

GENOTYPING BY PCR PROTOCOL

MUTANT MOUSE RESOURCE & RESEARCH CENTER: UC DAVIS

mmrrc@ucdavis.edu

530-754-MMRRC

Protocol Name: B6;129S5-Siglecetm1Lex/Mmucd **MMRRC: 032571-UCD**

Protocol:

Reagent/Constituent	Volume (μL)
Water	5.6
GoTaq® G2 Colorless Master Mix, 2X	7.5
Primer 1. (stock concentration is 20μM)	0.45
Primer 2. (stock concentration is 20μM)	0.45
DNA (example) extracted w/ "Qiagen DNeasy columns or other similar silica based kits"	1.0
TOTAL VOLUME	
15	

Comments on protocol:

- Protocol may work with other DNA extraction methods.
- Use Touch-Down cycling protocol-first 10 cycles anneal at 65°C decreasing in temperature by 1.0°C; next 30 cycles anneal at 55°C.

Strategy:

Steps	Temp (°C)	Time (m:ss)	# of Cycles
1. Initiation/Melting HOT START? ☐	94	2:00	1x
2. Denaturation	94	0:10	
3. Annealing steps 2-3-4 cycle in sequence	65 (↓1°C/cycle)	0:30	10x
4. Elongation	68	2:00	
5. Denaturation	94	0:15	
6. Annealing steps 5-6-7 cycle in sequence	55	0:30	25x
7. Elongation	68	2:00 (↑20sec/cycle)	

Primers:

Electrophoresis Protocol:

Name	Nucleotide Sequence (5' - 3')	Argarose: 1.5% V: 90		
1. DNA287-23	CTTCCCTATGCCCTAGAACCAT	Estimated Running Time: 90 min.		
2. IRESUP-LR	TGGAAAATAACATATAGACAAACGCA	Primer Combination	Band (bp)	Genotype
3. DNA287-19	GGCCAGTCACTGCGTCTCAT	1 & 2	548	Mutant
4. DNA287-20	CAGTAAGGTTTTGGATAGCCAG	3 & 4	384	wildtype

GENOTYPING BY PCR PROTOCOL
MUTANT MOUSE RESOURCE & RESEARCH CENTER: UC DAVIS

mmrrc@ucdavis.edu
530-754-MMRRC



wildtype	Primers
NTC	1 & 2
32571	
32571	



Lexicon Genetics Incorporated – Genentech Project Materials

Genentech ID:	UNQ668	Date of Submission:	4-6-05
Lexicon Contract Name:	DNA287	Mutation Type:	X Standard Knock out
LexVision Name:	MEM747N1		☐ Conditional
Reference accessions:	NM_031181	Is this gene X-linked?	No

Required Materials: X pKOS clone DNA(s) __ pKOS39 _____
X Target Vector DNA __pKOS39.TV_____
X Targeted ES Cell DNA __2C3_____
X Genomic Map

Southern Blot Analysis: *External/Internal Probe Strategies*

	<u>5' External</u>	<u>3' External</u>
Name of Probe:	15+16	17+18
Restriction Enzyme for Genomic Digest:	BglI	EcoRI
Predicted Wild-type Band (kb):	10.8 kb	10.6 kb
Predicted Mutant Band (kb):	8.9 kb	6.3 kb
Probe Size:	365 bp	333 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:	DNA287-19	5' Primer Name:	DNA287-23
3' Primer Name:	DNA287-20	3' Primer Name:	IRESUPLR
Predicted Wild-type Band (bp):	384 bp	Predicted Wild-type Band (bp):	none
Predicted mutant band (bp)	none	Predicted mutant band (bp)	548 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**

DNA287-15 5' – CACTCACTTAAGCATGTGATGC
DNA287-16 5' – CAATATCTTGATGGGTGACAGG
DNA287-17 5' – TAGTAGTCCTCTCAGAAAGAGG
DNA287-18 5' – CTTTCATGAGTGATCCATCAGC

PCR Genotyping

DNA287-19 5' – GGCCAGTCACTGCGTCTCAT
DNA287-20 5' – CAGTAAGGTTTGGATAGCCAG
DNA287-23 5' – CTTCCCTATGCCCTAGAACCAT

Genomic Sequence Deleted:

[illegible]

Genomic Locus: *(The deleted sequence represents nt 21924-24565 in the sequence below. KOS39 used to generate the TV represents 16279-26798 in the sequence below.)*

CCTTCACCAAGAGGGAGAGCCCACTGAGGGCAGGGACCAAGCGCTGAGTCAGGTCTTTCTCACTAGCGTAGGCTGAGAG
 GTGTTAGGAAATGCCCGCAACCGTGATTCTTATCCTCCCCTCCCGGGAGAGTTCAGGGCTTGCTTCTGCATCTCAACAC
 CTGCCCCCTCACACTCTCTCCTCTGTCACTTGTCTGTCTCCACTCTCGGATTCTAGGCTAGTCATTCCCTCTTCCAGGAA
 TGCTTTCCAGCGGTACGCCAAGTACCACCTCAATTTACACGGTTCTCTGCTGGGATGGGGCTGTCTCCTTTAGGCCACCC
 CTTTTCCGCTTAAATGGACAGGACACATCCTTACCGACACCTGTCAGTATCGAACTGTTGCAGTACATTACAGCTGTGT
 GTTCCTTCTTTTTATTTCTTTTCTCTCTCCTTCTCTGGCCTCCATCTTCCCAGCCCCCTTTCTTCTTCTCTCCAGCCTTT
 AGGCTCTGTCTGAGCAGTTTCTGCAGTTTAGCTGCGTTACCGGGTCTCATGCTCAGAGTCTGTGCAAGGCAAGGAAGG
 ACACATCATCTTTATGAAAACCTCAGAGGTTTCAGGCTTCTCTAGATCCAGTGCTGTCTGGGCCTGGGCTGGATACCCAG
 TTTTGGTGCGCAGATGTGGTCACAGCGCCCCCTTGTGTTCAAATGTGAACACAGCCCCCTTCTCACACAAGAGGCTCAG
 TAGCAGGGCAGAGTCCCTGGAGATATTCCAGAAATGAGAGGTGCCCTGCTGTGCATGCATTTGGAAGCAGGTCCTCTG
 GATTCCAGTTTTAAGAACCTAGAGTCCCTGCTCCCTCCCTGAGTCACAGTTATGTGAGTCTCGGCAAGTTACTTCACTGGG
 TTGCATGTTCACTAGCATAAGTATTAACAAGCATTACTCTCCTATCACTGCACTAGCCGGGATGGAACACCCCTCTTG
 GTACGGGTCCAGTCCCACAAGAGAAAAGCTTGAGATTGTACAATCTGCCTAGAGAGTCTTCAGTCACACCCTTACCGCC
 CCCAGCCCCTCTCTGTTCCCCCATCCCTGTCCATAGCTACTTCTCTGTACAGCAGTTGTTGGATAGACCCGGAATAGA
 GACTGGCCTTCACTGTTAGATAAAATTCAAGTCTTGACTCCACACACCTGGTCCAGCTTCAGATGCCTGGAAGAGATC
 AAGGTTATTCTCTATACCCTAGTTAGTCTGAATTTGGCGTTCCCTCCTCCAGGGGAACTCCCTCCCCATACTTTTGAGATT
 TGTTCCCTAGCTTTATGTGGGTGCTGTCAAAGGCCACCTCCCCAGAGGCCTTTCCTTCATGGCTCCCTCTACTCTAT
 TTTTGACAAGCAAACCTTTGTGCTGGGGATGTAGCTCAGAGATAGATTGTCTAGGATCCCCCTGTGAGGGGCTGAGGGT
 GTGGCTTGGCATGTTAGGTCCTTAATTCAATCTTCAGCGTTGAAAAAAGGGGAAAAAAACTTCTTCAAAACTGACCATA

