

GENOTYPING PROTOCOL

UC Davis Mouse Biology Program

Protocol Name: B6;129S5-Fam198btm1Lex/Mmucd

MMRRC: 032295

Protocol: GoTaq® G2 Colorless Master Mix(Promega)

Reagent/Constituent	Volume (µL)
Water	5.15
GoTaq® G2 Colorless Master Mix,2X	7.5
Primer 1. (stock concentration is 20µM)	0.45
Primer 2. (stock concentration is 20µM)	0.45
Primer 3. (stock concentration is 20µM)	0.45
DNA (example) extracted w/ "Qiagen DNeasy columns or other similar silica based kits"	1.0
TOTAL VOLUME OF REACTION:	15.00 µL

Comments on protocol:

- Protocol may work with other DNA extraction methods.

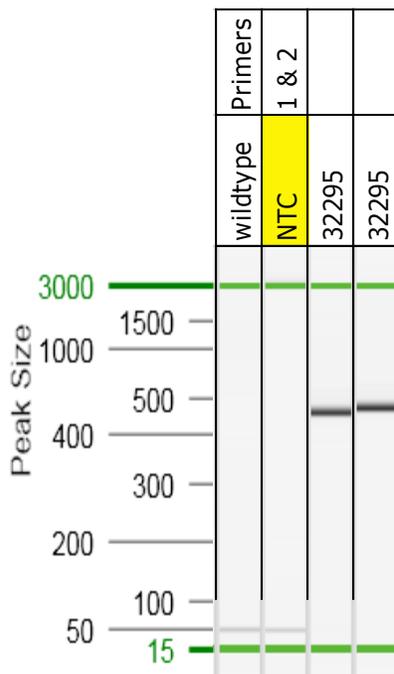
Strategy:

Steps	Temp (°C)	Time (m:ss)	# of Cycles
1. Initiation/Melting HOT START? <input type="checkbox"/>	94	5:00	1x
2. Denaturation	94	0:15	
3. Annealing steps 2-3-4 cycle in sequence	65 (↓1°C/cycle)	0:30	10x
4. Elongation	72	0:40	
5. Denaturation	94	0:15	
6. Annealing steps 5-6-7 cycle in sequence	55	0:30	30X
7. Elongation	72	0:40	
8. Finish	4	∞	n/a

Primers:

Electrophoresis Protocol:

Name	Nucleotide Sequence (5' - 3')	Agarose: 1.5%	: 90
1. DNA253-22	CCATCCTAGGAAGGAAGTTTCC	Estimated Running 90 min.	
2. Neo3A	GCAGCGCATCGCCTTCTATC	Primers	Band (bp)
3. DNA253-21	TGGCTGAGCAAAGAAGACATCC	1 & 2	549
		1 & 3	658
			Genotype
			Mutant
			Wildtype





Lexicon Genetics Incorporated – Genentech Project Materials

Genentech ID:	UNQ2512	Date of Submission:	1-10-05
Lexicon Contract Name:	DNA253	Mutation Type:	X Standard Knock out
LexVision Name:	MAS245N1		<input type="checkbox"/> Conditional
Reference accessions:	ENSMUST00000029567, AF285091	Is this gene X-linked?	No

Required Materials: X pKOS clone DNA(s) __pKOS30_____
 X Target Vector DNA __pKOS30.TV_____
 X Targeted ES Cell DNA __1A1_____
 X Genomic Map

Southern Blot Analysis:
External/Internal Probe Strategies

	<u>5' External</u>	<u>3' External</u>
Name of Probe:	15+16	19+20
Restriction Enzyme for Genomic Digest:	Hind III	Apa I
Predicted Wild-type Band (kb):	11.3 kb	3.2 kb
Predicted Mutant Band (kb):	9.8 kb	8.0 kb
Probe Size:	546 bp	577 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:	DNA253-21	5' Primer Name:	Neo3A
3' Primer Name:	DNA253-22	3' Primer Name:	DNA253-22
Predicted Wild-type Band (bp):	658 bp	Predicted Wild-type Band (bp):	none
Predicted mutant band (bp)	none	Predicted mutant band (bp)	549 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**

DNA253-15 5' – AATAAGTGGCTGCGTACTGG
DNA253-16 5' – TACTCGAAGGTACCTCAAGC
DNA253-19 5' – AGAGTCTTGGATAGTCAGGG
DNA253-20 5' – CTGGAGTGTATAGCATACCG

PCR Genotyping

DNA253-21 5' – TGGCTGAGCAAAGAAGACATCC
DNA253-22 5' – CCATCCTAGGAAGGAAGTTTCC
Neo3A 5' – GCAGCGCATCGCCTTCTATC

Genomic Sequence Deleted:

ATGTGGAAGCGGCAGAGAAATGACCTGTCCAGACAAGCCGGGGCAGCTCGTAAACTGGTTTTGTCTGCTCTCTGTGCGC
CCCACGAGTGTGTAACCTTTGGAGTAGTCGGCGTCCCAGGACCAGACGGAACCTCCTGCTGGGCACTGCCTGTGCCATC
TACCTGGGCTTTCTGGTGAGCCAGGTGGGCAGAGGTTCTTTTCAGCATGGGCAGGCGACTGACAGGGGACCACCCAAC
GGTCACGACATCTTCAAGGTACCCTTCTCTGAGATTCCCCTGGATGGTACCCTGGCCCCCTCCAGAGTTGCAGGGCAATG
GAAGCACTTTGCAGCCCAACGTGGTGTACATTACTCTACGCTCCAAGCGCAGCAAGCCTGCGAATATCCGTGGCACGGT
GAAACCCAAGCGCAGGAAGAAGTATGCGGTGGCATCTGCAGCCCCTGATCAGGAGGTGCTGGTTAGACCATCCCTTAT
ACAGCAGGAAGCTGCACGGGCAGCAGATGCTGAAGTACCTGGCTATGTTTCAGGGTTACCTAACCAAGGTTGGTGAACG
ACCCTGGAGGGTGTGCGTGGTCTGGAGTCAGAACTAGAGGTTCAAACCTGCAGCAGCCTAGGGCCCCGAGAGAGCAA
CATTAGGATTTATAGCGAGAGCGCCCCCTCATGGCTGAGCAAAGAAGACATCCGCAGAATGCGCCTCCTGGCTGATAG
TGAGGTGGCTAGCATCCTACCTATCTCTAAGAGTGGTACCCGCTTGCTGGTGTGGAAAGGGAGCACCTCAGGCTCTGTG
CCTGGCTGCGGGCCTAGCCCCTGTGGGCTTCTCAAGCAGCCGCTGGACATGAGTGAAGTGTTCGCCTTCCACCTGGACA
GGATCCTGGGTCTCAACAGGACCCTGCCATCTGTGAGCAGGAAATTAGAGTTCATCCAAGGTAACAGATT

Genomic Locus: (The deleted sequence represents nt 11221-12153 in the sequence below. KOS30 used to generate the TV represents nt 6229-13952 in the sequence below.)

TAACTTTTGTATGCCAGACTTACTTTGATGTTGACAACCTACCATTATGTGGTCATTAATTAATTATCAATTAATCATT
ATTGATAATTGATCATTAAATTAATTGACCATTAGTTTTAAGGTGTGCCTTCCCCAGTGCCTGGCTGTAACAAGCGCT
TCCACTTTGAATCCCAGGCTCTGGATTCAGTAGTGTGCTCACCTGTTGAAATCCCTGGATTAGATCCATCTGGCTGCTG
TGGTCTGTGACAGCCCTTTGAAGCTTGCCCTGCACACAAGAAGAGTGGAGTTTAAAGGGAAAGTTGAGGGAAAATGTG
TGTGTAAGCTTCAGTTTTGCTCTCAGGTTCTTCTCCTCGAGTAGTTTGCACCTCGGGCCAAAGGTCCATAGACATCTGT
CCTAGTTGCTTCTCTATTGCTGGGATAAACTCCACGACCAAAAGCAACTTGAGGAGGAAAGAGTTTATTTTCATCTTAC
AGCTCACAGTTCAACACAGAGAGAAGTCCGGGGCAGACGTTCAATGCAGGGACCTGAAGGCAGGACCTTGAATGAAGC
ACAGACCTTGAGGAACAATGGTTACAGGCTGGGTCTCCATGGTTTTGTTCCACCTTCTTATACACCCAGAACCACCTTC
CCAGAGGTGGCACTACCCACAGTAGGCTGGGCCTTCCCCTTCAATCCCTAACCAAGAAAATGCTGCGTAGACTTTCCA
ACAGGCCAATCTGATGGAGGAATTTCTCAGCTTCGATTCTTTCTTCCACGATGGGTCAAGTTGACAAACAGCTGATCAG
CACAGATCCTCAGTGGATTTCTTTCAGACCTATGAGACTGTTGCTTCTTGGATTTCTGCACCTCCCAATAATTT
GGAAAATGCCTTTAGGAAAGTTCCAAGGTAGAGTTAGGTTGGCTACGACAGCTCCCTCTGTCAGGGCTCAATGTCTG
CACTGCTTGTGTTTTGGGTGCCAGTGCTTTTCAGGGGGTTGGTTATATATATTTATAAATTTAAAGTTATTTTTAGTAGAT
TCAAATCAATATATGCTATAATATTGGATCTAGAATACAATTAATAAATTTAATTACAGCAATGATTATTATTTTTAATTA
CAGAAATGCCAAGTAAGCACGCAAAGAGAAGCAAGGAAAGGCCATGTGGTACTGGGCTGGAGAGGTGGCTCACTACA
TGCTATTTGCTCTTGCAGAGGACCTGAGTTTTGTTTCCCAGAACCACGTTGTTATACCTCAACCATCCATAATTACACTT
TTAGGGCTCTAGCATCTTTGTCAGGAACAAAGCTACACATGCAGAAATATAGCCAAATGGTTCTTACTGATAAAGTAAA
TAAAACAATTTTTTAAAAATATTCACATCAGGTAACCTCCAAAGTCACATCTCTACCTTTTTGAGAGGTGGCCTCTCACTG
AGCCTGAAATACACTGACTAGCTACAAAGACTGGCCAGAGAGTTCCAGGAATCCTCCTGTCTCTGACCTATAGTGGTG
GGGTTACATGCATGTGCTGCAGCACCTGGAGTTTTAGGTGGTACTGGGAATCTGAACTCAGGTCTTTATGCCTGCCCA
CGCTGTCTCTCCAGCCCCTGTTCTGTATTACCAGAGGCGTGGGAGAGGTGTGTCCTATTTAGCTTAAAAGCAGCAAATT
ACCAGGAAGAAAATGCTATACTTTCTGATTACACTTAATCTTTTTGTGACAAAGCTTTCTGATTTCAATTATATTGCCA
AGGCACTAAGTACCTGTGCAGATTACCACTAATTACTTATAATTTTTAAAGGCCAAAATCACCCATGAATTGAATCC
AAAGCAGCATGGAAAATATACTCCTGATTATAGGGTATAATCATGAAGCGACTTCTAGGTAATGTGTTACATGAGTAAC
TTCTGACAACCGTATCATGAACCTGAAATCGTGCCTGATCATGGGCTTTAGCTATGCCTGTCTCCTTACCATCTATGTA
GAAAGTTAGCTATTGCAGGAAGCGGGAAGAGTGAACAAGCTAACATGCTTCCAATCACTGTGGTAAGTGCTTTACAT
GCAAGGTCTAGTTTTAGAACCCTCCCGTGAACGACATAAACTGTCTTACATTTTTCAGGTGAGGGAACAGTAGAATTCA
AGCTCTTGCCCAAAGCACCTAGCTGAAGTAAGAATTTTTGCTTACAGATTCTTCAACCTCACCTAATGAAATGCAAATT
GGCAATCATAAACTCTATTGCCTACTTCCACGTTGTAAGCAATTAGTGCAAAAATGAAACAAGGAATTGCCTCTGAGCT
GGTGATTACTGCAGTCAAGGATGGCTCCGTTCTCTAAAGGACTGAAGTCCGTTGTGCATTCTCTCCTGTGGAGGAGCAG
CGAAGGTGAGTTGACTCAGGAAAAGACCACTCATTCTTCGGAAGACATTTAGTGCTCTTCTGTACCTCGTGCACCCAT
TCCTTTTTTAATTTTCAAGACAGACTCCAGGCTTCTGAGAAAAGGCTTTTAGGTTTCTACATTTTAGTTGCTCTACAAGTT
ATGTGAGCATGGGCCTTGAGCTTCCGTGGGAAGCAGGGTAATTTTAGTATAGAAGGCTGTCAGTTAGTATGGGGCTGTT
TTCTTCTGGATGCTTCCCTTAGCTAGCCTGACCCGACCCAACCATGTCTGTTCTTGGTTTTTCATCCTGTAGATGGTGAATT
GTGATCTTTCTCTGATTTTTTTCCACTGTGATTGAGCCATGCATGACGATGTATGAAAAACCATATGCATAAACTTTAT
AAACCGTAAAGGTAATTTTGAAGACAGTATTTCTAGCTAGTATGTTAATACCTTGTCTAGAGAAAGAGGCTGAACCCA
TAGGGCTGGGAAGTATGTTGAGTGGCTAGGCAGCTAAGATATTAACCTTACTTTACTTCTGTGATTCTAGTACTGACTG
AGGGGCAGGAAGGAACTGAGCCCTCAGGAGGGGGCAGCGTAGAGCAACCATAGATAAACTGCCAAGGTGACTGTG
AGTTTGAATCTTCTCACAGCTTTTTGGTGTATTGGTCTTCTCCTCCAGCACCTTCTTCTTCCCTTCTCGTCTGCTTCT
TGCTTGTGGAGTCTCATCAAGGACAGCGGTTCTCAATGTTTGGATTCCCTGTGTCAATTCAGACACTGGCACTTCCATCC
AGAGTATCCAATTTGGTAGTTCTGGCGCTACAGCCAAGGGGTTGCTCTTGTAGGAACTTCCAGGTGTAGCTGATGCTG

