGGTGTCAAGTTGGCAACACTAACCATCATACTAGCTGTAAATAGATGCAAGGCAAATGTGCTCAC
TGTTGATCGTGGTGGTTTTGTTTGCTTGTTTGTTTGTTTGTTTGTTGACTTGTTGAGTTCTTTTTACTTTGTTTCGTT
ATTCATTTTGTTTTCTTGGGTTTTGGGTTTATTTGATTTGGTTTTGGTGTTTTGCTTTGTTTCGTTTTGTTTTTC
CACAGCAGAAAGCAATGTCCTGGGACTGAAATCTTGAAGACATCTCATATTAAATTTTCGTGTAATTGCTATA
GACCAGTCAGCTTGATTTTTTTTTTTTTTAACCAACAAGGATGGAGAGGAAGTTTGGTTGCTAAGTGACCACAA
TATAATAAAAATCCTGGCAGCATGAGCTAACTTTCACTGTATGCACTATCTGGCTCATCCCTTAGCACTAGC
CTCATAGTATCTCATGAAATGTAATAGCTCTATTCATAATGACCAATTATGAGCCTATACTTCAACCAGCTG
ACTCCGGTTCCACTCTTTGTCAACTTCACCCTCAAGAAAGAACATAGTGCCTGTTAGGTGGTGCCGACAGGA
ATCAAAGCCAACTGGTTCAGAATGTAGCCTGTGCTGAGATTCTTGGTGCAGCAGAGCTGAAAATGCCCGT
CTTTCCTAAGAGCATCTAGGTATCTTCCTGAAGTTCTGCTGAATGTGATAGCCCTCTTCCCCTTGAGGATGCT
TATTCTGTGTATCCCTGTTCTGTGAGGCCATGAGTCTTGTCTCAGCTCTCCGAGAGGCTCTGGGATGCTCCCC
ACTGAATTGCTAATTTGGAGCATCCTTTGTATGTTATAGAGATACAGAGGAAGATCTTTAAAAAGTTATATG
CCTGACCCCAAGTCCACTAACCATTGTTACCAGGTGGCTCTCACTTCCCTGGCCAAACACATTTGCTGCAG
TGCCACCTGCCAGCCTCTGGCAGAGGGAAATGTAAAAACACGCACTCCCAGAGAGCTGACACTGGGAAAGT
TCTAAGGACTAAGATGATTTTTTTTTTTTTTAATGTCTGT