TAATCAGTCACAAGACAGGCCTCAACAGACACAAGAAGACTGAAATAATCCCATGCATCCTATTAGATCACCACGGAC
CAAGGCTGCTCTTTAATAGCAACAAAAACAACAGAAAGCCCACACACACATGGAAGCTGAACAGCGCTGTACTCAAT
GGTAACTTGGTCAAGGAAGAAATAAAGAAATAAATTTAAAGACTTTAGAAATTTAATGAAAACGAAGGCACAACATACCC
AACTTATGGGACATAGGAAAACTCATAGCTCTGAGTGCCTCCAAAAAGAACTGGAGAGAGCATACACTAGCAGCTT
GACAGCACATCTGAAAGCTCTAGAATAAAAAAGAAGCAAATGCACCCAAGAGGAGGAGAGGGCAGAAAGTAATCCAAC
TCAGGACTGAAATCAACCAAGTAGAAACCAAAAGGGCTATACAAAGAATCAACAAAACCAGGAGCTGGTTCTTTGAG
GAAAATCAACAAGATAGATAAACCCCTTATCCACACTAACTAGAGGGCACAGAGACAGCATCCTAATTAACAAGATCAG
AAATGAAAAGGGAGACATAACAATAGAACTTGAGGAAATCCAAAACACCATCAGATCCTACTACAAAAGGCTATAAT
CAACAAAACCTGGAACCTGGATGAAATGGACAATTTTCTAGACAGATACCAAATACCAGAATCAGGATCAGATAAAC
CATCTAAACAGTCCCATAACCCCTAAAGCAGTCATTAAGTCTCCCAACCAAAAAAGGCCAGGACCAATGGGTTC
AGTGACAGATTCTATCAGACTTTCAAAGAAGACCTAATACCAGTACTCTTCAAACCTATTCCAAAAATAGAAACAGAA
GGAACACTGCCCAATTCATTCTATGAAGCCACAGTTACACTGTGCATTCTCCCTGGAGATGGAATGGTTTTCTGTCTAAT
CAGGAACCTGTGCACAATTCCTTTCTATAGAGGACTTCATGAGAGATTTTTTTTTTCTACTTCTATCATGTTTAATGTTCC
AAGTAGATTTTAAAACTGGTTGAGTGCATATTACTTTTAGCTTCAGAAGAATTCATGTATATTTAAGAGGCATTTAACT
ATTATAAATTATTTTCGATGACTTAAAAATGTCAATACTGAGCTGTATATTTTTAAGTAAATTTTTAAAAAAGGAAAAA
GCGACAGTCACAATCACTCGTTATTTGTTTGAATGGCCCTCCCTCCGCCCCACCCAGACTGAAAAATTTGTGGAGGG
GCTCCTGTCTCTGCCACTGCAGCTTCCTGGCACTTGACAGGAGGACCAGACAAAAAGATGTCCAATATTTGCTGAATGA
ATATTTGACCTGGTGCTTTATAAGCCTAGGGGGACCTGATGGCGGCAGGGCATCCACCTTTGCTTTTTAACTTATCTTAA
TTTGGTAAATAGAGACCTATGGAGTCACTTCCAAGAGGACAGGGCCACAGAGGCTAAGGAGCACCTTTGCCAATGT
TGGGGGAATGATCCAGGGAAGTTTTAGTACTTTTGAAGAACCTCTTCTTGGGAAGGTTCTTCAGCCTCTCAACTTCTT
AATATGGCAAGGCAGCACCCAGAAGCCTGGAGCCCCCTGGTGCCAATCCCCAGTATACAGAGCCAAGCTGGACATGG
ACTTGATAACTGGACTCTCATCTCCAAGATAGGGGTGAAGGCAAGACAGTTCATTTTCACAGGAGGAAATGGCAC
CTTAGAGAGGTTAAGGCAGAGACTCAGCACAAGTTCTGTCTCCAGAGTCCAAGCTTGGGGTGCCCTCCTCACTCACAAC
AGATACCAGGACTGGGCAAGGCAGTCACCCTATTATAGATAGGACTGGTGACAGGCCCTGTGGTCCCTTGAAGTTGCC
ATGGGGAAGAAATGAGAAGGTAGATATAAGCACTCCAAGCAAGATGAAGTCCCCTTGAAAGCAACGTGTGTGATG
AAGACCCGTATGTGGACACTCTTACTTTTCTATTGCTGCGATAAAACACCAGACCAAAAAACATCTTTTCGAGAAA
AAGTTTTATTTCAACTTACATTTTAGGTACACTCCATTACTGAGGGAAGTCAGCAGGAAGTCAGGCAGAGGCCATGAG
GGAACACTACTACTGACTGGCTTACTCAGCCTGCTTTCTTATAGTATCCAGGATCACCTGCCTAGGGACTGGACCGCCC
ACAGTGGGCTGAGCCCTTCCACATCAATCATCAATCAGAAAATGCCCCACAAGCTTGCCCTGTAGGCCAATCTTATGGAA
GCATTTTCTCAGATGACCCACGCTGTGTAAAGTTGACAAAACAAAAACCAAAAAATGGCCAGCCAGGACACTAACTCA
ACAACCATGTGAAAACATAAATTTGGTTTCAAGACCTATCAGCTCAGCAGACCACTGGCTTCCAAGACCCACAAGCT
AAGAAAGTCATCAGATAGTTCTCAGACTGACAGAAGGGATTTAGCTTTGCTATAACCTGTCTACCTGCAGTTCACAC
CGACATACTTGACCAATGTCTTGATTAATGACTTTCTATTGTCTAGGGCTGTAAACGTTTGTGTAAGTGTCTCCACGGC
AGTTTCCCAGGCAACCTCAATTCACATACCCGCCCATGGAAGGTCCCAACTGGTTCAGAACAAACTTTCTCCAGTTCCC
GTAGGTGCGAGAGCTGTGCCTGGATGAGACGGGTATAGTGACGATTGTGAATATTCCTAGTACGCATGTGACTTTGTTT
ACCTGACTTTGGGAAAACAGAAAAGGAGGGCCAGGGCTCTCTGAGCCACAGAGGTGTGCGGGAATGCATGGGTGTG
GTCCCTTCTCTCTTAGAGCTGGTAGCTGTGCCTAGAGCGCCCTATACTTCAAGGTTTCTGTTGCTCTACAGGGCCCATCC
TTCCATGGGGTACAGGTAGGACACGGGGCTCAGGTTGCAGGGCACTGGACACTTTAAATAATCTGCAGGGCTCAAGCG
ACTCTGCAGGGTACAGCCACTCCACACGGAACAGGTCAGTCCCAAGGTGCCGTGCACTGAAGGGAAATCACTTCACA
GTGTATAGATTACTCCACAGTTGCAGGGCAGTGGGGTACAATCACTTCCCCGGACACAGGGCAATGTAGAGTGCAGAG
CTCAGGTCACTCCGCCACGGGGCTCAGGTACACTGCGATACACAGGTGGCTCCTGCCCGGTCCCCTCCATTCCCAAGG
CTCAGGTCCCTCTGCGATACACAGGTGGCTCCTGCCCGGTCTCTCCATTCCCGGGGCTCAGGTACACTGCGATACAC
AGGTGGCTCCTGCCCGGTCCCCTCCATTGCCGCATGGGTTGGCTTTATCTTTCGGTTGCTTGCAGGTGCAGGGTCTGT
GGGGCCACAGGGTCACTGGTGACTAGGCTTGGGTTCCAGGCTGTGGAGGCTCAACTTGCAGCACACGGCGGCCCTTG
CCGATGGCCAGGCGCGGCAGGCCTCGGTTGAGGCCATCCAGGAGGGCACAGGCCTGGCAGAGCTTGTGGCTGGCCAGG
GCTCCGCAGCGGGAGCAGGTGCCTGGAGGAGGGGGCTTTGCTGCCGGAGCCAGAGCTAGGCGCTCTGCCGAGTGCAGC
AGGTCCAGCACGGCTGATGGTCTGGCCGCTCCAGGAGCTTAAGCAGGTCCCGGGCATGACCACGGAAGGCCTCAGGG
GCATACACGCACTCCTCGGAAAAGTAGCGGAGATGGCGGAAGTGCGCATACAGCACCACTCCTTCTGCGAGGCAAC
TGCAGAGGCCGGCACCTGGGAAGTGCGCACCCCTCGCCCGTGAGGCCAGCACCCACCCCTCGCCAGCCTCCCAGCA
TCACCACGCAGGAAGTTCATGAGCACCGTCTCAGCCATGTCGTACGCTTGTGGCCTGCGGGAGAAAGAGCTCAGGTC
AGGTGAAGGATTAGGACAAAGAAGAGAAGGTAAAAAGTCCCAGCTCATTTCTGGTTTTGAAAAGTTACCGAAATCCAC
CAATCCCTGAGCCTGAAAACCCAGCACTCTGACTTGAAATGTCACCAATCCCCACCTTGAAAATCTTCACCCTGTAAAC
TCTTCCATGTTAAATACTCTAAGCCGGTCCCCTGCTCAGTACTCCATGGCTTCTCACTGCAGCAGAGGCAGCCACCTTCT
TGTGTCACTTTCAATCAATCTCTTGTGCGAGATTTGTTGTATGGTGTGACTCTGTGATATTCCTTGGCTCCTGACTGCCAA
GATACCTTTCCCCCTCAGAGCTGTGTACCGCACTCATAGCCTGCTGTTGCTCTTGCCAATGGCCAGACTCAGTAGGCCC
CAGCTGAGGCGTGTGTACAAGCCTGGTATTTACACGAGGAGGGGGGGCCCCAAGAAGCCCTGGACAACAGGAAAAAGTG
GAGAAGAGGGCCGGAACCCCTGGAGCAGATGAGAGGACCCGGTAGATCCTCCCTAAGGAGAAAATGTAAAAGGGACC
ATAGAGACACTGGGGCCTGGGAGAGTGGAGGTGGGCGTTGGAACGAACACTCAGAACCCAGAGATAAAAAGGAGGGA
CAGTGGAAGTTCTCAGCACCATAAAGGGGGGGGGGGAGTGAGACCCACCCACCCACTATCTTGCACCTTCATTT

[illegible]

TTTGTCTTAAAGCGTTCTCCAAGACCGCTTCCTCAGTCACCAGCCGGCTTCCTGGTCCTGTGAGAAAGTGAAAGAGAAC
AGCCAAATAAAGTGGAACGCTACTTCCTTAAGAACAGGAGAGTAAGTTCTTAGAAGAAAAATAGTGTATCCTTGAAC
ACAGATAGGATGGGACCCATTCCCAGAGACCTCTGCTACTTCTCATCCCATAGGACATCTGTGGTGGGAATGGTTAGTT
GGGAGTCTGTCTTCCTGGGATCCTCTTCTTCAGCCTCCTGCAGACTGTGTGTGGTTCCCAGCTTCCCCAGTCTGTTTCTAC
TGGATGTTTGTTCATGTCTGACCTGGTGCCCCATTATCTTTCTGCAGTTTGTCTGTTTATGCACTTGAAATGAAAAGCATT
CCTACTGTGGATCATTCTCCAGTTTCAGACAGCTTTCTACCGACGAACCACACTCCAGCCCCTCACTAGGGGATTCTAG
GTAGGGACTCGATTATTGAGCCACTTACTACCCAGGAACTTACTGGGAAATTCTAGGCAGGGGTTTTAACACTGTGCCA
CACCTTAGCCTCTCATTAGGGGATTCTAAGTGGATGCTCTATTACTAAGCTAGGTATATTCCCAGCACCTCATTGGAGA
AACTCTAGGCAGAGGTTTTAATAGTGAGCCATGCCCCAACTCCTCAGTATTGGTATTAGGTAAGCACTCTAATACTGAG
CTATAGCCCCAGAATGCACCACCTTCTATGCTTTTTAAATTTAAACAGGGTCTCGCCATGTGGCCAGTGCAGTCCCTCAA
CTTATAATCCTTTGCTCGGTCTCCAAGTAGCTGGAATTACGGCCCTGAGCTACCAGCCTGGGTTTCAGTCCGTGGTTT
TCAACCTTCTTAATTTTGCAACTCTTTCACACAGTTCCTCATGTTGTGGTGACCCCACTCATAAAATATTTTTGTTGCAA
CCTCATAATTGTAATTTTGCTGCTCTTATGACTCATAATGTGTGTATCTGTGTTTTCCAATGGTCTTAAGCAACTCCTGTG
ACCCCAAAGGGTCACAGCCTACAGCATGAGAACTGCTGACCTAGGCTATGGGAATAGTGCTTCAGCACACAGATAG
AGCGAGCTTAGATAGATAGAGCGAGCTTAGATAGAGCAAGCTTAGAGCGAGCCCACTTGTCTGGCCTGTCTACTCTGTC
CTGTGGTCCTTATGTGCCAAGCCCCTCTTCATCAGCATCCCAGACAAATTGATTCCAGCTAAGTAAGGGAAGAAGGAGA
AAGACTTCACCACACTGCAGAGAATCAAGGACCAACGCAGACATCTGGTTGGTCCCCTCCACAGCCCTAAAGAAATGT
GTGACCAAGTCTGGGCAGGCAGTTTTCTGGGGTCTGGTGTGTTGTGTGTAATAATGGAGAACTTCCAGGTCTGGGGCTCA
GGGGGGAGCACACTAAGAGGTCCAGAGGACTAGGGATTCTAGGAGAGCTCATGAGTTGGCGAACTTAAGTCTCAGTT
GTTCTGAGTTCTTGAGTGAGGAGAGAAAGAAAGGAGTCCAGGCCCCACCTTTCTGGTTGAGTTTATGGCTTCGTGTCTT
AATTTGCTTCCCTGCTGCTGTGATAAAACACTGACCGGAATAATTTGCATTTATTTTAGCTTAGAGAGCACAGTCCATC
GTTAAGGGAAGCCATGGGAGGAGCTCAAGTCAGGAGCTTGAAGCAGAAACCTTGGAGGAACCTCTACTTACTTACTTCC
TGGCTCACATTTAACTGCTTTTATAATACTAGGAGGACCACCTTCCCAGGAGTGGTGCCATGGGAGGTCCACCTTCCCA
GGAGTGGTGCCATGGGAGGTCCACCTTCCCAGGAGTGGTGCCATCTACAGTGTGCTGGGTCTCCCATATCAGTCAGCA
ATCAATAAGATCTCACATAGGCCAATGGGATTGAGGCAATTTCTCAATTGAGGCAATTTCTTCTTTTACGTTGTCTTA
GGGTTTCTGTACCTTTCCCCAGTGACACATTTACTCCGACAAGACCACACCTCCCAGTAGTGCCAGTCCCTATGAGCCT
ATGAGGCCGTTTTTCAATTCACAGGGCCACAGAGGTCTTACCTTTCTGTATTAGTCACGGTCCCCGTGGGCTGCGGCTTTGC
TCATCTTTTGCTAAGCATCAGAGCTTATTTGTGTCTTAAGAGATGTGAATCAACAAGGCCACACTGGCTTCACTGCACCC
TCAGTTTTGTTCTGGGCTCTTTCAGGACGTGACACTTGAGAGGGCAACCTTTGCTGGGGCGGGATGGCTGACCTCAAGC
ACTACCCACACAGGCCACTCTCCATAAGAGAGCCAAGAATTCCTCAGGTTTCTAGAAGCCCCATAAATCTATGAGTTG
AGGATTGAGGTTGAGCTATTGGGGCCTCAGAGCCTTTTAAAAGGCACACATTTTAAAAACCCAGGCATGGTAGCATGC
ACTTGTAATTCAGACTCACCGGTAGGGGGTGGGAAGAGACAGACAGAGGACTCCCCCGCCCCTGATTTACTGG
TTAGCCAGTTAACTTACTGTTAAAGCTTATGTCTACCCGAGAAGCCCCAGATTAGTGAGGTTGTCTCTGACCTCCACAT
GCATGCAAACATGAGGTGACTCTTCTACATGAATGTACCCTTCACACACATACATGATCATAGGCTCAATTCATATTTT
AGGTTGGGGTCTGGGAACCAACACGCAAAACCACTCAGACAATGATCTCGGTCAAACGGGGATACTTTATTAGATGGCA
CACCCCAAGACTGATCAATCAGGGCCATAGATCAGACTTGGGAGGTGGCTGTGACATTGAGTTAGGATCCTATAGGGT
TTTTAAGCCTAAAATCCACAAACATTTGTGCCAAGTTAATTCACAAGTCAGGATGTAGGGGACTTCTCAGGAACATGT
CTTGCTTATACACGTAATGCTGCTCCCATTTCGTAGGGGTATTCAACTGTGGTGAGGATTTGCCTTGCCTAACATTCATGT
TCTAACTTGCCCTACTAGCATGTCAGTTACCCGTGCAATATGTCTCTTTCTGCCAAATACAATGTCAGTTCCCAAGGAGGT
CTTGGGAACTTAACTTTACTCCACTCAAAATGGAAGTCTTACTCCAAATAGCTTTTTTATATTGGTGCAGGTGTCTCTCT
TATGTTGGGGTCCATTCCGAGGGTGGCTTATAAAAAGGGAAAAATCATAAAAGCTCAGACACAGGTGCAGGAAGTGCT
GCCTGGCCATTGGTTCTGGTCCAGACTTCTTGGGGCTAACTATACAAAGCAGTTCTAGATGACTTTTATTATGATGGGA
AAACACCAAAGCATAGACTATAACAAGATATGTAATTGAAAGACTCCGAAAGGAGCCCCTCGCTCAGGCCTCAGGACA
ATATCGGACACCCAAGAACTCACGATAGACCGAGCTTGTGCAAACCACATGAGGCTTTATTTCGGGGAAAGCCAGAGC
TCTGGGGACGACTCATATACCACGCAGGGAAAGAGGTCCCAGTTTTTATAGGCCCTCGGGGGAGAAAGGAGAAGGGG
GAGAGTAGGGGATTTCCAGATCTAAACAATGTCTATTCTCAAGAAATGGGTATGGGAAGGGTACAAGGAAAGAGTCTA
ATGAAGGTGCAGCAATGGGCACACACCACCTGGTCAGAACATTGGCAGACACACAGGTTTCGAGGAGTGGCCAGAGCA
TTGTGCACCTCTATTTTTCTAAATCAGTGAAGCTAGTTCTGCTAACACTGACATCTATCTTGCCAATTTACAGGGCTTCTGT
GACCTTTTACATTCTGTGAGGATCTTTCATAATCAGCTTGGCATGAGAACGTTTCTAGTAACCGTGATTACAGCATTG
AGAAAGTTTTCTTGTATCATTAGTAACAGCACAAAATGGCCCGCTTGAAAGATAACAGTTACCTAGGCCCTAACACTTT
AGAAGAGGCAGACGATAATGATGATGATGATGGTGATGGTGATGATGATGGTGATCAGTGTCTCTTATACTGAGTGGA
ATGTCATATTTGTATAGGAAATGCTTGTGGTTGTTTAGAGAATACTTCCCTCACGTGCTCACTCACTTAAGCATGTGATG
CCTTGCAATGATCTGTTGTGGGGCGGAATCACAACCTCTCAGGGATGATGAGAGGATCAACGAGACACGTACATAGAGA
ACAACCTTAGTGCCGTCCTTCTATCCCCGAGGATGGGCAGCACGGAGTCTCCTCGGTATGTCCATGCTAGCCCTTTGA
CTCCAGACCAGGGCCTCTGTTCTGTGTGACCAGGCTCTTCTGCGGGGACAGCAATGGCTCAGTCTCCATTGACACCATG
GACAGCATCATCCTCTTATTTAAAGCTCTCCAGAACCAGTCTGTCTTGGGCAGAGACAGAGGGCATCCCCAGCTCTCAT
GGGCATACCTGTCACCCATCAAGATATTGCTTCCCGTAGCGAGAATTTTGCTTTCTTTGAAAAGCACAGACATACTATG
GTAATATGTTTTTATTTTAGTCCCAGGTGTGGGATATGGGGCTGCTTCAGGTTGTCCACAGCAGCTGACTGTGATTTGCA
GTCAGTCATACTCTAGCAGGGGTGTGATTTTGCCAGCTGCAAAATAGTTTCTGCAATTGTGTGACATTTGAAATTCAGGG