TGGGGCCATGGCAGTGATTTGAGATGCGTGGGGCAAGGAGCCGTGCTTTGTTATCTTAATTTTTTCAATCATTAAATTCAT
TTACCCAACACTTACCGAGATACTATTGAGCCAAGTAAAAGTTGTCTCAGTTTGTCTCTACTGCTGTGAAAAGTACGA
AAAGCAACCTGGGGAGGAAAGGGTTACAGTCCAAGTGAGGGACATGGGGCTGGAGCTCAAGGAGGGGCTAGAGGTG
GGAATTGGAGCAGAGACTATGGAGGAACATTAGTTACTGTGTTCCACCTGACTTGCTCGGCTTGCTTATAGGTGCAAGG
ACCACTTGCCCTAGGGAGGCAGTGCCTACAGTGGGGCTGGGGCTCTCATGTCAATCATTAGCCAACAAAATGCTCCAG
CAGGCCAATCTGCTGGAAGCAGTTTCTTCCCGAGGTTCTCTCTTTCCAATTTTCTCTAGTTTGTCTCTAGTTAGCAACA
ACAACAACAACAACAACAACAACAACAACCCTAACCAGGTCAAAACACCCTAGAAAATTTATGCATTCTCCAGAAACCC
TGGTTTTGGACCACCATTTCAGCAGTTTTGTAAATGCTAAATGGTTTAGTAGCCTATAAAGGGGTTCTAACCAGACAAAG
TGTGGCAAACACAGGCCTGACCATGGCAAACATTGTAAGGCAATCAGGTTTTGCCCTTTACCTCTTCTCTCCCTTGCTA
AAACCAATCACATTCTAAAGCTAGCCTCTGAGGTCTATCCCCTATTGCTCACCAATTCCTTGAGACAAAATATA
TTATTTGATCCAATGATCAAAAATTCACTATTTGGTTAGTTTGGCCACTCAGGGTTTGCAGTTTCATTCTAACCAGTATT
CCCCCTTTCTCTCTAAAAAAGCCACTCCTGCACAAAATACCCTCTTGTCTTCTTGTCTTCTTGTGTTTGGGTTTGCTGCT
GCTGCCACCCTGCTGCCGCCACCGCCGCTGCTGCTTTCAGTCTCCCTGCCTTGTGTTGCCCTCCAGGGCAATAAATC
TCCTTTGTGCTGAGAATTTGTTGTCTGGGTGTGCCCTGTAAGTCCGATTCCAGGGGCCAACTTCTTTCGGTCTGTGG
GTTCCGCCAAGCACTCTTCAGCAGGAATGACTTGAATTGCTGGCTGTGCTCTCTTGTCTGAGATAAGCCCAGCAGCAC
CCTCAATAAAGCTCTTAATTGTGTCTCAGGGGTGTCAAGGCTTGTCACTCATAGGCTTATAAGCCTGTCAGTTCTGGTTA
CTACACGTAAGCCTTGTGTTGTCCTGTTTCTGTCCGTGAAGCAGCTTAAAGGGCACGTCGCCGCTGCACCTGTCACTGCT
CCTGTCTCCATGTATAACATGGTTACCCCATGGATGCTGTCTCTGCTATGCTCCACCTACTACCATGGGCTGAACAGC
CCTGGAGAGAGCAAGGTGCCATCAGACCCTGTGTACATCTCCTCAGCTAGAGACTCAAATGTGTTGCTTATTTCTCAT
TCTATCTCAGAATACTCGAAGGTACCTCAAGCAGGATCTTCTAAAGTTACCATGAATCTATTAGAGCTTCAGGGCTGA
GAATGGTTGGATGGGCAGGGATTGTGATATTATCCAGGCTGTCTTCTCTAATCTAGGTTTTTGTGATCAGTTCATAACACA
TGTATGTGAAGCTATACACCACATATCAGATATGCTGCACATATTTGAATCATAGATGGTGGCATATAAACTCTCAA
ACCACCAGCTTTAAATGAATGAGAAATCTCACTTTTCTCCCTCATTTGCCTCCTATGTATCATGTTTATTTATAATTCTGA
AGCATTCTAGTGTGCTAAATTTAATCTAGCATAGCTAAGAGGTCTTCTTCTTCAAATACAGTTCGCATAGCTTATTTT
CTGTTGTATAAACTGTGCTTGAGGTAAGGGGAGATGATTTACAGTTCTGGTCTAATTTCTTGCTAGGGGCCAAGCGTT
GAGCCAGTTTTGAGCAATCTTTACTTATGTACATTGATGCAGGCTGTGGGTATCCTGGGTCCAGTACGCAGCCACTTATT
CTTCCCCACAAGTGGTGTGTTGGCAGGGGTCAAGGCCACACACTAAGGACTTATTGTCCATTTCTGAAGTAGAAGCATT
TAGTTGTCTAGATTCTCTGCATATTTGGTAATAGCTTACATAGTCTTACAGTTAATTTTCCAGATTTTTTCCCTGATGA
AGCCAGAGGATTGACTCATCAGACAGCATAGCTGCCCTTGTATGGGACCCAAGCTCAATTTCCAGCACCCACATGGTCA
CTCACAGCCATCTGTAACCTCAGTTCCAGAAGATCTGACTGACACTGTCTCTGACCTCCAAGGGCACTACACACACAC
AC
ATAGATCTAAAAATAAATTAATAAATCTCAATGTCAATTGAAGCAAATGTGAATTATTCTAATATTCACAAAACACCAA
TGATTAAGAGGTGAAATAACAACCTTATACATCCTTCTTTCTTTAAACTTAAGTTAAATTGGCTGCTATATTTTTCTGA
GGGTTGAGACAGGGTCTTCTATATATTTCTGGCTGTCTACGATTTGCTTTGTCAGACCAGGCTGGCTTTGAACCTCACAG
AGACCCCCTGCTTCTGCCTCCCAATTGCTGGTTTTAAAGGCACGTGCCATGATGTCTGATGGCTGGCAAGGATTTGATGT
GTTATGGTATGGTCTGTTTCATGCAAACATTTTTGGTAATCAACAGGACCATTCTAACACACAGCTTTAAAGAAATGA
CACCACCTTTCTAGCGAAGTTAGGCTAAATGGATTGTGGCAAGACATTTCTTTACCGGGGCCAGGAGCATCCTTTTGT
CTTAATCAGTTTTGGTACAGATCAAGAACACATTTAATACCATGAGACATCTCTTGGGAATATGGCTACTGTATCTCTT
GCTTATGTAGGAGCACCTGCAAGCTGTGACAATGAGTGTCTGGCCAGGGATTTATTAGGACATCTCTGAGGAGATAGGT
TCTCCTGAAGTGTCCCTCCACTGCAAGTCAGGGTAGACATGGAGCTCTGTAGAGATGGTTTTCTGTGAGGAAACTTCTC
ATGCTACATGGATGTCTGTGGGTTTTCTACAAAACAGTGTAAAGAGTGGGACTCTCTGCACACAGCTCAAGGAAAAACT
AAAACACACAGTGTATCTAAACAGTTGCAAGCTGGTAAAGTGGGCCACACTTGGAAATGTTAGCATTGTGAATCTGA
GGCAGGAGGACTGTGTGAACCTAGGCTAGACCCTGCCTCAAATAATGACAAGATCACCACCAACCAAATAGCAAC
AGCAATAACAAAGACATAAAAAAGAAACACAAAAGCCAAAACCAAATCTAGGTAACCAATATTCCTTATTACCAAG
AATGCACCTGTATCACGGTATTTCAAGGATTATGAAGTTGAGAGTACTTCAGTTTCTAGCAGGGCAGCTTGGCACTAT
CCAGGCCTGGAGTGAAAACAATCAGCACACACATGAGGAATTCCCACGTGGCAAGCAGTCAGCACACACATGAGGAA
TTCCCATGTGGCAAGCAGGAGAAAGGCTGCAGTTGAATTGAGCTTCCAGTGAAGTGGTGCATCCTGTCAGGAGTACCA
CTGTGTGCCCTGTGGACTCAAACCTCCCAACCTTCTGAAAGCTATTGGCAAATAATTTATAGGGACTCTCACTGAAAG
TCACTCACTAACTCTTCCCTTTTCTTTGTTGACCCTTGTGTTACATGTTACATATCCAAGAATGGGCATTCTGAGATG
AAGTGTGGGTCACCACATGAAGGGAATTTACCATGTAGACCAAGGGTGTGATGGAGACTGTTGAATCACATCCCTTAT
GAGACAGGGCTAAGGAAGCCAGTTTGTGGTCACTGACATGCTGCTTGGAGAGAACAAATTAGGAGAGGTGAAGTGTAA
TGACTAGTGTGTAATGGTGGAAATGATGGATTTTCAGAGTCTGAGGAGACATCAATAGCCAGCTGGAGAGATGCTGTGAT
ATTGGCCCTTTGAAGAGATTGTAAGATGCTCCTTGGAGGGCACATATACCCCATGCCAGGGACCTGCTCAGTAGATT
CACAATAGTTTTCAAAGGGGAGATTTTCTGCTCTCCCCCTAGTCTATCGAACACTGGGTTACCTGGAGCCAGGCTTAGCA
TTCGGTGGAGGAGTAGAAAAGCCAGAATGGATTTATTATACAGGAAACACACAAAACAAGCAAACAACACCATGGG
TCACCTTGCTTTTCTGTTTTAGTAGTTTTTCGTG
AGATAACTTCTTGCTATGTAGCCCAAGCTGCCCTCTAATATTCTTCAGCCTCCAGAGTGTGGAATTGTGGGTACATGCT
TTTTGAGAGGCCAAGGTAGCTTCTGCAGAGGGAGTATGATTCACCTGTGAAATGAAAAGATTTGACTACGATACAGAA
TCAAACATTTTGATAAGTTATGCAGAAACATCTAGGACTAACAATAACTGATAAACTTTAAACCTCCTCCAGTGCAAC

CCCAGTGTAGAAAGAAGAGACCTAGATCCCACCTGGAGTTGTAGCCAAGGGGGTTGAAGATGGTAATAAGGCCTCAGC
ATAGGTTTGAATGGCAGTGGAAAGTAATGATATACTAAGTCTTCTCTGATTACATCGAAGGAGCCTCGTCTGATGTACTG
ATTTTATTTTCACAACATAAATAATTTCTTATGCTTGTCCCAAGTCTACAGTAATGGCTTTTCCCTTGGCATGACCCGTTT
CAGTAGACGGTCTTTTGAGAACTCAGTAAGGTGTGGACAGGAGGCGAGAAAGACAAACACATCACCAACTCTTCCAG
AAGGTCCTTCCATCCATGCTGACTCCTTTAACCAAAAGGGGGAGCCCTCAGGGCGAGTGTGTTGTCTGACTCTTGAT
GTGGACTCCTCAATACTGAAGATGAGACCGGTTCCAGTCTGCACCACAGTAATTGAGGGGCAGAGCCACGTTTCTGACT
TATCCTTTGCTGACCACACGGCTTAGCTCCTGTTAGTCCCCATTGTGATGGAAGGAGGGGAATAATGAACTGAATCTTT
CCTTATAAGGAACATTCTTTTTCAGGTAAGAGAGGAATCAGCTGGATTTATGAGCCACACAACCTTCTGCTTCTAGGT
GCCCCCTAAAGTTGCCTTTAAAACGCTCTGGAAGAGGCTTCTGCCAAATGTTTATCTATGAGTTTTTAATTTAATATTTTA
TGTTGTCAAAAATAGGACTTTAAGAGCTCCCACATGCTAAACTAGTGTCTATCAGCAAGCCACACCTCAGCTCAGGGC
TTTCTTTGTAAGGCTTACTTAGTCAATTAATCTTTTGAATATGCGTAAAGTACAAGATAGCTATAAAAAAGCAGTTCT
GAGCCGGCGTGGTGGCGCGCAGCTTTAATCCAGCGCTCGGGAGGCAGAGGCAGGTGGATTTCTGAGTTTGAGGCCA
GTCTGGTCTACAAAGAGTTCCAGGACAGCCAGAGCTACACAGAGAAATCCTGTCTCGAAAAAACCAAGCCAAACCAAC
CAACCAAAACAAACAAAAAAGCAGTTCTGCCATTGTCCATCTCAGAAACTTCTGAGATACTTTCTAGAAAACAAATTC
TGTTTCATAGAGTTTGTCTTAAAGAGTTTTGGAGCATAAAGAAAAATGACTTCAGTGCCCGAATTCTCATTAAGTTT
AAGCCAGTCAGAACTTTAAGGTTCTGTCCATCTCTGATTTGTCTCTTTTTCATGATGTATCATAACTTTTAAAGAGGAAG
AATAGTTTGAGAATGGGAAAATCTTTGCTTTTTTTTTTGGCATTGTAACACGATATTTTAAAGGATTATACAGCATCATAT
TCTATTATTTTCATTTCCACCACATCACAGCCTTTTCTCTAAAAAGGGGGTAATCGTCCCTATCCCATTGGTGGCTTCTT
GTTTGATTCTGTTTGTCTGCGGAAGCAGAGACAAGTAAGCCCAGTGAACCCCAAGGTTCATCTGATCCTGCCTTTGTGCC
AGGACATGCAAATGACCCAGGCCAATCACTAACCTGTTTTCAGAAGACCTCCAATCAGAAGGGGTCCAGGCTGCCTTC
TGAGGGCTGTTGCTGTGTTTCAATTTGCATGCTGCAAGAACCTTCTCATCTCCCTACACCCCACTCTTATCTCAGCTTCCGT
TTCTCTACTCATTTCCAGTGACCCCTTCTTAGCTTTGTCTACCTTTCTGGCCGTTTACCCCATCGAGAAGTGGTGGG
AGACAAGAGTTAGTCTGCAAACAGCCAGATGTAAGGTAAGTTGCAGGCCCTGGACTCTGGCGTCCAGTTTCCCCTTCC
CAACTCCGTGGGGTCAGGCAGGGGTGAGTGGGCACTCCTCATTTTTCTAAGGATTTTATTTGGCAACAGGGTCTCCGCC
AACTCCAGCAAAACACTTCAGATCACTTCAGCTTCCCAAGGCTGCCATTTCTGTGTGCTTAGCAAAATGAGACACTAGG
GGGCTCCAGGGGCTGAAAGGAGCAGAAAGTTGTTGAATGAAAACCTGGGTCTGAGCTGTGTTTGGAGAAATTCAAAA
TTAAATTTTATTTTTTATTTTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTTATTTT
AATCATTTTGCTCCGCTGTTAGAAAGGCGGCAGCTTTTAAAGGCTGAGCCGAGATGTTTGAAGGTTGGAACACCCTTGGCC
ATGAAATATGTTCTCCTTACGTGCCTCAGCCTTTCAAAGTTCGTGTGATTAGAGTCAGGAATTCCATTCTTCTTGGAGCT
AAGCGTGGGGCCAGCTGTGTAAGTAAAGTTTTGTTTTTCTTCTTAAACAACCTTTTCCCTCTATTTAAAAATGTGAAGAA
AAAGGCAAAAAAACAACAACAAAAAACAACAACAAAAAACCACCAAAAAACCTAGATATTTCTTTTCTTTTCTTTT
ATTTTTGCTCTCTTTAGTGAAAGAAAAGGAATAAAAAGTTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGA
GAACTCACCTTTTCAAGCTATATAAACATCAAG
GGTAGTTAAATAACAATTTTAGATATGGAATATATTGTGAAAACAATGTGGAACATTAGTTAAGAGAATATGTTTAAA
TATGAACTCACTACTGATATTTTTGTAATATATATCTTACAAAAGTTAGGGTGTCTATAAAAACTTAAAAAGTATTTA
TTTTTTTTCTTATTTCTGAATCACAAAAAGGGGTCTGCAGGGGATCCTGGTTGATGACTTTTAAAGATTTTGCTTCTCA
GATGTAGTGGCTTTAACTGTGAGCTAGCAAACGCTCTTTGCAGCTTGTCTTACTTTTAAAGTAAAATCAGACTCACA
CACCTATCTTGCTTCCGCATTTTAAACTTTACACCAAACCTGGTGAATTTGTGGAAGGAAAGGGTTACTCGCCTCTTTC
CTCTTGTAGAGGAACTGAAATGGGTTGAGTTAGTGATTACAGTCAACTCTTGTTTCCATTCAATCCCAGAGTCAGCCCTCC
TTTTCTCTGGGAAAGGCTGATAGGAGTTTAAAAGGCTTGCAGTGGCCAGTTCACAAAGCGTTCCCAGAACCCGCAGCA
GCGACCCTTCTCTTTTACCTCTCTGCCTGTTGGAGACCACTTAGATAGCGAAGCGGACTGGACGGCTGGATTACAGGAAG
CCATGAATCATGTCACCCGGAGCCAGCTGCAGACTTTAAACTCAGTTCAGCATGTGGAAGCGGCAGAGAAATGACCTG
TCCAGACAAGCCGGGGCAGCTCGTAAACTGGTTTGTCTGCTCTCTGTGCGCCCCACGAGTGTGTAACCTTTGGAGTAGT
CGGCGTCCCAGGACCAGACGGAACCTCCTGCTGGGCACTGCCTGTGCCATCTACCTGGGCTTTCTGGTGAGCCAGGTGG
GCAGAGGTTCTTTTCAGCATGGGCAGGCGACTGACAGGGGACCACCAACGGTACGACATCTTCAAGGTACCCTTCT
CTGAGATTCCCCTGGATGGTACCCTGGCCCTCCAGAGTTGCAGGGCAATGGAAGCACTTTGCAGCCCAACGTGGTGT
CATTACTCTACGCTCAAGCGCAGCAAGCCTGCGAATATCCGTGGCACGGTGAACCCCAAGCGCAGGAAGAAGTATGC
GGTGGCATCTGCAGCCCTGATCAGGAGGTGCTGGTTAGACCATCCCTTATACAGCAGGAAGCTGCACGGGCAGCAGA
TGCTGAAGTACCTGGCTATGTTACGGGTTACCTAACCAAGGTTGGTGAACGACCCTGGAGGGTGTGCGTGGTCTGGA
GTCAGAACTAGAGGTTCAAACCTTGCAGCAGCCTAGGGCCCAGAGAGCAACATTAGGATTTATAGCGAGAGCGCCCC
TCATGGCTGAGCAAAGAAGACATCCGCAGAATGCGCCTCCTGGCTGATAGTGAGGTGGCTAGCATCCTACCTATCTCTA
AGAGTGGTACCCGCTTGTGTTGTTGGAAGGGAGCACCTCAGGCTCTGTGCCTGGCTGCGGGCCTAGCCCCTGTGGGCT
TCTCAAGCAGCCGCTGGACATGAGTGAAGTGTTCGCTTCCACCTGGACAGGATCCTGGGTCTCAACAGGACCCTGCCA
TCTGTGAGCAGGAAATTAGAGTTTCAATCAAGGTAACAGATTCACTTGTCTTATTTGCAGCTGCTGGGGATTTGGGAT
CGTTTTCTCCTTTCCCCACTCTCTCTGAATATTTTTCCCACCCATGTTTCCATTTGGACAGCAGCAGCAGCAGTAGC
GTCATTTTTCCATACGCGTGGCATTCTTCTATTTCCAGTCTGGGGATATTAGAGTTCTAATGCACAGCTGTGCTGGGCA
TGTGAGGGAAAGCCCACTGCAATCTTTGCTCTCCGTTTCTCTGTGCACTTTTTCGTGGCATGTTAAATCTAATTA
AACTAGTGACAGTTTGCACGATGACAGGAAGCCAGGGTACAGAGCTTGTGACAGCCTTGCATAGAACCTTACAGGTT
TCTATGGAACCTCCTTCTAGGATGGTTTAAAGAGTAAGGGGTTGGGGGTGGGGCATAGAAATGATGTCTCAGTGGT