GACTTTTCAGAGGGTATATAAATGCTAGAGCCCTAATAGGTTGGGTGGTTGTTGTTGCTGGGTTGGTCGGGGTTTGTTA
AGTAGTTGTTAAGAAGAAACAAGAAGAAATTAATATCCTGATGGTGAAGATCAAACCTTGCCCCAAGGAACCTTTACAC
TCCCAATCAGCAGGAAGTAATCTAATGATAATATCACCCCTCCCCCTCTATCCTTTTTTCTCTCCTATCTATAGTTAGG
AGAAATTAGTGGTTTCAATAGGTTTGGCACCCATAGACTTGTGTGTTTGAATGCTTGACCCACAGGGAGTGATACTATT
AGGAGGTATGTCCTTGTGGAGGAAGTATGTTATTGTCAGGGTGGGCTTTGCCAGTCTTCCCCTGGATCCCTCCAGAAC
AAGATGTAGAACCCACAGCCCCTTCTCTCATGCCTGCCTGGATGCTGCCATGCTCCGACCTTGATGATAATGGACTGAA
CCTCTAAGCCAGCCCCAATTAATATTGTCCTTATAAGAGTTGCCTTGGTCATGGTGTCTCTTCCAGCCAATGGAAACC
CTAAGACAGGGGTAAAGTGYGGGGGAAAAAAGAGTGTAGAAGGATGGAAGAAAGAACAACCCACAAAGTAGCCA
AAGACGGGCTACAGCTGTCCACTAGATCTGCCCTACCTGCCTTTTCTGGAGACCTGAAGACATAGCATGAATGTGTTCT
ACCAGGCAAAATGAATGAATAATGAATGGAATGAATGAATGAATGAAGTTCCATCCAGAGTACCATGGGTCATGGGCAA
CAATTCATACGTATTAATTTGATGCCAGTAGACAATGTTGACCAATGGCGTGTGAGGTGGAGAATGCATGCAATTAGA
CAATCCCTGCCATACACTATTGAGATTTATATGGCAAGATACCCACAACTATAAAGCTTACAGATATCAGAGGTTTACT
CCTTATAGAGCAGGAGGTTAATTGGTGGCCTGGCAGATTCAATATCCTGTGAAAGTGTATGTTCTTGAAAATGATACTT
TGTCTTGTGGTCTGAACAAGCAAGCAACCTCCCTTGGGTCTCTTATATAAGTAGCATTAGTCCAATTTGTGTGGGCCCATC
CCTGTGACCTAATTCCTACCTAAGTGTGATGGCTAGTTTTATGTCAACTTGACACAAGTAGAGTCACCAGAGAAGGGAG
TTTCAATGAATAAAATACTCCTGTAAGATAGGACTGTTGGCAAACCTGTAAGGCATTTTTCTTAATTAGTGATTAACAAG
GGATGGCCCAGACCATTGTGGATGGGACCAGCCAGGACTGGTGGTCTCTGGATTCTCTAAGACAGCAGACTGAGCAAC
CCATGGGGAGCAAGCCAGCAAGCAGCACTCACCTATGGCTTTTGGAACCTTCCACTGCCTCCAGATTCTTGCCCTGCCTG
AACTCCTGCCCTTCTGATTCTGACGATGAAGTGTGTTATGTGGAAGTGTGAGTTAAACAAACCCCTTTCCTCCCCAAGT
TGCTTTCAGATTTGGGGTTGCATCACAGCAATAGAAACCATGACTAAAACACTAGACAACCTCACCTCCGTGGCTCATTG
AAGTGTTCACTACACAAGCATGAGGGTCTGAGTTCAGACGCCAGCTCCACATAAAATCCAAGGGCAGGGTGCATGGC
TGTATTGACAGTGCTGGAGTGTGGGGGAAACACTAGGCAGATGCCAGGGAGTCACTGGCTAGTGGGGGTGGGGTGGGG
AGGGGACTACCTTAGGTGTGTGCTTGTGTTGTTTGTGTTTGTGTTGTTGATGAAATACCCTAACAAAAGCAACTTATAGGAG
AACTATTTATTTACACTCTAAGTTCAAGATACTGTTGTGGGAGAGAAGTCAGGACAGCAGGAGCTCAAAGCATCCACA
ATCAGGAAGCAGAGAGCAATGTTTGGTGGTGCCTCAGCTCAGTTTCTCCTTTTCATACAATCCAGGATCCCAGCCTAAGG
AATGGTACCACCCACAGAGAAAGCATCTTCCCACCTCAATTCATCTAATCAAGATAAGCCCCCACAGGCATGAGCAG
AGGCCCATCTCCCAAGTGATCTTAGGTTTTGTCAAATTGACCACCACAGAACCTGCTCAAAAAGTAAGGTGGAGAGTG
ACAGAGGAAGAATATACCCAAAGTAGAATTCGGGATTTTATATGTGCATGCATGTGCACAGGCAAGTGCCTGCCCCC
CACCCCAAACACACACACATACACACACACATACATACACATTCCCTCCACCCACAAGGACCCACGTCTTAACACC
ATAGCCTTGGGGAAAAGGATCTTAACATTTGTGTTGTAGGGACTTTAGCACTTCCATTCTGGAACCTCGGTGTCTTCTGAA
AATGAGGAAGAGACATGTGTATCTTCTCAATTCCTAAGGGCTATGTGTCATAAGTTCCCTCTCTTAGATACAGATTCTCAG
GGTCTTTTCTTCTGTACTGCTTTTTTACAAAATGGGGACAAGAGAGAACCAGAGAGGCAATGGCCCAGCCCTTCTGAC
CACTGAATTGCTGCAATTTCTAGTAAGTAGAAGAGAGTATTTGGGCGAAGATGGGGGAAAGGTTGGTTGACAATTGAA
AATTCAGAAAGTGGCGCTAGAGAAAGAGAGTGAGAGAGAGAAGAGAGAGAGAGAGAAATTGTTAGTTGAGGATGATG
GACAAACATACTTAAGCCACATGTATTAATCAGGGTTCTCTCAAGGAACCTGGATATTTATAAAATGAATATGATATAT
ATCAGATATATACACAGTGGGGGTTATAGTAGAATGATATACAGCCTATGGTTCATCTACTTCAACAATGGATGACTA
CCAATGGAAGGACAAAGGACCCAGTAGTTGTTCCGTCATTGAGGCTTAATGTCTCATCTGGTCTTCAGTATATGGTAGG
ATGCCAAAGACGTGGGCTCTCCCGCAGGAGAAGGCGTGGCACAGATTAAGGATGGGCCTTCTCATACCAAAAAGATCTC
TATTAAGGTTTATTTTCTCACTGCAAAAAGATCCAGATCAAAAAGTGGGTCTTCCCACCTCAAATGATTTAATTAAGGGG
GGGGGAACCCTCATAGATATGCCCAATCACTTGGGTTTTGACTAATTCCAGATGTAGTTTCGTTAAACAACCAAGACTAG
GCATAACAAGGAGCAAATGTAGAAATAAGGAAAGGAGTAGGTGGATGACCCAGGAGGCTCACAATGGGAAGTTTCTT
GATGGCATTCTCTTGTGGTATATCTCTGGGTCACTTTTCGGATGTGTTATGTATATTTTTCTATCTCAAATGTTTCAAG
GAAAACCTGACGTAAGTCAAAAGAGACTTGACCTCTCGGGATTATCTCCACTCCCTCCTAGCTCCCACCACAAGTTAAAC
ACAGTCTTCTAGGAATTGCTGACACCATTCTGAGGGGAGACAATAACAAGGCTGGTGTGTTCTCACTTTATGTCTTCTGTT
CACTTGAACCCCTTAGGAAAGATTCTGAATAGACAAGTGGTCCTCTGGAGCCAGGCAAGAGTAAGAGACAACAGCAGG
GAAGAAATATGTATTGGTAGGCTGTGGCCATGACTCAGCAGTAGAGAATGCCAGTGAGAGGGTAGGGGCATGACTCAA
TAGGAGAACCCTTCTAGAGCCTCCCAAAGTGGCACTGATAGTGTGGTTCAGGTTTAGAGCTCCTGCCTAGAATGCCC
CAGTGAGGGGCTGGGGATGTGGCTCAGTCGTAGAGCATATGCCTAATGTAAGTGACCCTGAATTTTGCTCCAACAAG
AAACCTTTCCTTGATAAGGAAGAGAGTTTTTACCTCTTTTAAAAATCTGTGTTACTGGGGCTGGAGAGATGGCTCAGT
GGTTAAGAGCACTGACTACTCTTCCGAAGGTCTGAGATCAAATCCCAGCAACCACATGGTGGCTCACAACCATCCGTA
ATGTAATGAGATCTGACGCCCTCTTCTGGTGCATCTGAAGACAGCTACAGTGTACTTACATATAATAAATAAATCTTTTT
TTTTTTTTTAAATCTGTGTTATTGTAGTTTTCTAGGTCAATGCTTGAGCGCTAGTAGCCCCAACAGACCTAATAGACCTC
AAGTCTATCTTCAGGGTCTGATAAGAAGTTTAGGTTTAATTACAGATCAAGAAGTATGTATGATTAAGAGTCCTGCTA
AACGCCGGGCCATGGTGGTGCACACCTTTAATCCCAGCACTCGGGAGGCAGAGGCAGGTGGATTTCTGAGTTCGAGGC
CAGCCTGGTCTACAAAGTGAGTTCCAGGACAGCCAGGGATATACAGAGAAACCCTGTCTCAAAAAACCAAAAACAAGC
AAACAAAGGAGTCTGCTAATGGTTTGATACAGCCCATCTTTGGCAGATCCTTGTTTGGCTCACAAGGTGTTCCAGTAA
GTTTTGTCAAACGGTGTGGATTCTTCTGGGTTTTGAGTTCAGCCTGTGGGTATCATCTGGACTTTAGCATTCTCTTAC
TTCAGCATGGTACTCCTGTGGAAGTTTAACTCTTTGGAGCCTTTTATCCCCCCCCAAAAATGTGATAGCAAATGGAAG
GCACAGCATCTCTTAAATGTCTCCTCTCTCGCTAGATCAGCTACATTAGACTTCCATTTGACAATCTTCTCTCTACCA