TAAGAGCACTCAGTGCTTTTGC AAATCACACACACACACACAGACACAGACACACACACATACACACACAGG
GTGTTTCACAACCGCCTGTAATTCATGGGTATCCAACACTGTCTTCTGACCTCTGTTGGCATCAGGCATGAGTGTGGTAC
ACATCCACATATGAAGACAAACACTTCTATGCATAAAAATAAAGATTAATAATTCTAAAAATTAAGAGGAAAGTGGTTA
TCTTTCTCAGCAAATAGTCTTTGTCAGAGGCTCAGACAGAACTGACCACATGAGAGCTAACTCTTTTACCTCGACTGTG
ACCAATGGACTCAGCCTCTTTAATAAAATAAAGAGCATAAAAATCATAGGTGCATTTAGAGTGTAGACTAACTAGCCAT
GTGACTTCTTCAAGCTTCACTATTTACAGAGCCCCATGTGTCCTCCTGTAACACAAAGGTTGTGTCTAGGGCATGTGGCC
ACTAACTGAAGTACAGCTTTGCAGTGTGGTCTATGGAATGATCTTGCCACACAGAGGATACTCTCTGAATGAGAATG
CCATGTCGGGGTTGGAATCTGAAGTACACTCAGTCAGTGACTTGTGTTGCAATGTAGAACCACCCAGGCTGAAATGTTA
GAGCATCTCTTTCAGCTGTGCAATGGCAATACTGTCCACCTCATGAAGTTGCTGGTAGCTTACACATAGACAGCAGTT
CTTGGCACCAACAAACCTTCAATAAGCGCTGGCTATTGCTGTTATTCCACTGAGTGACCCAAGTACCAAGTTCCCTGA
GTTGCTTTGGGCCATCAACCTCAAAGGTCATTTTCTTATAAACAATACTAGCAATAGAACTCTTCTAGTTTGACTGTG
CCTATTTTGTGCCAGAATTCCTCTTGGACATTTGATTCTGTTCCCTGGGTTTCTAGAATATCAA AACCCCTAAAATTGAG
TTTGAAGAAGTCTCTGGCATGGTCTCGCTCCAGCCATATCCAAGTGGCGGTTGAAATAAATGAATAGAGTCACAGCCG
CGGCTCAGTGTGATGAGTTC AAGAGTAGGATTTTGTATCAGATGGCTTCAGTGGTTGTTCCCTGCTTCAATATCTCTTCCC
TTCAGTGTTTTAGAGTCATGAAGTCAGGTCAGCTTCCCTCAGGAGCATATGTATGGACTCACGTGTGCATCATTTTCATACA
GGTGTTTTGTACAGTGAGGTAGGTGACAAGAACAGGCCAGTTCAGCATGCAACGAACATTACTCAGGTTTCCCCTTC
CTATGTTGCTTTTTTTTCTACCTGATTTACTCGTTGGGTGTGAATTTCCCTGTCGGGACCACCTATTCCCTGGTAACTCAGTT
TTACGTGAGCAGTGTCTGAGCTCTGAAAGAGATCCAGCTCATTCTATAATAATCCTATTGTGTTATCTCTCCCTTCCCCT
GTCTCTGTGTCTGGGAGGCAGCAATGTTTCTTGTATTTTTTATTGTGTTGAGCCACTGGAGTGTATAGCATAACCGTAG
ACACTCATGGAATGAACACATTGAATGAATGCAGGGGTTCCCTTCTGCTTGTCTTTGATGCTTGACGGCAAATCCGT
ACCTGCCTCCAGTTTCTAATGCTAGGGACTAATAAAAATTAGTATTTTTATCCTAAATCCAGGCTGGGATTCATCTGGAA
GGACTTCACAAAAGTTTACTGTGGAGGCTAATGACAAATGTTCCCTGGTAGCCTTGTACAGCACAAATAATTAGGCTT
GTAGATGTATTATGCTGAGGACGATCAGCATGGCATGTTGATATCAGGCTAGCATGATTTAATGATGGGTTTTCTATAG
GCAGAACAAATATGATTTGTTAAGGGGTATGGTTTGGTCTAGAAATCTTTTTATATGGAGGAGAGAGCAGGTAGTTAGC
ACATCTTGATGCATGTAGTGTGCTTAAGGGCTGTATCTATTCTTTGACTTTTACTTGTATTTATGAAAATACATTTATG
TCTCGAGCAAGGAAGATAGTTTGTATGAGGTGCAGAGTTAAGCATTGGGTTATCTCCCTGACTATCCAAGACTCTTAC
ACAGTTGGCATTAAAAAAGACAAAACACCTTAATGTGAGATGAAAGACACGTCTGTTTAGAGTCATAATAGGA
GAATGAATCTTGAGACCATAAGGAATAAAGACTCTATTTTCTCTGGTTTTCTTTCTTTCTTTTTTTTATTAGATATTTTC
TTTTATTACATTTAAAAATGCTATCCTGAAAGTTCCCTATACCCTCTCCCCGCCCTGCTCCCCACTCATTCACTCCTGCTT
CTTGGCCCTGGCATTCCCCTGAACTGGGGCATATAAAGTTTGAAGACCAAGGGGCCCTCTTCCCAGTGATGGCTGAC
TAGGCCATCTTCTGCTACATATGCAGCTAGAGACACGAGCTCTGGGGGGGGGGTACTGGTTAGTTCATATTGTTGTTTC
ACCTATAGGGTTGCAGACCCTCAGCTCCTGGGTGCTTTCTCTAGCTTCTCCATTGGGGGGCCCTGTGTTTCATCTTATAG
ATGACTGTGAGCATCCACTTCTGTATTTTCCAGGCACTGGCATAACCCTCACAGGAGACAGCTATACCAGGGTCCCTTCA
TCAAATCTTTCTGGCATAATGCAATAGTGTCTGGGTTTGGTGGCTGATTATGGGATGGATCCCCAGGTGGGGTAGTCTC
TGGATAGTCCATCCCTTTGTCTTAGTGCCAAACTTTGTCTCTGTAACCTCTTCATAGGTATTTTGTCCCTATTCTAAGG
AGGAATGAAGTATCCACCATTGGTCTTCCCTCTTCTGATTTTTCTTGTGTTTTGCAAATGTATCTTGGGTGTTCTATGT
TTCTGGGCTAATATCCACTTATCAGTGAGTGCATATCTAATGACTTCTTTTGTGATTGGGTTACCTCACTAAGAATCATA
TCCTCCAGATACATCCATTTGTCCAAGAATTTATAAATTCATCATTTTAAATAGCTGAGTAGTACTCCATTGTGTAAT
GTATCACATTTTCTGTATCCATTCTTCTGTTGAGGGACATCTGGGTTCTTTCCAGCTTCTGGCTATTATAAATAAGGCTGC
TATGAACATAGCTGGAGCATGTGTTCTTATTACCAGTTGGAATCTTCTGGGTATATGCCCAGGAGAGGTATTGCTGG
AATTATGTCCAATTTTCTGAGGAACCTCCAGACTGACTTCCAGAGTGGTTGTACAAACTTGCAATCCCACCAGCAGTGG
AGGAGTGTTCCTTTTCTCCACATCCTCGCCAGCATCTGCTGTCAACTGAATTTTTGATCTTAGTCATTCTGACTGGCGT
GAGGTGGAATCTCAAGGTTGTCTTTACTGCTTTTAAATATTCTATCTTTATTTAGTGCATTTGTTCTGATTATTATGTGTC
AGGAGGAATTTCTTTTCTGGTCCAGTCTATTTGGAGTCTGTAGGCTTCTGTATGTTTCATGGGCATCTCTTTCTTTAGGT
TTGGGAAGTTTTCTTCTATAATTTTGTGTAAGATATTTGCTAGCCCTTAAAGTTGAAAATCTTCATTCTCATCTACCCCTA
TTATTTTGTAGGTTTGGTCTCCTCATTGTGTCCTGGATTTCCCTGGATGATTTGAGTTAGGATCTTTTTAAATTTTGCATTTT
CTTTGATTGTTGTGCCCATGTTCTGTATGGAATCTTCTGCACCTGAGATTCTCTGTTCCATCTCTTGCATTCTGTTGCTGA
TGCTCGCATCTATGGTTCCCTGATTTCTTCCCTAGGGTTTCTATCTCCAGAGTGTCTCCCTTTGGGTTTTCTTTATTGTTTC
TACTTCCCTTTTTAGGTCTTGGATGGTCTTGTTC AATCCATCACCTGTTTGGTTGTGTTTTCTGTAATCTTTAAGGGA
TTTTTGTGTTCCCTCTTCAAGGACTTCTACCTGTTTAGCAGTGTACTCTTGTATTTCTTTAAGTGAGTTATTAATGCCCTTC
TTAAGGTCTCTACCAGCATCATGAGATATGATTTTGAATCCGAATCTTGCTTTTTCGGGTGTGTTGGGGTATCCAGGACT
GGCTGAGGTGGGAGTGTGGGTTCTGGTGATGGTGAGCGGTCTTGATTTCTGTTGGTAAGATTCTTACATTTGCCTTTTCG
CCATTTGGTAATCTCTGGTGTATTGTTTATAAATGTCTCTGGCTGGAGCCTGTTCCCTCCTGIGATTCTGTTAGCCTCTGT
CAGCTGTCTGGAAGTCCAGCTCTTCTGAGTCTCAGTGGTCAGAGTACTCTTTCAGGCAAGCTCTCCTCTGGCAGGG
AAGGTGCACAGATATCTGGCTTTAGACCTGCCTCCTGGCTGAAGATAAAGACCCGAAATAGGGCCTGTCCCAGATAA
TGGGTTGCCTCTGCAGTCTGAGCGTTCACCTGCACAGACTGGTCTCCGAGGGACCCAAGACACAAGATGGTTCCTCAC
ATGCTCTGGAGGTCCGAGCCCTCCAGGTGGTACCTCTCCTCTGGTGGGGAAGGTGCCAGATGTCTGCAGCCTAAAA
CAGGGCCTGTCTCAGAAGCTGTGTAGTTTCTGTAGTCTGCTCGCTCACCCCTCCGTGGTCCGCATTCTCAACTGCACAGAC
TGGTCTCAGAGGACCTGGGAGTCAAGATCTTCTCTGTATTTTTATCCTAAGTTTTCAAATCTTTCTAGATTTACCAATC

AGCTTCTTTAAACACATCCTTTAAGGGGCCACAAGGCATCTCTTTTTCTCTCCATATATGTAACAATCAGAATCCCAGTC
ATTGAATACAGTATCACAGGTGACCAACACTCATGCACACATACAGGCTGTAGAAACCTCTTCTCTCGAGGGAATAGC
AGTGTCTTAGTCAGGGTTTCTATTCTGACAGACATCATGACCAAGAAGCAAGTTGGGGAGGAAGGGGTTTATTTCGGC
TTACATTTCCATACTGCTGTTGATCACAAAGGATGCAGGACTGGAAGTCAAGCAGGTCAGAAAGCAGGAGCTGATGC
AGAGGCCATGCAGGGATGTTCTTTACTGGCTTGCTTCCCCTGGCTTGCTCAGCCTGCTCTTTATAAAACCCAAGACTAC
CAGCCCAGAGATGGTCCCACCCACAAGGGGCCTTTCCCCTTGATCACGAATTGAGAAAATGCCTTACAGTTGGATCTC
ATGGAGGCATTTCTCAACTGAAGCTCCTTTCTCTCTGATAACTCCAGCTGTGTCAAGTTGACACAAAACACTAGCCAGTA
CAATTGACCCCATGTCAACTGACACACAAAAACATCACTAGTAAGCCTCAACCTTACAATCTTATTTCATCCCCAAGA
TCTAAATAACTTTAAAAGTCCCACAGCCTTTACATATTTCTTAAAATTTCAATTTCTTTAAGGTATCCATCTTTTTTAAAAT
CCAAAGTCTTTTTACAATTTAAAAGTCTTTAACTGTGGGCTCCACTAAAACAGTTTCTTCCCTCAAGAGGGAATAAT
AGGGCACAGTACAATCAAAGCAAAGTCAATCTCCAAGTCAATGTCTGGAATCAACTCAGATCTTTCTGGGCT
CCTNN
NN
CCAGCCATGCCCTTTGTAGCACACGCATCATCCTCTAGGCTCCAGATGCCTGTACCCCACTGCTGCTGCTGCTCTTGGTG
GTCATCTCATGGTACTGGCATCTCCAAAACACTGCATGACCCCTTCAGTCTGGGCCTTCAATTGCAACTGAGGCTGCA
CCTTACCAATGGCCTTCCATGGCCTCTCACAGTACCGAGCCTCAGCTGCTTTGCGTGACCCCTTCATGCCTTCAAAC
AGTACCACCTGGGTGACCCTTACATATTACCAAGTCCCGCTGCAGCAGGAGTACAACCTTGGCCATATCTGGAACACAG
CCTCTTTGTGCTTTCAGAAAACACTTCCCAGAAGATGTCACCTCAATGATGCTGGTCTCTTCTTAATCACCGCTAATTTT
TTAGCTCCAGCTAACCCAGCATCAATAGTCCCAGTAATGCAAAGTTTTTGTCTTGGTAGTTCTGGTATCTTGTAAATCACA
GCTGATTCTTACGCCCCAGCTAACCCAGAACCCACAGAATCTTACAATCAAACAGCAATGGCCCTGAAAAGAGTCTTT
AATTTCCCTCTGAAATTTACACACCAGAGCTCCATCTTCTGCAGTGTCTCAACATATTCTTCCAAGCTCCTACACGA
CATCCGACAGAGCTCTTAAACAACGGATGGATCTTCAAGCCCAAAGTCCAAAATCCTTCCACAGTCTCCCCAAAACAT
GGTCAGATTGTCACAGGAATACCCCACTCTGCTGGTACCAATTTGTCTTAGTCAGGGTTTCTATTCTGCACAAACATCA
TGACCAAGAAGCAAGTTGGGGAGGAAGGGGTTTATTTCGGCTTACATTTCCATACTGCTGTTGATCACAAAGGATGCA
GGACTGGAAGTCAAGCAGGTGAGAAAGCAGGAGCTGATGCAGAGGCCATGCAGGGATGTTCTTTACTGGCTTGCTTCC
CCTGGCTTGCTCAGCCTGCTCTTTATAAAACCCAAGACTACCAGCCCAGAGATGGTCCCACCCACAAGGGGCCTTTCC
CCCTTGATCACGAATTGAGAAAATGCCTTACAGTTGGATCTCATGGAGGCATTTCTTCAACTGAAGCTCCTTTCTCTCTG
ATAACTCCAGCTGTGTCAAGTTGACACAAAACACTAGCCAGTACAAGCAGCCTCCATTGTGACCATGGCTCACTGAGTGT
ACTTACACCAAGCGCCATGTTGTTTTAAGAACTGGGTCTCCATTATCACATGAAGTCCACATAAAAATCTTTTGGAAAGT
GTTCTCAAGTACAGGACTTTGGAAGTCCATAATAGGAAGTTGATGAATATGAAGATAGAAGGCCAGAAATTTTTTTCAA
AAGCCCATGGATATAAACTAATATGAAAGGGATTGTGTAACATTCCTAGGGAGATACAAAGAAGACCCCGAATGGCT
TGCCACTCTTGGTCTCCAGTAGAAGCTATCCATTGATCCAGTCTAGTGATAAGAGAGCCCCAACTATCAACACATCT
CACATACCATAGGTTTATGCACTGAAATTAGAAGTGCATTAATACAGCTAACGTAGGCCATTGTCAATCAGCCTGTC
CCACCTTAAGCATGATCAGGTAACCTCCAGGAGTATTTGTACTAGACTATAGCTGGGCAAATCGTCTACCACCAAGCT
TGTTTTATAATAAAGACTCAT

Selection Cassette:

GCTCTAGAGGCCATAGCGGCCATTTAAATGGCGCGCCGGATCCCAGGGCCGCTCTAGCTAGACTAGTCTAGCTAGAGGA
ATTCCGCCCCTCTCCCTCCCCCCCCCTAACGTTACTGGCCGAAGCCGCTTGAATAAGGCCGGTGTGCGTTTGTCTATA
TGTTATTTCCACCATATTGCCGCTTTTGGCAATGTGAGGGCCCGGAAACCTGGCCCTGTCTTCTTGACGAGCATTCT
AGGGGTCTTTCCCCTCTCGCCAAAGGAATGCAAGGTCTGTTGAATGTCGTGAAGGAAGCAGTTCCTCTGGAAGCTTCTT
GAAGACAAACAACGTCTGTAGCGACCCTTTGCAGGCAGCGGAACCCCCACCTGGCGACAGGTCCCTCTGCGGCCAAA
AGCCACGTGTATAAGATACACCTGCAAAGGCGGCACAACCCCAAGTCCACGTTGTGAGTTGGATAGTTGTGGAAAGAG
TCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTGAAGGATGCCCAGAAGGTACCCCAATTGTATGGGATCTGATCT
GGGGCCTCGGTGCACATGCTTTACATGTGTTTGTAGTCGAGGTTAAAAAACGTTAGGCCCCCCGAACCACGGGGACGT
GGTTTTCTTTGAAAAACACGATGATAAGCTTGCACAAACCATGGAAGATCCCGTCTGTTTTACAACGTCGTGACTGGGA
AAACCCTGGCGTTACCCAACCTAATCGCCTTGACGACATCCCCCTTTCGCCAGCTGGCGTAATAGCGAAGAGGCCCGC
ACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCGCTTTGCCTGGTTTTCCGGCACCAGAAGCGGTGC
CGGAAAGCTGGCTGGAGTGCATCTTCTGAGGCCGATACTGTGCTGCTCCCTCAAACCTGGCAGATGCACGGTTACGA
TGCGCCCATCTACACCAACGTAACCTATCCATTACGGTCAATCCGCCGTTTGTTCACCGGAGAATCCGACGGGTTGT
TACTCGCTCACATTTAATGTTGATGAAAGCTGGCTACAGGAAGGCCAGACGCGAATTTTTTGTGAGGCGTTAACTCGG
CGTTTCATCTGTGGTGAACGGGGCCTGGGTGCGTTACGGCCAGGACAGTCTGTTGCGCTCTGAATTTGACCTGAGCGC
ATTTTTACGCGCCGAGAAAACCGCCTCGCGGTGATGGTGCTGCGCTGGAGTGACGGCAGTTATCTGGAAGATCAGGA
TATGTGGCGGATGAGCGGCAATTTCCGTGACGCTCTGTTGCTGCATAAACCGACTACACAAATCAGCGATTTCCATGTT
GCCACTCGCTTTAATGATGATTTAGCCGCGCTGACTGGAGGCTGAAGTTCAGATGTGCGGGCAGTTGCGTGACTACC
TACGGGTAACAGTTTCTTTATGGCAGGGTGAACGCAGGTCGCCAGCGGCACCGCGCCTTTCGGCGGTGAAATTATCGA