[illegible]

[illegible]

GTGCCAGGGTAGGGGCGAGAAACAACACTGGACCTGGTGCAAAATGGTGAGCTCCAGGGTTAATGAGAGAGGCCCTGTCTTAAAA
AATAAGGTGGAGCACCATAAAGGAAGACCCCGATATAGACGTTTTACCTCGGCATTACAGTGTATACACACACCTCAC
ACTGATGTAAACACACATATATCAAGAATAAAAAGAAGCCATGGTCTACGTCTGTCATACCCATTCCACCTTAGAATATC
CAACAACCTGCCTAAAAATCTCACACTTGTGTCCCTAGTACAATATAGGTATTGGGGGTCAGAAGGAATGGATTATGGTC
TTAACTGGAATTTTGGTTTGGGTTTCTCTTTAGGGCTTGTACAGTAGCCAGATTGAACTGGAATTCCTATGTAGACCA
CACTTGTCTTGAACCTGTAGTGAGTCTCCTGTCTCTACCTCTGCCCCCTAAGTCTAGCATGGCAGCTGTGCACCAGCTTT
CCCAGGGACTCTGGTTGAGTTGCTTATTTCCGTCTCGGCTTCACATCTATAAACTAGAGACAGAAGGACTATCTTGCTG
GTGGAGCTAGGGAGACGGGGTGCTTGTTAAGTATTAAATGTTTTTCAGAAAGTAGGAGTGAAGGTGATTCCCTCTCCCCAC
CCCCCAAAAAAATTGCACATGGGAGGCTGGAGAGAGGGCTCGGGTTTAGAGAGTGTGTTGCTCCAGCAGAAGATCTGA
GTTTCAGTTCCCAGCACCTACATCGAGCTCCTCACAACCTCCTTTAACCTCAGCTCTAGGGAATCAAATGCCACCTTCTGG
CATCCGTAGGCACTGCACCTTATGTGTATATACCCCTACACACATATATGCAATTTAAAAATTTAAAAATGTTTGCGGGTG
AGTAGATGTGGGGTTCCAGGGGGCCCTGCTGTCTTCTCTGACTCTCTCCTTTTCTCTTTACAGAATCCCCTGGTTGAA
TCCCAGGCAGATGACAGCTCTGAGCCCTGCCTTCATACTTGAGGCGGGCCCCCTCCTCCACAGAGGAAGAGATACATT
ATGCGACCCTCAGCTTTCACGAGATGAAGCCCATGAACCTGTGGGGGCAACAGGACACTACCACGGAGTACTCAGAGA
TAAAGTTTCCACAAAGGACCGCATGGCCATGACCGTGGCTGGAGAAAGCATGGTGGCCCCAGGAGAGCTGGCTCTGGA
GAAGGAAAGAGTACCTAGGTTGACATGTGATACACAGGCGTTTCAGAGCCATTCTTCTGTGACACAGGCGGTTCTGTGC
TGCCCATGCCCTGTGCTGCCCTGTCCACACAACCTGCTATTGTGCCCTGGGAATCATAAAGCTTGACCTTTTACTCCTCT
TCTCCCTTCCCTCCTTCCCGCCCCCTCTTCTCCTCCTCCTCTCTCCCTCTCCTCCCTCTTCTCTTTGTTTTTCCAAG
ACAGGGTTTCTCTGTGTAGCCTTGCGTGTCTAGAACTTGCTCTGCAGACCAGACTGCCCTTGAACCTCTTCTTTCCAAGT
GCTGGGATTAAAGATGTGCACCACCACCCAGCACTTGACTTTATTGTAAGTGTATGTGTGTGAATGTTTTGCCTGCACGC
AGGCCTGTGCGCCACCTACATGCCTCCTGCCTGCAGTGGCCAGAAGAGGTCATCAGACAGTTTGAAATTGGAGTTACAG
AGGGTTGTGAGAGGGCCACATGGGTGCTAGGAACTGAACCCAGACATCTGTAAGAGTAGCCTGTGCTCGTAACTACTAA
GCCATCTCTCCAGTAATAAGATTGACTGTTTTAGATCTAATTTTTACTTAAAAATTGGCATATATTATTTACACAGTGAT
AGACTTTGCTATATTTTCTTCCAAGTGATCACATATTTTGGCCATGTTTCATCCCCTTCTCCTGTTAGCATCCTATTAGTC
GCTAGGCTCCTTTCTCTCCCCAAACAATCCCTTTATGGTTTCATGTTGTATGTATTAGCTACTTTTCTTGCTTTTGTGAT
AGGATGCTGACAGAAACATGAAGGATAGGAAGGTTTATTCTTGCTCATGGTTTCAGTCTATCATGGCGAGGAAGGCAA
CATGGTGCTCAAGTGAGTACATGTAGTGGAGGCTCCAAATCTTGATGAATCAGGAAGCAGCAGGCTCAAACCAGAACT
AGATGTAGGTATCATCTTCCAAGCCCAGTCTAGACACCCACTTCTATAAGCTGTGCCTCATGTCTGAGAGATCGCAAG
GCTTTAGAAAATACTGCGACCAGCTGGATACCAAATGTCCAAATATGTGGGCCTTTGGGGACAATGTACATTTAAACCC
AAACTAGATGGATGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGATAGCAGAAAGAAAA
GGGTTAGTAGATGATATATAGATAGATGATAGAAAATAGAGACATAGAGATGACAGATAATGATGGAAAGGTAGATA
GATGATAGAAGATAGATGCTATATAAAAGGTAAATGGTAGATACAAGATAGATGATAGAAAAAAGATGACAGACAG
ACAGACAATTTGGCAGAGATGCTGCTCCACTCTGCTTTGCTATTGGTGATGCACCACTGAACGTAGCTCAGAGAAAGTG
CAGATAGCAGTGCTGGATACTGAGGGGCTGCCAAACGTGCCTTAACTCGGTTTCTTTTTCTGGTTTTTAAAAACAGTG
CATATACTTTGTGAGAGAAAAGCACTTGAGAGCAAAACATAAAGAAGATTCTAACGTAAGAGGAAATACTGATAATAC
TTAACATTTTGTCAAATGTTCACTTGATGTGAACATAAAACTGGACTGAATCTGTATTTGTGCCTATCATTGTTGATT
ATCTATACTTTTTTATTTGGGTTTTTTTTTGAGACAGTGTGGTGGTTGAATGAAAATGTCACTCATAGGAAGTGGCAT
TATTAGAGGTATACACTTGTTGGAGGAAGTCTGTCACTGAGGAGGGTTATGAGGTTTCTGCAGCTCAGCCAGGCCCCAG
TGTCACCTCTCTCCCTGCTCCATGCCTATCCAGATGCAGAACTCTCAGCTTTTTCTCCAGCACCATATCTGCCTGTCTAC
CACCATGCTTCCCTGCCATGATGGTAATGGACTAATCCTCTGAACTGTAAGCCAGCCCCGATTAAAAATAAGAGTTGCCAT
GGTCACAGTGTCTTTTCACAGGAATAGAATACTAACTAAAACAGACAGGGTCACAAGTACCCAGGCTGTCTAGAAC
GTGCTATGTAGCTTAAGATGACCTTGAACCTCCCGAACCTCCTGCTTCCAGCTTCCAAAGCCTGGGATCATGGGCATATA
CAACATACTTTCTTATATATTTCATATATATTTTCAAGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGAATGCAGT
TCATGCTGAGTTCAGATGAGAGCATCAGATAACCTGTAGTTGGAGTTACAGGTGATTGTGAGCTGCCCAACATGGGTGC
TGGGAGCCCAACTTGGGATCTTTGCAAAGGCAGTATATACTCTTCCCTCCAGCCCCCTGATCTGTTCTTTCTGTTTCTGACC
CCATCTCTGTGCCTCTGTGGCCCTATCAGATGTAGCTTTGTGTATTTCATCTATAATTAGAAGGCAACTACCTTCCTCATT
GAGAAGCCTTTCTACCAGTGTGCTTCTTAAACCTGTGTGTAGGACCCATTTAAGCAACTGACACCAGTTGTCTGAACTT
AAAATGGCTTCATTTCTCTGTCAATTGGTATCTGCGCATCTTTGAAGAATCTTCAAGATCCCCTAGTGTCAGAGTAAGGA
TGTGGAGCTGGAAACTGGGGGGATGGGGGGCGGTGCCTAGAATTAGATCCTGGAGCTCTTACACGATCTGCCCCAGCT
TGGCCAGCTCTGATTAGCAGATGGTATTAATGGCCAGGCTCCCTGTGATGTCACCCCTTGTCAGGTCCCACAGGGAGT
CTTCCAATTTATCCAGAAGCCCAGATTTCTTCAGCTCACTAAACCTGGGATGGTTCCCTTCCCTGGAATGTTCCAGAGACA
CTGGTGCTGGTGCAGTTCAGCCGTCCCCACAGGAGACTCATTCTCCTTTGTCTCTCTCCATCATCTCCTTGCTAGTT
GGTCTGCCATGGACACTTATGACAAGTTTTTCTGTGGGACGAAATGAGAGAAGTCACATCTTGTGTTTCATAAAATCCT
GGGAAAGAAATTATTGTAGATTTGGTTTAAACGCTTATATTAACCTGGGTTCTCAAATTAATCTCGAGACACTGAGTCCCTG
CCCCCAGTTGGTTCTGATTGGTAAATAAAGTTGCTGGCAGCCAATAGCTGGGCAGGGAGACATAGGCAGGACTTTAGG
ATTCTCAGACAAGGAACCAAGTAGAGGAAGGAAGAGGATGCCTATGCAGAGAAGGAATAAGATCCAGGCTTTGAG
AGCATCAGAAGAGAGAGACATACTAGTCATATAAGAGCCAGGAAAGAGCACCCCCAGGGCCTCCCCATTGGGTCTAGGGT
AACAAAGATAGAACATAGATTTTTAGTAAGTAATAACTCAGGAATATCGGAAGGGAGGTGTTAACAACATGAAAGTTTG
GGAGTGGCACAGCCATTGAGCTGTTTAAAGACATATTTAAAAATAGAAGGCTACATGTGTGTCTTTTCATTTGAGAATCCAGA