TGAGCGTGGTGGTTATGCCGATCGCGTCACACTACGTCTGAACGTCGAAAACCCGAAACTGTGGAGCGCCGAAATCCC
GAATCTCTATCGTGCAGGTTGAACTGCACACCCGCCGACGGCACGCTGATTGAAGCAGAAGCCTGCGATGTCGGTTTT
CGCGAGGTGCGGATTGAAAATGGTCTGCTGCTGCTGAACGGCAAGCCGTTGCTGATTTCGAGGCGTTAACCGTCAAG
CATCATCCTCTGCATGGTCAAGTTCATGGATGAGCAGACGATGGTGCAGGATATCCTGCTGATGAAGCAGAACAACCTTTA
ACGCCGTGCGCTGTTTCGATTATCCGAACCATCCGCTGTGGTACACGCTGTGCGACCGCTACGGCCTGTATGTGGTGA
TGAAGCCAATATTGAAACCCACGGCATGGTGCCTAATGAATCGTCTGACCGATGATCCGCGCTGGCTACCGGCGATGAG
CGAACGCGTAACGCGAATGGTGCAGCGCGATCGTAATCACCCGAGTGTGATCATCTGGTCGCTGGGAATGAATCAGG
CCACGGCGCTAATCACGACGCGCTGTATCGCTGGATCAAATCTGTGATCCTTCCCGCCCGGTGCAGTATGAAGGCGGC
GGAGCCGACACCACGGCCACCGATATTATTTGCCCGATGTACGCGCGCGTGGATGAAGACCAGCCCTTCCCGGCTGTG
CCGAAATGGTCCATCAAAAAATGGCTTTCGCTACCTGGAGAGACGCGCCCGCTGATCCTTTGCGAATACGCCCACGCG
ATGGGTAACAGTCTTGGCGGTTTCGCTAAATACTGGCAGGCGTTTCGTCAGTATCCCCGTTTACAGGGCGGCTTCGCT
GGGACTGGGTGGATCAGTCCGCTGATTAATAATGATGAAAACGGCAACCCGTGGTTCGGCTTACGGCGGTGATTTTGGCG
ATACGCCGAACGATCGCCAGTTCTGTATGAACGGTCTGGTCTTGGCCGACCGCACGCCGATCCAGCGCTGACGGAAGC
AAAACACCAGCAGCAGTTTTTCCAGTTCGTTTATCCGGGCAAACCATCGAAGTGACCAGCGAATACCTGTTCCGTCAT
AGCGATAACGAGCTCCTGCACTGGATGGTGGCGCTGGATGGTAAGCCGCTGGCAAGCGGTGAAGTGCCTCTGGATGTC
GCTCCACAAGGTAACAGTTGATTGAACTGCCTGAACTACCGCAGCCGGAGAGCGCCGGGCAACTCTGGCTCACAGTA
CGCGTAGTGCAACCGAACGCGACCGCATGGTCAAGCCGGGCACATCAGCGCTGGCAGCAGTGGCGTCTGGCGGA
AAACCTCAGTGTGACGCTCCCCGCCGCTCCACGCCATCCCGCATCTGACCACAGCGAAATGGATTTTTGCATCGAG
CTGGGTAATAAGCGTTGGCAATTTAACCGCCAGTCAGGCTTTCTTTTACAGATGTGGATTGGCGATAAAAAACAACCTG
TGACGCCGCTGCGCGATCAGTTCACCCGTGCACCGCTGGATAACGACATTGGCGTAAGTGAAGCGACCCGCATTGACC
CTAACGCCTGGGTGCAACGCTGGAAGGCGGCGGGCCATTACCAGGCCGAAGCAGCGTTGTTGCAGTGCACGGCAGATA
CACTTGTGATGCGGTGCTGATTACGACCGCTCACGCGTGGCAGCATCAGGGGAAAACCTTATTTATCAGCCGAAAAC
CTACCGGATTGATGGTAGTGGTCAAATGGCGATTACCGTTGATGTTGAAGTGGCGAGCGATACACCGCATCCGGCGCG
GATTGGCCTGAACTGCCAGCTGGCGCAGGTAGCAGAGCGGGTAAACTGGCTCGGATTAGGGCCGCAAGAAAACCTATCC
CGACCGCCTTACTGCCGCTGTTTTGACCGCTGGGATCTGCCATTGTCAGACATGTATACCCCGTACGCTTCCCGAGCG
AAAACGGTCTGCGCTGCGGGACGCGCGAATTGAATTATGGCCACACCAGTGGCGCGGCGACTTCCAGTTCAACATCA
GCCGCTACAGTCAACAGCAACTGATGGAAACCAGCCATCGCCATCTGCTGCACGCGGAAGAAGGCACATGGCTGAATA
TCGACGGTTTTCCATATGGGGATTGGTGGCGACGACTCCTGGAGCCCGTCAGTATCGGCGGAATTCCAGCTGAGCGCCGG
TCGCTACCATTACCAGTTGGTCTGGTGTCAAAAAATAATAAACCGGGCAGGCCATGTCTGCCCGTATTTTCGCGTAAGG
AAATCCATTATGTAATTTAAAAAACACAACTTTTGGATGTTTCGGTTTATTCTTTTTTCTTTTACTTTTTTATCATGGGA
GCCTACTTCCCGTTTTTCCCGATTTGGCTACATGACATCAACCATATCAGCAAAAGTGATACGGGTATTATTTTTGCCG
TATTTCTCTGTTCTCGCTATTATTCCAACCGCTGTTTGGTCTGCTTTCTGACAAACTCGGAACTTGTTTATTGCAGCTTAT
AATGGTTACAAATAAAGCAATAGCATCACAAATTTACAAATTTAATTAAGGCCGCGGGATCGATCCCGTCGAGCAGT
GTGGTTTTCAAGAGGAAGCAAAAAGCCTCTCCACCCAGGCCCTGGAATGTTTCCACCCAATGTGAGCAAAACCCCGCCAGCGTCTT
CAAGAGGAAGCAAAAAGCCTCTCCACCCAGGCCCTGGAATGTTTCCACCCAATGTGAGCAAAACCCCGCCAGCGTCTT
GTCATTGGCGAATTGAAACACGACAGTGCAGTCCGGCGGGCGCGTCCCAGGTCCACTTCGCATATTAAGGTGACGCG
TGTGGCCTCGAACACCGAGCGACCCCTGCAGCCAATATGGGATCGGCCATTGAACAAGATGGATTGCACGAGGTTCTC
CGGCCGCTTGGGTGGAGAGGCTATTCCGGCTATGACTGGGCACAACAGACAATCGGCTGCTCTGATGCCGCCGTGTTCCG
GCTGTCAGCGCAGGGGCGCCCGTTCTTTTTGTCAAGACCGACCTGTCCGGTGCCCTGAATGAACTGCAGGACGAGGC
AGCGCGGCTATCGTGGCTGGCCACGACGGGCGTTTCTTTCGCGAGCTGTGCTCGACGTTGTACTGAAGCGGGAAGGGA
CTGGCTGCTATTGGGCGAAGTGCCGGGGCAGGATCTCCTGTATCTCACCTTGCTCCTGCCGAGAAAGTATCCATCATG
GCTGATGCAATGCGGCGGCTGCATACGCTTGATCCGGCTACCTGCCCATTCGACCACCAAGCGAAACATCGCATCGAG
CGAGCACGTACTCGGATGGAAGCCGGTCTTGTGATCAGGATGATCTGGACGAAGAGCATCAGGGGCTCGCGCCAGCC
GAACTGTTCCGCAAGGCTCAAGGCGCGCATGCCGACGGCGAGGATCTCGTCGTGACCCATGGCGATGCCTGCTTGGCC
AATATCATGGTGGAAAATGGCCGCTTTTTCTGGATTCATCGACTGTGGCCGGCTGGGTGTGGCGGACCGCTATCAGGACA
TAGCGTTGGCTACCCGTGATATTGCTGAAGAGCTTGGCGGCGAATGGGCTGACCGCTTCTCTGCTGCTTTACGGTATCGC
CGCTCCCGATTTCGAGCGCATCGCCTTCTATCGCCTTCTTACGAGTCTTCTGAGGGGATCGGCAATAAAAAGACAGA
ATAAAACGCACGGGTGTTGGGTGCTTTGTTTCGGATCCGAATTCCTCGAGGGCGCGCCATTTAAATGGCCAGCGAGGCC
GTACCCAATTCGCCCTATAG

Targeted Locus:

TACCATGAGACATCTCTTGGGAATATGGCTACTGTATCTCTTGCTTATGTAGGAGCACCTGCAAGCTGTGACAATGAGT
GTCTGGCCAGGGATTTATTAGGACATCTCTGAGGAGATAGGTTCTCCTGAAGTGTCCCTCCACTGCAAGTCAGGGTAG
ACATGGAGCTCTGTAGAGATGGTTTTCTGTGAGGAAACTTCTCATGCTACATGGATGTCTGTGGGTTTCTACAAAACAGT
GTAAGAAGTGGGACTCTCTGCACACAGCTCAAGGAAAAACTAAAACACACAGTGTATCTAAACAGTTGCAAGCTGGT
AAAGTGGCCACACTTGGAAATGTTAGCATTTGTGAATCTGAGGCAGGAGGACTGCTGTGAACTCTAGGCTAGACCCCTG
CCTCAAAATAATGACAAGATCACCAACCAAAATAGCAACAGCAATAACAAGACATAAAAAAGAAAACACAAAAGC
CAAACCAAAATCTAGGTAACCATATTCTTATTACCAAGAATGCACCTGTATCACGGTATTTCAAGGATTATGAAGT

TGAGAGTACTTCAGTTTCCTAGCAGGGCAGCTTGGCACTATCCAGGCCTGGAGTGAAAACAATCAGCACACACATGAG
GAATTCACCGTGGCAAGCAGTCAGCACACACATGAGGAATTCCTATGTGGCAAGCAGGAGAAAGGCTGCAGTTGAAT
TGAGCTTCCAGTGAAGTGGTGCATCCTGTGTCAGGAGTACCACTGTGTGCCCTGTGGACTCAAACCTCCCAACCTTCTGAA
AGCTATTGGCAAAATAATTTATAGGGACTCTCACTGAAAGTTCACTCACTAACTCTTCCCTTTTCTTTGTTGACCCTTGC
TTGTTACATGTTACATATCCAAGAATGGGCATTCTGAGATGAAGTGTGGGTCACCACATGAAGGGAATTTACCATGTAG
ACCAAGGGTGTCTGATGGAGACTGTTGAATCACATCCCTTATGAGACAGGGCTAAGGAAGCCAGTTTGTGGTCACTG
ACATGCTGCTTGAGAGAACAATTAGGAGAGGTGAAGTGTAACTGACTAGTGTGAATGGTGAATGATGGATTTACAGAG
TCTGAGGAGACATCAATAGCCAGCTGGAGAGATGCTGTGATATTGGCCCCTTTGAAGAGATTGTAAGATGCTCCTTGA
GGGCACATATACCCCATGCCAGGGACCTGCTCAGTAGATTACAATAGTTTCAAAGGGGAGATTTTCTGCTCTCCCC
TAGTCTATCGAACACTGGGTTACCTGGAGCCAGGCTTAGCATTCCGTGAGGAGGTAGAAAAGCCAGAATGGATTTAT
TATACAGGAAACACACAAACAAGCAAAACAACACCATGGGTCACCTTGGCTTTTCTGTTTTAGTAGTTTTTCTGTGTGT
GT
TATTCTCAGCCTCCAGAGTGTGGAATTGTGGGTACATGCTTTTTGAGAGGCCAAGGTAGCTTCTGCAGAGGGAGTAT
GATTCCACTGTGAAATGAAAAGATTTGACTACGATACAGAATCAAACATTTTGATAAGTTATGCAGAAACATCTAGGA
CTAACAACTGATAAACTTTAAACCTCCTCCCAGTGCAACCCAGTGTAGAAAAGAGACCTAGATCCCACCTGG
AGTTGTAGCCAAGGGGGTTGAAGATGGTAATAAGGCCTCAGCATAGGTTTGAATGGCAGTGAAGTAATGATATACTA
ACTGTTCTCTGATTACATCGAAGGAGCCTCGTCTGATGTACTGATTTTATTTTCAACATAAAATAATTTCTTATGCTTGT
CCCCAAGTCTACAGTAATGGCTTTTCTTGGCATGACCGGTTTTCAGTAGACGGTTCTTTGAGAACTCAGTAAGGTGTG
GACAGGAGGCGAGAAAGACAAACACATCACCACCTTCCAGAAGGTCCTTCCATCCATGCTGACTCCTTTAACCACA
AGGGGGAGCCCTCAGGGCGAGTGTGTTGTCTGACTCTTGGATGTGGACTCCTCAATACTGAAGATGAGACCGGTTCCA
GTCTGCACCACAGTAATTGAGGGGCAGAGCCACGTTTCTGACTTATCCTTTGCTGACCACACGGCTTAGCTCCTGTAGT
CCCCATTGTGATGGAAGGAGGGGAATAATGAACTGAATCTTCCCTTATAAGGAACATTCTTTTTCAGGTAAGAGAGGAAT
CAGCTGGATTTATGAGCCACACAACCTTCTGCTTCTAGGTGCCCCCTAAAGTTGCCTTTAAACGTCTGGAAGAGGC
TTCTGCCAAATGTTTATCTATGAGTTTTAATTTAATATTTTATGTTGTCAAAAATAGGACTTTAAGAGCTCCCACATGC
TAAACTAGTGTCTATCAGCAAGCCACACCTCAGCTCAGGGCTTTCCTTTGTAAAGGCTTACTTAGGTCAATTAATCTTT
TGAATATGCGTAAAGTACAAGATAGCTATAAAAAGCAGTTCTGAGCCGGGCGTGGTGGCGCGCACCTTTAATCCCAGC
GCTCGGGAGGCAGAGGCAGGTGGATTTCTGAGTTTGAAGCCAGTCTGGTCTACAAAGAGTTCCAGGACAGCCAGAGCT
ACACAGAGAAATCCTGTCTCGAAAAACCAAGCCAAACCAACCAACCAACCAACCAACCAACCAACCAACCAACCAACCA
CCATCTCAGAACTTCTGAGATACTTTCTAGAAAACAAATTCATGTTTCATAGAGTTTGTCTTAAAGAGTTTTGGAGCATA
AAGAAAATGACTTCAGTGCCCGAATTCTCATTAAGTTTAGTCAAAGCCAGTCAGAATTTAAGGTTTCTGTCCATCTCT
GATTTGTCTCTTTTTCATGATGTATCATAACTTTTAAAGAGGAAGAATAGTTTGAAGATGGGAAAATCTTTGCTTTTTTTT
TTGGCATTGTAACACGATTTTTAAGGATTATACAGCATCATATTCTATTATTTTCAATTTCCACCACATCACAGCCTTTT
CTCTAAAAAGGGGGTAATCGTCCCTATCCCATTGGTGGCTTCTGTTTGATTCTGTTTGTCTGCGGAAGCAGAGACAAGT
AAGCCCAGTGAGACCCCAAGGTCATCTGATCTCTGCTTTGTGCCAGGACATGCAAATGACCCAGGCCAATCCTACTAACCT
GTTTTCAGAAGACCTCCAATCAGAAGGGGTCCAGGCTGCCTTCTGAGGGCTGTTGCTGTTTCAATTTGCTATGCTGCAAG
AACCTTCTCATCTCCCTACACCCCACTTTATCTCACGTTTCCGTTTCTCTACTCATTTCAGTGACCCCTTCTTGACTT
TGTCTACCTTTCCTGGCCGTTTTACCCCATCGAGAACTGGTGGGAGACAAGAGTTAGTCTGCAACAGCCAGATGTA
AGGTAAGTTGCAGGCCCTGGACTCTGGCGTCCAGTTTCCCTTCCCAACTCCGTGGGGTCAGGCAGGGGTCAGTGGGCA
CTCTCATTTTTCTAAGGTATTTATTTGGCAACAGGGTCTCCGCCAACTCCAGCAAAACACTTCAGATCACTTCAGCTTC
CCAAGGCTGCCATTTCTGTGTGCTTAGCAAATGAGACACTAGGGGGCTCCAGGGGCTGAAAGGAGCAGAAAGTTGT
TTGAATGAAAACCTGGGCTGAGCTGTGTTTGGAGAAATTCAAAATTAATTTTTATTTTTTATTTTTTATTTTTTATTTTAA
AAAGAACCTCACGTGTCTGAAAACGGCGCAGCAGCCAGTTTACAAATCATTTTGTCTCCGCTGTTAGAAGGCGGCAGCTT
TTAAGGCTGAGCCGAGATGTTTGAAGGTGGAACACCCTTGGCCATGAAATATGTTCTCCTTACGTGCCTCAGCCTTTC
AAAGTTCTGTGCATTAGAGTCAGGAATTCATTCTTCTGGAGCTAAGCGTGGGGCCAGCTGTGTAAGTAAAGTTTTGT
TTTTCTTCTTAAACAACTTTTTCCCTCTATTTAAAAATGTGAAGAAAAAGGCAAAAAAACAACAACAAAAA
CAACAAAAAACCACCAAAAAACCTAGATATCTTTTCTTTTCATTTTTGTCTCTTTTAGTGAAAGAAAAGGAATA
AAAAGTTGT
GAGAGAGAGAGAACTCACCTTTTCAAGCTATATAAACATCAAGGGGTAGTTAAATAACAATTTTATAGATATGGAATAT
ATTGTGAAAACAATGTGGAACATTAGTTAAGAGAATATGTTTAAATATGAACTCACTACTTGGATATTTTTGTAATATAT
ATCTTACAAAAGTTAGGGTGTCTATAAAAATCTTAAAAAGTATTTATTTCTTTTCTTATTTTCTGAATCACAAAAGGGGG
TCTGCAGGGGATCCTGGTTGATGACTTTTAAAGATTTTGTCTCTCAGATGTAGTGGCTTTAACTGTGAGCTAGCAAACGC
TCTTTGCAGCTTGTCTTCACTTTTAAAGTAAAATCAGACTCACACACCTATCTTGTCTCCGCATTTTAAACTTTACACC
AACTTGGTAGAATTTGTGGAAGGAAAGGGTTACTCGCTCTTTCCTCTTGTAGAGGAACTGAAATGGGTTGAGTTAGT
GATTCAGTCAACTCTTGTTCATTCCAGAGTCAGCCCTCCTTTCTCTGGGAAAGGCTGATAGGAGTTTAAAG
GCTTGCAGGTGGCCAGTTCACAAAGCGTTCACAGAACCCGACGACGACCCCTTCTTTTTACCTCTCTGCCTGTTGGAG
ACCACTTAGATAGCGAAGCGGACTGGACGGCTGGATTCAGGAAGCCATGAATCATGTCACCCGGAGCCAGCTGCAGAC
TTTAAACTCAGTTCAGCCGCTCTAGAGGCCATAGCGGCCATTTAAATGGCGCGCCGATCCCGGGCCGCTTAGCTAGA
CTAGTCTAGCTAGAGGAATCCGCCCCCTCCTCCTCCCCCCCCCTAACGTTACTGGCCGAAGCCGCTTGAATAAGGCC
GGTGTGCGTTTTGTCTATATGTTATTTCCACCATATTGCCGCTTTTTGGCAATGTGAGGGCCCGGAAACCTGGCCCTGTC