ACACTGAGGTGGCAGCAAGAACTCATGTTGCCATGGCCATGGGGCGATTTTGAGTAGAGCACTAACCCACCTAATGCAAC
AAGAAATAAATAAAGTGATCCAAATCTTCCCTCTACACACTTGCCGGTGGAAGAGATGAACCTGGGGCTTAACCTCGG
TGCCTAGCGTTTCTAATATTTCCACCCATGCTTTTAAATATTAATTTATTTTAAATGTCAGGAAAAAAATAATTAGCAAA
ACCCATCTGTTCTAGCTTCAGTTCTATTGCTGTGATAAAACACCCAGACCAAAGTAGGGACAGAGAGGGTTTGTTCAG
TTAACAATTCCAGATAACAGTCCATCACCGAAGGAAAGCACGGCAGGAACCTGGAGGCAGCTCTGCTTGCTATTCCAC
ACAGTGTAAACAGTCAACCCGGAACCTCACTCACAACCACGGAAGTGCAGCAGAAATCATGGCGGAGGCTGCCTGCTGGT
TCCACAGACTGGCTTATACCCAGCCACTTTCAAGTATTGTCACCACATCAATGTCACCGTCACCACCAGCATCATTAGT
AGTGCCATCTTTATCACCTTAGTCTGCTGTATTGGATCTATAATGTTCCCTATAAGACTACACGTTAAAGGTTTAGTCCC
TCATGGACTCAGAGTTGGGAAATCCTTAAGACATAAGGACTAGTTAAGTAAGATATGAAGTGGGTTTGGCCTAAAAGC
TGCTTGTATTATGTAATTTTGGTCCCCAAACTGCCTACATGAGTGTCTACACGTAAGACACTGAGGGGACCCCTGCTCC
CAGTTGGTTCTGATTGGTAAATAAAGAGTCTGGCAGCCAATGGCTAGGCAGGGCAGACAGGGGCGGGACTTTTAGGAT
TCCCAGGCTCGAGAGTGAGAGGAAGAAGGAAAAATGAGAGCTGCCATGCTGGAACCTGTGGGCAGGAGAGGAGAGATG
CCATGCCTGAGAAGATGGCAGGAGAGAGAGGTATGGCGGCCATGTGAAGGAGCCGAGAGGGTGCGGCCAGAGTGCGG
CCCAGCTGGGCAGCCCTCTGGGTCCACAGCAGCAAACATAGAACACAGAATGTATCAAGTAGTAACTCGGGATTATCG
CGGGAGGCAGATTAACACATGGAGGTTAGGAAGTGGCCAGCTATTGTGCTGTGTAAGGCATAGCAAAATATAAAGG
CTGCATGTGCTTTTCATTTCGGGAACGTAACAATTGGGGCGGGTAGCAGGACCCACTGCCGGACGGTTTATTAATTAT
TTATTTCTACAAAGATAGGTTATTGAAAGGATACCAATTGAAGGGAGGACTGGACTCCCAGCTTCTTCCCTTCTCTTTGC
TTTCTGCTCATTACAAAGTGTAGAAGCCAGAATGCATTGCTTTGGCACAGGTCCAGTAGCAATGGGGGCAACTATGAAC
GAAAGTTCTGAAACTGTGATCCAAGATTTATCTTAATTTTGTAAAGTAAGTTGACTCAGGTATTTTGTACAGTAGCAGA
CTGATACCATCACCAACCGTCATCACTATCACCATCACCAACCATCCACCACCATGATTACACCATCATCTCATGATGTATC
CCCCTAGCTATCCTGGAGCTCACTATGTAGGCTAGGATGGCCTAGAACCACCGAGACCCACCTGCCCACTACTTCCCA
AGTGCTGGGACAAAAGGTGTATGCCAGCACATCCAGACCCACCTTCTTTTTTAGGAGTCTCTCACTTACTGTTTCAGCTA
GCCTGGTGGTTGACCAGTAAGCCCCTGGAATATGCCTGCCATCCTCTGGTGCTGGGATTACAGGCACACACTGCCATGG
ATGGTTTTTACATGGGTGTTGGGGATATAAATTTAAGTCTTCATTCTTCAATAGGAAGAATTTTACCATTGTGCCATTTT
TCTGGCTCCATCACCACTTCTCTGAATTTTATGCCAGGGCAGTTTTGGTCCCCCTAACCTAACCTGGGTATATTTTTAG
CTATCTAATCCAGAATAGTGGTGGATTTTACTACTGGCATTAGTGGTCAGGTGCCAAGGGTGGTGCTCACCATCTTAC
CACGCCCAGGATAGTCTTACTCTCCCATATGGAACAAGTCTCTTAAAGTATGGTCAGTGCTGAAGTTGAAGTGCTG
TACTCTTTGGAGACCATGACTAATCCACCCCTCAGCACCCAGCATGTGTGCTAGCTCCTTCATCATGAGCTCTCTCTTC
CACTAGCTTCTGGTCTCTGGGGAATCTATCTGTCTGCCTCATAAGAACCCTGGTGCTCCAGTTCTGGACAGTCTCGCCATCT
TCCCATGTCTCCTGGATCATGAGGCCAAGCCCTGACCCCATGATGTAGAACAATGGTCACCTCTGGAGCAGGATTGGAA
CAGGCTGTAGACCAGGACTCGACACACAAAGGCACCTCCCAGGGATGTCAATAGGATGAGAAATATCACCAAGGGTCC
TGGGATGTAGAGCTCTCTGTTACAGTAGGCAGTGGTGGCCCTGGATGGAGAGGACAACACCACAATCAGGACATTCA
TTAAACTCATTCTTCACTCACTGTCTATAGCCAGAATCTCTATTGCTGTGATAAAACACCATGACCAAAGCAACTTGA
GAGGAAAGGACTTATTTTATCTTACAGGGAAGGGAAGTCAGGACATCATGAAGGGAAGTCAGGACAGGAACCTCAAGC
AGAAATCTGGAGGTAGGAACTAAAGCACCCGGCCATGAGGATCAAGGCTTGCTGTCTGATTGTGCTCAGCTTGCTTTCTTA
TAACGGCCAGGACCACTATTGCTCCAGGGGTACCACTACCCACAGTGAGTGGCTGGCCCTTCCCACACAAGTCATTAATTAG
GAAAATGTCCCACATATTTGTCTACAGGCCAATTTTATGAAGGCACTTTTCTCAGGTATGTTGGCTTTCTTCCCAGATAC
TTCTAGGCTTATGTAATTGACAAAAAAGGGAAGGGAAGGGAAGGGAAGGGAAGGGAAGGGAAGGGAAGGGAAGGGAAGG
TTGTACGTACCCACTGTGTACAAAGTACTATTAGTACCAGGGATTATCAATGATCAAAATGAATTCCTTGGGGCTGG
TGAGATCGGTCAGGGAGTAAAGTGCTACCAAGCAAGCCATGTAAAGGTGGAAGGGGAGAACCGACTCCACAAAGTT
GGTCTTCACCCTCTATAGATGCACCACTCCGTAGATATGCATCATGTACACACACAATAAAAAATAAAATAAAGACAACC
CCTTGCTCTTCTGGAATAACTTCCAGGGGGAGGACATGATGCCTGATATTGAGAACTTGACTGACAATGAGGGACATTG
CTGGACAGGTCTAGTAGGGGATTTCCAGAGAGGTTTAGCTGAAGAGGGAAGATCCATCCCATGGGCCGTGGTACCAGA
CTAAATAAAAAAGTGAGCCAGCACCAACACTCAGCTTTCTGCACCCTGACCAGCTGCCTCACACTCCCAGTGCCATGA
CTCTGCTGACACAATGAGCTGTGCCGTTGGGAGTTGTAAGGGGTGCAGTGCTGGTTACACAGGGTCATTAACCTTGCTGA
AGATGATCGCAGAGCACCAAGCAGCATGCCAGACACTGCAGTAAGGGACAAGCAGCGAGCTAATGGCTGGACAGCCTT
GCCTTCTAAAGCTCAGTCTTGCGGAGTAGAAAACGATGAATGGGGGAGCCTCAGAAGCATGCTCTGCTGAATCAGCC
TTCAGTCTTCTCCGGGGTGTGCAGCAGGCTGGCCGCTTTCATGCAGTCTTCTACAGTGTTCTGATTCTCACAGCAATCT
ACTGCAGAGGCATTGTCTAGCTCTGCATATGGGAAAACGGAGTCTGGAATGGTGACATTCTTGCTCCTGGTTCACAT
TAGTTACAGAGCTAGAAATGGAATCTGGGATCCTTTGATTCTAGAACAGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTG
TGTGATGTGTGCACATACATGTGTTTGGTCATGCATATGAAGGTCAGAAGTTAATCTCAAGTGTCAATTCTGAAGGTGTT
CCCTAATGTGAGTTTTAAAAAAGTTACATCCAGTTACTTGCTGCGTGTGGATATCAGAGGACAATTTGAGGGAGCCAT
CCCTCTTCTTGTATTATTGGAGGTCTCTGGGATTGAACTCAGTTTGGCAGGTTTGGAGGCAAGTACTTCCATTGCTGAT
CCATCTTAATAGTTCACCTTGCTATTTTGTGTTTGGAGACAGAATCTCACTGTATAGCCCTGCCTGGTCAAGAATTCTCT
ATATAGATCAGCTGTCTCAGACCCAGAGATCTGCCTGCTTCTCTCTCCTGACCTCATTTTCAGTTTCAAGATAAGCTTT
CGCACTGGCCTGGGACTCTCAAAAGTGGCGAGTTGGGTGGCCTACAAGCCCCAGGATCTCTGCTCTGCCACCCGA
GGTGCATCAGAGCGCACCAACATAGCTGACATTTTACCTGGGCTCTGCATACGGATCTCCGGTCTCTCACGCAAG
CTTGCGTAGCAATCACGTGACTGCACCAAGCCCTCAGCTCGAGTCTGCACGGCTTAGTACCCTTGCTTGGCTCGCTCC
CTGTTCTCTGTCACCTTCTCTCTTTGTGGAAAATGACAGAGCTGCTGGGGAGAAAAGTGGGGCTTTCTCTGCTCTGCAAACTCT

GCCCCAAGTTCCTTGTTTTGAAACCAGAAGAAATATGTATTTCCGCAGTGTCTGAACTGCTCTCTCCTCTGGAAGAGAT
ACAGCACACTGTGGATGCACTGAGAGCAAAGACTGTGGCGTCAGAGCCCCTCGGAAAGGATTTCTCCACTTTCCCATAT
GCTATGGAGCCTTGGGTCAGGTACTCAACAACCCGGGGCTATGTGTCTTTACCTGTGAGACAGATGTGGATGGTATTGA
ACCACTCATTGTGCCAGGAGACCAGGATAGTCACACAGGCCAGGACTGTGGCTAGCACATAGGAAATAAAATGCTGGCC
AGTCTTGTGTCTGGTGGACGTTGCTCTGACTCCAGGACAGGGGACTATGCATGATTGACAGACGGGCAGCTTTGGTCAG
ATACTTAGAGGATAAGGAGGGAGGGAGGGCTTCACTGAAGGGCTCTAGCAGGCAGGCCTGAGCATGGCAAACAGGGC
TCTGGCAGGCCTTGCCCTTCCCCATTTTTCTGCCAGTTAAATTGTTAGGTAACATTACTAAAGCTAGCTCTCAAGGTC
TATTCCCTTATTTGGCCACTTCCTCTTCCTGAGGCTGACTGCCAAGGTCCAGCTATCAAAGTTTTGAAGTCCAGCAATCA
AAAGCCCTTTTTTGGCTCACATAATTAACATGCCCAATCAAAACAAACCAACTCGCTGGGCAGTGGTGGCGCACGCCTT
TAATCCCAGCACTTTGGGAGGCAGAGGCAGGTGGATTTCTGAGTTCGAGGGCCAGCCTGGTCTACAGAGTGAGTTCAGG
ACAGCCAGGGCTATACAGAGAAACCCTATCTCAAAAAACACAAAAAAACCCTCATCCTAACACTGGACTTCCCATT
TCCTCTATAAACTCTCATTTGCTTAAGGGCCACATCTGTTTCCCCTCTATCCAGAGGCAGTCCTTTGTCCTTTGGAGCAA
ATACCCCTTTTCTTTCTCTCCCTTGTTCTTTTCCCCTCTCTCCCATCCTTTGTCTCTGGTCTTTGTGTCTTATTCCCCTTCC
CTTTGTCTTTCTGAGGCAAAAAACCTCCTTTGTGTGAGAAAGTTGGTTCTTGGTGTGTCTATGCCGATGCCGGTCCCT
TCATGTCACCAGAGGCTGTGAGTGGGGTGTAGCAGCAGAGGGGCCTCCTGTCTAGACAAAAAGCACATGGGAAGCAAA
GTTTGGAGAGCATGGTGGTTGCACTCACGAGGTGGCTGGATGGTGACATCTCTGTAGAAGGTCAGCTGGGTCTCCGGAT
TCTCCACAACACACCGGTAAGTCCCCTCTGCTCCCAGGAGAGACTGGGGAGGGTTCATGTTATTCTCTGGGATGCTTAG
GAAGGAGCCGTTATGGATCCAGTGGTACCTGGGCTCCGGCTTGAGAAACAGTTACATTCCAGCTGCACACTGGAACC
AATATCAGCAGTCAGCACACCAGCAAAGAAATAGGGCTGGGTCCACAGTGACACATAGTCTGGACCATCTGCAGAGAC
AGTGAAGGAGAAGACCACAACCTGTATTTCTGATCTCTTGGGATGGCATCTTGTCCAGAAGACACATGGTGTCCCTCTAT
GTGCAATGAGCCACCCAGGTGACAACCTGAAACAATAAAGGTAGCTTCCATTTTGGGTTCTTGTGTACTAAACCTTGG
TTGTCTTACACACTATATATAGTAAACGGCATAAAGCAAAGCAGAAAAGCTCATCACACCAACTGTGTTACAGGAAGC
AAGCTAGGCTATGAATGTGTAATCCACAAAACCTCATTGTTATGA

Selection Cassette:

AGCAGAGCCTGGAGAGACAGTTTTAGCTGGACAGGCCGCTCTAGAGGCCATAGCGGCCATTTAAATGGCGCGCCGGAT
CCGAATTCCTCGAGGCTAGAACTAGCGATAAGCTTCGAGCGGGATCAATTCCGCCCCCCCCCTAACGTTACTGGCCGAA
GCCGCTTGGAATAAGGCCGGTGTGCGTTTGTCTATATGTTATTTTCCACCATATTGCCGTCTTTTGGCAATGTGAGGGCC
CGGAAACCTGGCCCTGTCTTCTTGACGAGCATTCTAGGGGTCTTCCCCTCTCGCCAAAGGAATGCAAGGTCTGTTGA
ATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTTGAAGACAAACAACGTCTGTAGCGACCCTTTGCAGGCAGCGGA
ACCCCCACCTGGCGACAGGTGCCTCTGCGGCCAAAAGCCACGTGTATAAGATACACCTGCAAAGGCGGCACAACCCC
AGTGCCACGTTGTGAGTTGGATAGTTGTGGAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGGCTGAAGG
ATGCCCAGAAGGTACCCCATTTGTATGGGATCTGATCTGGGGCCTCGGTGCACATGCTTTACATGTGTTTAGTCGAGGTT
AAAAAAACGTCTAGGCCCCCGAACCACGGGGACGTGGTTTTCTTTGAAAAACACGATAATACCATGGGGGATCCCG
TCGTTTTTACAACGTCGTGACTGGGAAAACCTGGCGTTACCCAACTTAATCGCCTTGACGACATCCCCCTTTCCGCG
CTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCGCTTTGC
CTGGTTTCCGGCACCGAAGCGGTGCCGAAAGCTGGCTGGAGTGCATCTTCTGAGGCCGATACTGTCGTCTGTCCTCC
TCAAACCTGGCAGATGCACGTTACGATGCGCCATCTACACCAACGTGACCTATCCATTACGGTCAATCCGCCGTTTG
TTCCACGGAGAATCCGACGGGTGTTACTCGCTCACATTTAATGTTGATGAAAGCTGGCTACAGGAAGGCCAGACGCG
AATTATTTTTGATGGCGTTAACTCGGCGTTTCATCTGTGGTGCAACGGGCGCTGGGTGCGTTACGGCCAGGACAGTCGT
TTGCCGTCTGAATTTGACCTGAGCGCATTTTACGCGCCGGAGAAAACCGCCTCGCGGTGATGGTGCTGCGCTGGAGTG
ACGGCAGTTATCTGGAAGATCAGGATATGTGGCGGATGAGCGGCATTTTCCGTGACGTCTCGTTGCTGCATAAACCAC
TACACAAATCAGCGATTTCCATGTTGCCACTCGCTTTAATGATGATTTTACGCCGCTGTACTGGAGGCTGAAGTTTCA
ATGTGCGGCGAGTTGCGTGACTACCTACGGGTAACAGTTTCTTTATGGCAGGGTGAAACGCAGGTGCCAGCGGCCACC
GCGCCTTTCCGGCGGTGAAATTATCGATGAGCGTGGTGGTTATGCCGATCGCGTCACACTACGTCTGAACGTGAAAACC
CGAAACTGTGGAGCGCCGAAATCCCGAATCTCTATCGTGCGGTGGTTGAACTGCACACCGCCGACGGCACGCTGATTG
AAGCAGAAGCCTGCGATGTCGGTTTCCGCGAGGTGCGGATTGAAAATGGTCTGCTGCTGCTGAACGGCAAGCCGTTGC
TGATTCGAGGCGTTAACCGTCACGAGCATCATCCTCTGCATGGTCAGGTCATGGATGAGCAGACGATGGTGCAGGATAT
CCTGCTGATGAAGCAGAACAACCTTTAACGCCGTGCGCTGTTTCGCATTATCCGAACCATCCGCTGTGGTACACGCTGTGC
GACCGCTACGGCCTGTATGTGGTGGATGAAGCCAATATTGAAACCCACGGCATGGTGCCAATGAATCGTCTGACCGAT
GATCCGCGCTGGCTACCGGCGATGAGCGAACGCGTAACGCGAATGGTGCAGCGCGATCGTAATACCCGAGTGTGATC
ATCTGGTCTGCTGGGGAATGAATCAGGCCACGGCGCTAATCACGACGCGCTGTATCGCTGGATCAAATCTGTGATCCTT
CCCGCCCGGTGACGATATGAAGGCGGCGGAGCCGACACCACGGCCACCGATATTATTTGCCCGATGTACGCGCGCGTGG
ATGAAGACCAGCCCTTCCCGGCTGTGCCGAAATGGTCCATCAAAAAATGGCTTTCGCTACCTGGAGAGACGCGCCCGC
TGATCCTTTGCGAATACGCCACGCGATGGGTAACAGTCTTGGCGGTTTCGCTAAATACTGGCAGGCGTTTTCGTGAGTA
TCCCCGTTTACAGGGCGGCTTCGTCTGGGACTGGGTGGATCAGTCGCTGATTAAATATGATGAAAACGGCAACCCGTGG
TCGGCTTACGGCGGTGATTTTGGCGATACGCCGAACGATCGCCAGTTCTGTATGAACGGTCTGGTCTTTGCCGACCGCA

CGCCGCATCCAGCGCTGACGGAAGCAAAACACCAGCAGCAGTTTTTCCAGTTCCGTTTATCCGGGCAAACCATCGAAG
TGACCAGCGAATACCTGTTCCGTCATAGCGATAACGAGCTCCTGCACTGGATGGTGGCGCTGGATGGTAAGCCGCTGGC
AAGCGGTGAAGTGCCTCTGGATGTCGCTCCACAAGGTAAACAGTTGATTGAACTGCCTGAACTACCGCAGCCGGAGAG
CGCCGGGCAACTCTGGCTCACAGTACGCGTAGTGCAACCGAACGCGACCGCATGGTCAGAAGCCGGGCACATCAGCGC
CTGGCAGCAGTGGCGTCTGGCGGAAAACCTCAGTGTGACGCTCCCCGCCGCTCCACGCCATCCCGCATCTGACCACC
AGCGAAATGGATTTTTGCATCGAGCTGGGTAATAAGCGTTGGCAATTTAACCGCCAGTCAGGCTTTCTTTACAGATGT
GGATTGGCGATAAAAAACAACTGCTGACGCCGCTGCGCGATCAGTTCACCCGTGCACCGCTGGATAACGACATTGGCG
TAAGTGAAGCGACCCGCATTGACCCTAACGCCTGGGTGCAACGCTGGAAGGCGGCGGGCCATTACCAGGCCGAAGCAG
CGTTGTTGCAGTGCACGGCAGATAACACTTGCTGATGCGGTGCTGATTACGACCGCTCACGCGTGGCAGCATCAGGGGA
AAACCTTATTTATCAGCCGGAACCTACCGGATTGATGGTAGTGGTCAAATGGCGATTACCGTTGATGTTGAAGTGGC
GAGCGATACACCGCATCCGGCGCGGATTGGCCTGAATGCCAGTGGCGCAGGTAGCAGACGGGTAACCTGGCTCGG
ATTAGGGCCGCAAGAAAACATCCCGACCGCCTTACTGCCGCTGTTTTGACCGCTGGGATCTGCCATTGTTCAGACATG
TATACCCCGTACGTCTTCCCGAGCGAAAACGGTCTGCGCTGCGGGACGCGCGAATTGAATTATGGCCACACCAGTGG
CGCGGCGACTTCCAGTTCAACATCAGCCGCTACAGTCAACAGCAACTGATGGAAACCAGCCATCGCCATCTGCTGCAC
GCGGAAGAAGGCACATGGCTGAATATCGACGGTTTTCCATATGGGGATTGGTGGCGACGACTCCTGGAGCCCGTCAGTA
TCGGCGGAATTCCAGCTGAGCGCCGGTCTGCTACCATTACCAGTTGGTCTGGTGTGACGGGGATCCCCCGGGCTGCAGCCA
ATATGGGATCGGCCATTGAACAAGATGGATTGCACGCAGGTTCTCCGGCCGCTTGGGTGGAGAGGCTATTCGGCTATG
ACTGGGCACAACAGACAATCGGCTGCTCTGATGCCGCCGTGTTCCGGCTGTACGCGAGGGGCGCCCGTTCTTTTTGT
CAAGACCGACCTGTCCGGTGCCCTGAATGAACTGCAGGACGAGGCAGCGCGGCTATCGTGGCTGGCCACGACGGGCGT
TCCTTGCGCAGCTGTGCTCGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATTGGGCGAAGTGCCGGGGCAGGA
TCTCCTGTATCTCACCTTGCTCCTGCCGAGAAAGTATCCATCATGGCTGATGCAATGCGGCGGCTGCATACGCTTGATC
CGGCTACCTGCCCATTTCGACCACCAAGCGAAACATCGCATCGAGCGAGCACGTACTCGGATGGAAGCCGGTCTTGTCG
ATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCCGAAGTTCGCCAGGCTCAAGGCGCGCATGCCCCG
ACGGCGAGGATCTCGTCGTGACCCATGGCGATGCCTGCTTGCCGAATATCATGGTGGAAAATGGCCGCTTTTCTGGATT
CATCGACTGTGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTGAAGAGCTT
GGCGGCGAATGGGCTGACCGCTTCCTCGTGCTTTACGGTATCGCCGCTCCCGATTTCGCAGCGCATCGCCTTCTATCGCCT
TCTTGACGAGTTCTTCTGAGGGGATCAATTCTCTAGAGCTCGCTGATCAGCCTCGACTGTGCCTTCTAGTTGCCAGCCAT
CTGTTGTTTGCCCCCTCCCCCGTACCTTCCTTGACCCTGGAAGGTGCCACTCCCACTGTCTTTCTTAATAAAATGAGGAA
ATTGCATCGCATTGTCTGAGTAGGTGTCATTCTATTCTGGGGGGTGGGGTGGGGCAGGACAGCAAGGGGGAGGATTGG
GAAGACAATAGCAGGCATGCTGGGGATGCGGTGGGCTCTATGGCTTCTGAGGCGGAAAGAACAGCTGGGGCTCGATC
CTCTAGAGTCGAGTACCGGGTAGGGGAGGCGCTTTTCCCAAGGCAGTCTGGAGCATGCGCTTTAGCAGCCCCGCTGGG
CACTTGGCGCTACACAAGTGGCCTCTGGCCTCGCACACATTCCACATCCACCGGTAGGCGCCAACCGGCTCCGTTCTTT
GGTGGCCCCCTTCGCGCCACCTTCTACTCCTCCCCTAGTCAGGAAGTTCCCCCCCCCGCCGAGCTCGCGTCGTGCAGGA
CGTGACAAATGGAAGTAGCACGTCTCACTAGTCTCGTGCAGATGGACAGCACCGCTGAGCAATGGAAGCGGGTAGGCC
TTTGGGGCAGCGGCAATAGCAGCTTTGCTCCTTCGCTTTCTGGGCTCAGAGGCTGGGAAGGGGTGGGTCCGGGGGCG
GGCTCAGGGGCGGGCTCAGGGGCGGGGCGGGCGCCGAAGGTCTCCGAGGCCCCGGCATTCTGCACGCTTCAAAAGC
GCAGTCTGCCGCGCTGTTCTCCTCTTCTCATCTCCGGGCCCTTCGACCTGCACTGCGCGCCAGCTTACCATGACCGAG
TACAAGCCCACGGTGCGCCTCGCCACCCGCGACGACGTCCCCAGGGCCGTACGCACCCTCGCCGCCGCTTCGCCGACT
ACCCCGCCACGCGCCACACCGTTCGATCCAGACCGCCACATCGAGCGGGTACCGAGCTGCAAGAACTCTTCTCACGC
GCGTCGGGCTCGACATCGGCAAGGTGTGGGTGCGGGACGACGGCGCAGCAGTGGCGGTCTGGACCACGCCGGAGAGC
GTCGAAGCGGGGGCGGTGTTGCGCCGAGATCGGCCCGCGCATGGCCGAGTTGAGCGGTTCCCGGCTGGCCGCGCAGCAA
CAGATGGAAGGCCTCTGGCGCCGACCGGCCCAAGGAGCCCGCGTGGTTCTTGCCACCGTTCGGTGTCTCGCCCGAC
CACCAGGGCAAGGGTCTGGGCAGCGCCGTCGTGCTCCCCGAGTGGAGGCGGCGGAGCGCGCCGGGGTGGCCGCTTC
CTGGAGACCTCCGCGCCCCGCAACCTCCCCTTCTACGAGCGGCTCGGCTTCACCGTCACCGCCGACGTCGAGGTGCCCG
AAGGACCGCGCACCTGGTGCATGACCCGCAAGCCCGGTGCCTGACGCCCGCCCCACGACCCGACGCGCCCGACCGAAA
GGAGCGCACGACCCCATGCATCGATGATCTAGAGCTCGTGATCAGCCTCGACTGTGCCTTCTAGTTGCCAGCCATCTG
TTGTTTGCCCCCTCCCCCGTGCCTTCTTGACCCTGGAAGGTGCCACTCCCACTGTCTTTCTTAATAAAATGAGGAAATT
GCATCGCATTGTCTGAGTAGGTGTCTATTCTATTCTGGGGGGTGGGGTGGGGCAGGACAGCAAGGGGGAGGATTGGGAA
GACAATAGCAGGCATGCTGGGGATGCGGTGGGCTCTATGGCTTCTGAGGCGGAAAGAACAGCTGATTACCTGTATT
CCCTACTCGACCTCGAGGGCGCGCCATTTAATGGCCAGCGAGGCCGGTACCCAATTTCGCCCTATAGCTGTGTCTCTG
GCAGTGTCCCTATTAGCC

Targeted Locus:

GATCCCAGTAGACAATAGTTGACCAATGGCGTGTGAGGTGGAGAATGCATGCAATTAGACAATTCCCTGCCCATACTAT
TGAGATTTATATGGCAAGATACCACAACTATAAAGCTTACAGATATCAGAGGTTTACTCCTTATAGAGCAGGAGGTTA
ATTGGTGGCCTGGCAGATTCAATATCCTGTGAAAGTGTATGTTCTTGAAAATGATACTTTGTCTTGTGGTTCGAACAAGC
AAGCAACCTCCCTTGGGTCTCTTATATAAGTAGCATTAGTCCAATTTGTGTGGGCCCATCCCTGTGACCTAATTCCTACC
TAAGTGTGATGGCTAGTTTTATGTCAACTTGACACAAGTAGAGTACCAGAGAAGGGAGTTTCAATGAATAAAATACTC

CTGTAAGATAGGACTGTTGGCAAACCTGTAAGGCATTTTCTTAATTAGTGATTAAACAAGGGATGGCCCAGACCATTGTG
GATGGGACCAGCCCAGGACTGGTGGTCTCGATTCTCTAAGACAGCAGACTGAGCAACCCATGGGGAGCAAGCCAGCA
AGCAGCACTCACCTATGGCTTTTGGAACTTCCACTGCCTCCAGATTCTTGCCCTGCCTGAACTCCTGCCCTTCTGATT
TGACGATGAAGTGTTGTTATGTGGAACGTGTGAGTTAAACAAACCCCTTCTCCCCAAGTTGCTTTCAGATTTGGGGTTG
ATCACAGCAATAGAAACCATGACTAAAACACTAGACAACTCACCTCCGTGGCTCATTGAAGTGTTCACTACACAAGCA
TGAGGGTCTGAGTTCAGACGCCAGCTCCACATAAAATCCAAGGGCAGGGTGATGGCTGTATTGACAGTGCTGGAGT
GTGGGGGAAACACTAGGCAGATGCCAGGGAGTCACTGGCTAGTGGGGGTGGGGTGGGGAGGGGACTACCTTAGGTGT
GTGCTTGTGTTGTTGTTGTTTGTGATGAAATACCTTAACAAAAGCAACTTATAGGAGAACTATTTATTTACACTCT
AAGTTCAAGATACTGTTGTGGGAGAGAAGTCAGGACAGCAGGAGCTCAAAGCATCCACAATCAGGAAGCAGAGAGCA
ATGTTTGGTGGTGCTCAGCTCAGTTTCTCCTTTTCATACAATCCAGGATCCCAAGCCTAAGGAATGGTACCACCCACAGA
GAAAGCATCTTCCCACCTCAATTCAATCAAGATAAGCCCCACAGGCATGAGCAGAGGCCCATCTCCCAAGT
ATCTTAGGTTTTGTCAAATTGACCACACAGAACCTGCTCAAAAAGTAAGGTGGAGAGTGACAGAGGAAGAATATACC
CAAAGTAGAATTCGGGATTTTATATGTGCATGTCATGTGCACAGGCAAGTGCCTGCCCCCACCCCAAACACACACAC
ATACACACACACACATACATACACATTCCCTCCACCCACAAGGACCCACGTCTTAACACCATAGCCTTGGGGAAAAGG
ATCTTAACATTTGTGTTGTAGGGACTTTAGCACCTTCATTCTGGAACCTCGGTGTCTTCTGAAAATGAGGAAGAGACATG
TGTATCTTCTCAATTCTTAAGGGCTATGTGTCATAAGTTCCTCTCTTAGATACAGATTCTCAGGGTCTTTTCTTCTGTAC
TGCTTTTTTACAAAATGGGGACAAGAGAGAACCAGAGAGGCAATGGCCCAGCCCTTCTGACCACTGAATTGCTGCAAT
TTCTAGTAACTAGAAGAGAGTATTTGGGCGAAGATGGGGGAAAGGTTGGTTGACAATTGAAAATTCAGAAAGTGGCGC
TAGAGAAAGAGAGTGAGAGAGAAGAGAGAGAGAGAGAGAAATTGTTAGTTGAGGATGATGGACAAACATACTTAAGC
CCACATGTATTAATCAGGGTCTCTCAAGGAACTGGATATTTATAAAATGAATATGATATATATCACATATATACACAC
GTGGGGGTTATAGTAGAATGATATACAGCCTATGGTTCATCTACTTCAACAATGGATGACTACCAATGGAAAGGACAA
GGACCCAGTAGTTGTTCCGTCATTGAGGCTTAATGTCTCATCTGGTCTTCAGTATATGGTAGGATGCCAAAGACGTGGG
CTCTCCCGCAGGAGAAGGCGTGGCACAGATTAAGGATGGGCCTTCTCATACCAAAGATCTCTATTAAGGTTTATTTT
CTCACTGCAAAAGATCCAGATCAAAAGTGGGTCTTCCACCTCAAATGATTTAATTAAGGGGGGGGGAACCTCATAG
ATATGCCCAATCACTTGGGTTTTGACTAATTCCAGATGTAGTTTCGTTAACAACCAAGACTAGGCATAACAAGGAGCAA
ATGTAGAAATAAGGAAAGGAGTAGGTGGATGACCCAGGAGGCTCACAAATGGGAAGTTTCTTGATGGCATTCTCTTGT
GGTATATCTCTGGGTCACTTTTTCGGATGTGTTATGTATATTTTCTCTCAAAATGTTTCAAGGAAAACCTGACGTAAGT
CAAAAGAGACTTGACCTCTCGGGATTATCTCCACTCCCTCCTAGCTCCCACCACAAGTTAAACACAGTCTTCTAGGAAT
TGCTGACACCATTCCTGAGGGGAGACAATACAAGGCTGGTGTCTCACTTTATGTCTTCTGTTCACTTGAACCCCTTAG
GAAAGATTCTGAATAGACAAGTGGTCTCTGGAGCCAGGCAAGAGTAAGAGACAACAGCAGGGAAGAAATATGTATT
GGTAGGCTGTGGCCATGACTCAGCAGTAGAGAATGCCAGTGAGAGGGTAGGGGCATGACTCAATAGGAGAACCCTTTC
CTAGAGCCTCCCAAAGTGGCACTGATAGTGTGGTTCAGGTTTAGAGCTCCTGCCTAGAATGCCCCAGTGAGGGGCTGGG
GATGTGGCTCAGTCGTAGAGCATATGCCTAATGTAAGTGACCCTGAATTTGCCTCCAACAAGAAACCTTCTCTTGCAT
AAGGAAGAGAGTTTTTACCTCTTTTAAAAATCTGTGTTACTGGGGCTGGAGAGATGGCTCAGTGTTAAGAGCACTGAC
TACTCTTCCGAAGGTCTGAGATCAAATCCCAGCAACCACATGGTGGCTCACAAACCATCCGTAATGTATGAGATCTGA
CGCCCTCTTCTGGTGCATCTGAAGACAGCTACAGTGTACTTACATATAATAAATAAATCTTTTTTTTTTTTTTAAATCTGT
GTTATTGTAGTTTTTCTAGGTCAATGCTTGAGCGCTAGTAGCCCCAACAGACCTAATAGACCTCAAGTCTATCTTCAGGGT
CCTGATAAGAAGTTTAGGTTTAATTACAGATCAAGAAGTATGTATGATTAAGAGTCCTGCTAAACGCCGGGCCATGGTG
GTGCACACCTTTAATCCCAGCACTCGGGAGGCAGAGGCAGGTGGATTTCTGAGTTCGAGGCCAGCCTGGTCTACAAAG
TGAGTTCCAGGACAGCCAGGGATATACAGAGAAACCCTGTCTCAAAAAACCAAAACAAGCAAAACAAGGAGTCCTGC
TAATGGTTTGATACAGCCCATCTTTGGCAGATCCTTGTTTGGCTCACAAAGGTGTTCCAGTAAGTTTTGTCAAAACGGTGT
GGATTCTTCTGGGTTTTGAGTTCAGCCTGTGGGTATCATCTGGACTTTAGCATTTCTCTTACTTCAGCATGGTACTCCTG
TGGAAAGTTAACTCTTTGGAGCCTTTTATCCCCCCCCAAAAATGTGATAGCAAATGGAAGGCACAGCATCTCTTTAAA
ATGTCTCCTCTCTCGCTAGATCAGCTACATTAGACTTCCATTTGACAATCTTCTCTCTACCAAGTTTCAGTACAAAATTT
AGCCTCCTTATCCCCTGATCTACTGTGAGTGAGACTCCCCTCTGTAACCTTGCTGTATTTTGGCTTGTGCTGTGTTGTTT
TGACTTATATGTTTTGAGCCTGGGTCTGCTGAAGCCAAGGCTGAGCTGAAACTCACTATGTAACCAACCAAAATTGACA
TTGGACTTCTGACCTCTTGCTCCTATTCTAAGTGCCAAGTTGGAAGGCACATACTACCACACACAACCTATGTGGTG
CAGGAGATGGAACCTAGAGCTCTGTGTATATGAAACAAACACTCTACCAAGCTAGCTATATGTTTCAAGTTCCTTGATAG
GTTTTAGTGGGAAGAATGTTAATCTCCACCTGTTAGTTGTACTGGCTGGTTTTGTGTATCAACTTGACACAGGCTGGAGT
TATCACAGAGAAAGAAGCGTCAGTTGGGGAAGTGCCTCCATGAGATCCAGCTGTGGGGCATTCTCTCAATTAGTGATCA
AGTGGGGAGGGCCCATTGTGGGTGGTGCCATCCCTGGGATGGTAGTCTTGGGTTCTATAAGAAAGCAAGTTGAGCATG
CCAGGGGAAGCAAGCCAATAAATATCATCCCTCCATGGCCCCTGCATCAGCTCCTGCTTCTGACCTGCTTGAGTTCCA
GTCCTGACTTCTTTTGGGGATGAGCAGCAGTGTGGAAGTGTAAGCCGAATAAACCCTTTCTCCCCAACTTGCTTCTTG
GTCGTGATGTTTGTGCAGGAATAGAAACCCTGACTAAGACAGTGGCAATATGTAAAGTGTTTGTGTCAGTTTTACTCTT
AATCCAATAACTCCTAAATAATTGAGATCGGACTATTATATTGATTTAAACAAGCTTTAAGGGCAAAACAATTGAGCAG
TACCAGTCTATTATAATCCTCTAAATTAATCCGGCTATGCCCCAGTTATACTTGCATTTTAGTACTGATCTGCTCCCTGG
GCTCCAGGTCTTCTGTCATGTCTCCTGGACTGTCTCCTCGTGGTGAACCCCCACTTCTTTCTGTCTCCTGTCCCTAG
CTGGGAGGAAGTCCAGTCCTATTTTCTCCCCGACTCAGTCATTGACTGATCAGCTTCTTTATTGACCAATCAGGGAATAA
TTGGGTAGCAATGTTTTGCAACCTGATATGGGGGCACAGAAATCAGCATTGAACAATACAATGACAATCTTTACACAC

TGCACAGTAACATTATGTCTATATAAACCCCTCTATAGCAACTAGCCATTCAGTCTTTGCTACCACTACTGAATCTCTGG
CTGTGAGATACTCGAGGGGCTGAGATCCATCTCCTAATTGGACAGTGGAGCTTTGGGAACAAGCCTCGGGTCATTGTG
CAGAGAGGGTGGGCAGCCAGGACAAGCTGCTAAAGGAAGGAGGGATGCTTCCCAGCCTGTACCTCCCAGTTCCCCTTC
TTCCCTATGCCCTAGAACCATCCCCAACTCCACCAATATCATCAGCCTCAGGGGAAGCTCTGGGGGCTCTGGAGGGAGC
AAATGCATTTTCACTGGGCAAAAAATGTCACTCAAAGGCCAAGGTTAGTAGAGAAGGAGGAGAGGTGGTCAGGCCCTG
AACTGGTGAATGTGGGAGAGGCCATCTTTGGTCTCAGGAGTAGGTCTGGGTGGTAAGTAGCTGATACTCAAGGGTCTC
GACAGTGCCTGGGTCTGAAGCTCTTCTCCTGAGGCAGCCACTTTCTGGCCTCACCCCTGCTTCCGCTGGGGCTTCTC
AGGGCCTTGCACTCTTAGTTCTCAAAGCAGAGCCTGGAGAGACAGTTTTAGCTGGACAGGCCGCTCTAGAGGCCATA
GCGGCCATTTAAATGGCGCGCCGGATCCGAATTCCTCGAGGCTAGAACTAGCGATAAGCTTCGAGCGGGATCAATTCC
GCCCCCCCCCTAACGTTACTGGCCGAAGCCGCTTGGAATAAGGCCGGTGTGCGTTGTCTATATGTTATTTTCCACCATA
TTGCCGCTTTTGGCAATGTGAGGGCCCCGGAACCTGGCCCTGTCTTCTTGACGAGCATTCTAGGGGTCTTTCCCTCT
CGCCAAAGGAATGCAAGGTCTGTTGAATGTCTGAAGGAAGCAGTTCTCTGGAAGCTTCTTGAAGACAAACAACGCTC
TGTAGCGACCTTTGCAAGGCAGCGGAACCCCCACCTGGCGACAGGTGCCTCTGCGGCCAAAGCCACGTGTATAAGA
TACACCTGCAAAGGCGGCACAACCCCAGTGCCACGTTGTGAGTTGGATAGTTGTGGAAAGAGTCAAATGGCTCTCCTC
AAGCGTATTCAACAAGGGGCTGAAGGATGCCCAGAAGGTACCCCATTTGTATGGGATCTGATCTGGGGCCTCGGTGCAC
ATGCTTTACATGTGTTTAGTCGAGGTTAAAAAACGTCTAGCCCCCGAACCACGGGGACGTGGTTTTTCTTTGAAAA
ACACGATAATACCATGGGGGATCCCGTCGTTTTACAACGTCGTGACTGGGAAAACCTGGCGTTACCCAACCTAATCGC
CTTGACGACATCCCCCTTTCCGACGCTGGCGTAATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCA
GCCTGAATGGCGAATGGCGCTTTGCCTGTTTTCCGGCACCAGAAGCGGTGCCGGAAGCTGGCTGGAGTGCGATCTTCC
TGAGGCCGATACTGTCTGTCGTCCTCCTCAAACCTGGCAGATGCACGTTACGATGCGCCCATCTACACCAACGTGACCTAT
CCCATTACGGTCAATCCGCCGTTTGTTCACGGAGAATCCGACGGGTTGTTACTCGCTCACATTTAATGTTGATGAAA
GCTGGCTACAGGAAGGCCAGACGCGAATTATTTTTGATGGCGTTAACTCGGCGTTTCATCTGTGGTGCAACGGGCGCTG
GGTCGTTACGGCCAGGACAGTCGTTTGCCGCTCTGAATTTGACCTGAGCGCATTTTTACGCGCCGGAGAAAACCGCCTC
GCGGTGATGGTGCTGCGCTGGAGTGACGGCAGTTATCTGGAAGATCAGGATATGTGGCGGATGAGCGGCATTTTCCGT
GACGTCTCGTTGCTGCATAAACCGACTACACAAATCAGCGATTTCCATGTTGCCACTCGCTTTAATGATGATTTACAGCCG
CGCTGTACTGGAGGCTGAAGTTCAGATGTGCGGCGAGTTGCGTGACTACCTACGGGTAACAGTTTCTTTATGGCAGGGT
GAAACGCAGGTCGCCAGCGGCACCGCGCCTTTCCGGCGGTGAAATTATCGATGAGCGTGTTGGTTATGCCGATCGCGTC
ACACTACGTCTGAACGTCGAAAACCCGAAACTGTGGAGCGCCGAAATCCCGAATCTCTATCGTGCGGTGGTTGAACTG
CACACCGCCGACGGCAGCTGATTGAAGCAGAAGCCTGCGATGTGCGTTTCCGCGAGGTGCGGATTGAAAATGGTCTG
CTGCTGCTGAACGGCAAGCCGTTGCTGATTCGAGGCGTTAACCGTCACGAGCATCATCCTCTGCATGGTCAGGTCATGG
ATGAGCAGACGATGGTGACGATATCCTGCTGATGAAGCAGAACAACTTAACGCCGTGCGCTGTTTCGATTATCCGA
ACCATCCGCTGTGGTACACGCTGTGCGACCGCTACGGCCTGTATGTGGTGATGAAGCCAATATTGAAACCCACGGCAT
GGTGCCAATGAATCGTCTGACCGATGATCCGCGCTGGCTACCGGCGATGAGCGAACGCGTAACGCGAATGGTGACGCG
CGATCGTAATACCCGAGTGTGATCATCTGGTCGCTGGGGAATGAATCAGGCCACGGCGCTAATCACGACGCGCTGTAT
CGCTGGATCAAATCTGTCGATCCTTCCCGCCGGTGCAATGAAGCGCGCGGAGCCGACACCACGGCCACCGCATATT
ATTTGCCCCGATGTACGCGCGCTGGATGAAGACCAGCCCTTCCCGCTGTGCCGAAATGGTCCATCAAAAAATGGCTTT
CGCTACCTGGAGAGACGCGCCCGCTGATCCTTTGCCAATACGCCACGCGATGGGTAACAGTCTTGGCGGTTTCGCTAA
ATACTGGCAGGCGTTTTCGTCAGTATCCCCGTTTACAGGGCGGCTTCGTCTGGGACTGGGTGGATCAGTCGCTGATTAAA
TATGATGAAAACGGCAACCCGTGGTTCGGCTTACGGCGGTGATTTTGGCGATACGCCGAACGATCGCCAGTTCTGTATGA
ACGGTCTGGTCTTTGCCGACCGCACGCCGCATCCAGCGCTGACGGAAGCAAAACACCAGCAGCAGTTTTTCCAGTTCCG
TTTATCCGGGCAAACCATCGAAGTGACCAGCGAATACCTGTTCCGTCATAGCGATAACGAGTCTCTGCACTGGATGGTG
GCGCTGGATGGTAAGCCGCTGGCAAGCGGTGAAGTGCCTCTGGATGTCGCTCCACAAGGTAAACAGTTGATTGAACTG
CCTGAACTACCGCAGCCGGAGAGCGCCGGGCAACTCTGGCTCACAGTACGCGTAGTGCAACCGAACGCGACCGCATGG
TCAGAAGCCGGGCACATCAGCGCCTGGCAGCAGTGGCGTCTGGCGGAAAACCTCAGTGTGACGCTCCCCGCCGCGTCC
CACGCCATCCCGCATCTGACCACCAGCGAAATGGATTTTTGCATCGAGCTGGGTAATAAGCGTTGGCAATTTAACCGCC
AGTCAGGCTTTCTTTACAGATGTGGATTGGCGATAAAAAACAACCTGCTGACGCCGCTGCGCGATCAGTTCACCCGTGC
ACCGCTGGATAACGACATTGGCGTAAGTGAAGCGACCCGCTTACCCTAACGCCCTGGGTGCAACGCTGGAAGGCGGC
GGGCCATTACCAGGCCGAAGCAGCGTTGTTGCAGTGCACGGCAGATACACTTGCTGATGCGGTGCTGATTACGACCGCT
CACGCGTGGCAGCATCAGGGGAAAACCTTATTTATCAGCCGGAACCTACCGGATTGATGGTAGTGGTCAAATGGCG
ATTACCGTTGATGTTGAAGTGGCGAGCGATAACCCGCATCCGGCGCGGATTGGCCTGAACTGCCAGCTGGCGCAGGTA
GCAGAGCGGGTAAACTGGCTCGGATTAGGGCCGCAAGAAAACCTATCCCGACCGCCTTACTGCCGCTGTTTTGACCGCT
GGGATCTGCCATTGTCAGACATGTATACCCCGTACGTCTTCCCGAGCGAAAACGGTCTGCGCTGCGGGACGCGCGAATT
GAATTATGGCCACACCAAGTGGCGCGGCGACTTCCAGTTCAACATCAGCCGCTACAGTCAACAGCAACTGATGGAAAC
CAGCCATCGCCATCTGCTGCACGCGGAAGAAGGCACATGGCTGAATATCGACGGTTTCCATATGGGGATTGGTGGCGA
CGACTCCTGGAGCCCGTCAGTATCGGCGGAATTCAGCTGAGCGCCGCTGCTACCATTAACAGTTGGTCTGGTGTGAG
GGGATCCCCCGGGCTGCAGCCAATATGGGATCGGCCATTGAACAAGATGGATTGCACGCAAGTTCTCCGGCCGCTTGG
GTGGAGAGGCTATTCGGCTATGACTGGGCACAACAGACAATCGGCTGCTCTGATGCCGCCGTGTTCCGGCTGTACGCG
AGGGGCGCCCGGTTCTTTTGTCAAGACCGACCTGTCCGGTGCCCTGAATGAACTGCAGGACGAGGCAGCGCGGCTAT
CGTGGCTGGCCACGACGGGCGTTCCTTGCGCAGCTGTGCTCGACGTTGTCACTGAAGCGGGAAGGGACTGGCTGCTATT

[illegible]