TTCTTGACGAGCATTCCCTAGGGGTCTTTCCCTCTCGCCAAAGGAATGCAAGGTCTGTTGAATGTTCGTGAAGGAAGCAG
TTCCTCTGGAAGCTTCTTGAAGACAAACAACGTCTGTAGCGACCCCTTTCAGGCAGCGGAACCCCCACCTGGCGACAG
GTGCCTCTGCGGCCAAAAGCCACGTGTATAAGATACACCTGCAAAGGCGGCACAACCCAGTGCCACGTTGTGAGTTG
GATAGTTGTGGAAAGAGTCAAATGGCTCTCCTCAAGCGTATTCAACAAGGGGCTGAAGGATGCCCAGAAGGTACCCCA
TTGTATGGGATCTGATCTGGGGCCTCGGTGCACATGCTTTACATGTGTTTAGTCGAGGTTAAAAAACGTCTAGGCCCC
CCGAACCACGGGGACGTGGTTTTCTTTGAAAAACACGATGATAAGCTTGCCACAACCATGGAAGATCCCGTCGTTTTA
CAACGTCGTGACTGGGAAAACCTGGCGTTACCCAACTTAATCGCCTTGCAGCACATCCCCCTTTCGCCAGCTGGCGTA
ATAGCGAAGAGGCCCGCACCGATCGCCCTTCCCAACAGTTGCGCAGCCTGAATGGCGAATGGCGCTTTGCCTGGTTTTCC
GGCACCAGAAGCGGTGCCGGAAGCTGGCTGGAGTGCATCTTCTGAGGCCGATACTGTCTGTCCCTCAAACCTG
GCAGATGCACGGTTACGATGCGCCCATACACCAACGTAACCTATCCCATACGGTCAATCCGCTTTGTGCCACG
GAAATCCGACGGTTGTTACTCCCTCACATTTAATGTTGATGAAAGCTGGCTACAGGAAGCCAGACGCGAATATTT
TTGATGGCGTTAACTCGCGTTTTCATCTGTGGTGCAACGGGCGCTGGGTTCGTTACGGCCAGGACAGTCGTTTGCCGTC
TGAATTTGACCTGAGCGCATTTTTACGCGCCGGAGAAAACCGCCTCGCGGTGATGGTGCTGCGCTGGAGTGACGGCAGT
TATCTGGAAGATCAGGATATGTGGCGGATGAGCGGCATTTTCCGTGACGTCTCGTTGCTGCATAAACCAGCTACACAAA
TCAGCGATTTCCATGTTGCCACTCGCTTAAATGATGATTTACGCCGCGCTGTACTGGAGGCTGAAGTTCAGATGTGCGG
CGAGTTGCGTGACTACCTACGGGTAACAGTTTTCTTTATGGCAGGGTGAAACGCAGGTCGCCAGCGGCACCGCGCCTTT
GGCGGTGAAATTATCGATGAGCGTGGTGGTTATGCCGATCGCGTCACTACGTCTGAACGTCGAAAACCCGAAACTG
TGGAGCGCCGAAATCCCGAATCTCTATCGTGCAGTGGTTGAACTGCACACCGCCGACGGCAGCTGATTGAAGCAGAA
GCCTGCGATGTCGGTTTTCCGCGAGGTGCGGATTGAAAATGGTCTGCTGCTGTAACGGCAAGCCGTTGCTGATTTCGAG
GCGTTAACCGTCACGAGCATCATCTCTGCATGGTCAGGTCATGGATGAGCAGACGATGGTGCAGGATATCTGCTGAT
GAAGCAGAACAACTTTAACGCCGTGCGCTGTTTCGATTATCCGAACCATCCGCTGTGGTACACGCTGTGCGACCGCTAC
GGCCTGTATGTGGTGGATGAAGCCAATATTGAAACCCACGGCATGGTGCCAATGAATCGTCTGACCGATGATCCGCGCT
GGCTACCGGCGATGAGCGAACCGTAACCGCAATGGTGCAGCGCGATCGTAATCACCCGAGTGTGATCATCTGGTTCGC
TGGGGAATGAATCAGGCCACGGCGTAATCACGACGCGCTGTATCGCTGGATCAAATCTGTGATCCTTCCCGCCCGGT
GCAGTATGAAGGCGGCGGAGCCGACACCACGGCCACCGATATTATTTGCCCGATGTACGCGCGCTGGATGAAGACCA
GCCCTTCCCGGCTGTGCCGAAATGGTCCATCAAAAATGGCTTTCGCTACCTGGAGAGACGCGCCCGCTGATCCTTTGC
GAATACGCCACGCGATGGGTAACAGTCTTGGCGGTTTTCGCTAAATACTGGCAGGCGTTTTCGTCAGTATCCCCGTTTAC
AGGGCGGCTTCGTCTGGGACTGGGTGGATCAGTCGCTGATTAATATGATGAAAACGGCAACCCGTGGTTCGGCTTACG
GCGGTGATTTTTGGCGATACGCCGAACGATCGCCAGTCTGTATGAACGGTCTGGTCTTTGCCGACCGCACGCGCATCC
AGCGCTGACGGAAGCAAAACACCAGCAGCAGTTTTTCCAGTTCGGTTTATCCGGGCAAAACCATCGAAGTGACCAGCGA
ATACCTGTTCCGTCATAGCGATAACGAGCTCCTGCACTGGATGGTGGCGCTGGATGGTAAGCCGCTGGCAAGCGGTGA
AGTGCCTCTGGATGTCGCTCCACAAGGTAACAGTTGATTGAACTGCCTGAACTACCGCAGCCGGAGAGCGCCGGGCA
ACTCTGGCTCACAGTACGCGTAGTGCAACCGAACGCGACCGCATGGTGCAGAAGCCGGGCACATCAGCGCCTGGCAGCA
GTGGCGCTGGCGGAAAACCTCAGTGTGACGCTCCCCCGCGCTCCACGCCATCCCGCATCTGACCACCGCAAAAT
GGATTTTTGATCGAGCTGGGTAATAAGCGTTGGCAATTTAACCGCCAGTACGGCTTTCTTTCACAGATGTGGATTGGC
GATAAAAAACAACCTGCTGACGCGCTGCGCATCAGTTACCCGTGCACCCGCTGGATAACGACATTGGCGTAAGTGAA
GCGACCCGATTGACCCTAACGCTGGGTGCAACGCTGGAAGGCGGCGGGCCATTACCAGGCCGAAGCAGCGTTGTTG
CAGTGCACGGCAGATACACTTGTGATGCGGTGCTGATTACGACCGCTCACGCGTGGCAGCATCAGGGGAAAACCTTA
TTTATCAGCCGAAAACCTACCGGATTGATGGTAGTGGTCAAATGGCGATTACCGTTGATGTTGAAGTGGCGAGCGATA
CACCGCATCCGGCGCGGATTGGCCTGAACTGCCAGCTGGCGCAGGTAGCAGAGCGGGTAAACTGGCTCGGATTAGGGC
CGCAAGAAAACCTATCCCGACCGCCTTACTGCCGCTGTTTTGACCGCTGGGATCTGCCATTGTGACAGCATGTATACCCC
GTACGTCTTCCCGAGCGAAAACGGTCTGCGCTGCGGGACGCGGAATTGAATTATGGCCCACACCAGTGGCGCGGCGA
CTTCCAGTTCAACATCAGCCGCTACAGTCAACAGCAACTGATGGAACCAGCCATCGCCATCTGCTGCACGCGGAAGA
AGGCACATGGCTGAATATCGACGGTTTTCCATATGGGGATTGGTGGCGACGACTCCTGGAGCCCGTCAGTATCGGCGGA
ATTCCAGCTGAGCGCCGTCGCTACCATTACCAGTTGGTCTGGTGTCAAAAATAATAAACCAGGGCAGGCCATGTCTG
CCCGTATTTTCGCGTAAGGAAATCCATTATGTACTATTTAAAAAACACAACTTTTGGATGTTTCGGTTTATCTTTTTCTTT
TACTTTTTTATCATGGGAGCCTACTTCCCGTTTTTCCCGATTTGGCTACATGACATCAACCATATCAGCAAAAAGTGATAC
GGGTATTATTTTTGCCGCTATTTCTCTGTTCTCGCTATTATTCCAACCGCTGTTTGGTCTGCTTTCTGACAAAACCTCGGAAC
TTGTTTATGTCAGTTATAATGGTTACAAATAAAGCAATAGCATCACAATTTACAAATTTAATTAAGGCCGCGGGAT
CGATCCCGTCGAGCAGTGTGGTTTTCAAGAGGAAGCAAAAAGCCTCTCCACCCAGGCCTGGAATGTTTCCACCCAATGT
CGAGCAGTGTGGTTTTGCAAGAGGAAGCAAAAAGCCTCTCCACCCAGGCCTGGAATGTTTCCACCCAATGTGCGAGCAA
ACCCCGCCCAGCGTCTTGTCAATTGGCGAATTCGAACACGCAGATGCAGTCGGGGCGGCGCGGTCCAGGTCCACTTCGC
ATATTAAGGTGACGCGTGTGGCCTCGAACACCGAGCGACCCTGCAGCCAATATGGGATCGGCCATTGAACAAGATGGA
TTGCACGCAGGTTCTCCGGCCGCTTGGGTGGAGAGGCTATTCGGCTATGACTGGGCACAACAGACAATCGGCTGCTCTG
ATGCCGCCGTGTTCCGGCTGTCAGCGCAGGGGCGCCCGGTTCTTTTTGTCAAGACCGACCTGTCCGGTGCCTGAATGA
ACTGCAGGACGAGGCAGCGCGGCTATCGTGGCTGGCCACGACGGGCGTTCCTTGCAGCTGTGCTCGACGTTGCTCACT
GAAGCGGGAAGGGACTGGCTGCTATTGGGCGAAGTGCCGGGCGAGGATCTCCTGTCATCTCACCTTGCTCCTGCCGAG
AAAGTATCCATCATGGCTGATGCAATGCGGCGGCTGCATACGCTTGATCCGGCTACCTGCCCATTCGACCACCAAGCGA
AACATCGCATCGAGCGAGCACGTACTCGGATGGAAGCCGGTCTTGTGATCAGGATGATCTGGACGAAGAGCATCAGG

GGCTCGCGCCAGCCGAAC TGTTCGCCAGGCTCAAGGCGCGCATGCCCGACGGCGAGGATCTCGTCTGACCCATGGCG
ATGCCTGCTTGCCGAATATCATGGTGGAAAATGGCCGCTTTTCTGGATTTCATCGACTGTGGCCGGCTGGGTGTGGCGGA
CCGCTATCAGGACATAGCGTTGGCTACCCGTGATATTGCTGAAGAGCTTGGCGGCGAATGGGCTGACCGCTTCTCTCGT
CTTTACGGTATCGCCGCTCCCGATTTCGCAGCGCATCGCCTTCTATCGCCTTCTTGACGAGTTCTTCTGAGGGGATCGGCA
ATAAAAAGACAGAATAAAACGCACGGGTGTTGGGTGCTTTGTTTCGGATCCGAATTCCTCGAGGGCGCGCCATTTAAAT
GGCCAGCGAGGCCGGTACCCAATTCGCCCTATAGCACTTGCTTCTTATTTGCAGCTGCTGGGGATTTGGGATCGTTTTCT
CCTTTCCCCACTCTCTCTGAATTATTTCCCCACCCATGTTTCCATTTGGACAGCAGCAGCAGCAGTAGCGTCATTTTT
CCATACGCGTGGCATTCTTCTATTTCCAGTCTGGGGATATTAGAGTTCTAATGCACAGCTGTGCTGGGCATGTGAGGG
AAAGCCCACACTGCAATCTTTGCTCTCCGTTTCTCTCTGTGCACTTTTTCGTGGCATGTTAAATCTAATTA AAACTAGTG
ACAGTTTGCACGATGACAGGAAGCCAGGGTACAGAGCTTGTGACAGCCTTGCATAGAACCTTACAGGTTTCTATGGA
AACTTCTTCTAGGATGGTTTAAAGAGTAAGGGTTGGGGGTGGGCATAGAAAATGATGTCTCAGTGGTTAAGAGC
ACTCAGTGCTTTTGCAAATCACACACACACACACACAGACACAGACACACACACACATACACACACAGGGTGTTC
ACAACCGCTGTAATTCATGGGTATCCAACACTGCTTCTGACCTCTGTTGGCATCAGGCATGAGTGTGGTACACATCC
ACATATGAAGACAAACACTTCTATGCATAAAAATAAAGATTAATAATTTCTAAAAATTAAGAGGAAAAGTGGTTATCTTTCC
TCAGCAAATAGTCTTTGTCAGAGGCTCAGACAGA AACTGACCACATGAGAGCTAACTCTTTTACCTCGACTGTCACCAAT
GGACTCAGCCTCTTTAATAAAAATAAAGAGCATAAAAATCATAGGTGCATTTAGAGTGTAGACTAACTAGCCATGTGACTT
CTTCAAGCTTCACTATTTACAGAGCCCCATGTGTCTCCTGTAACACAAAGGTTGTGTCTAGGGCATGTGGCCACTAACT
GAAGTACAGCTTTGCAGTGCTGGTCTATGGAAATGATCTTGCCACACAGAGGATACTCTCTGAATGAGAATGCCATGTC
GGGGTTGGAATCTGAAGTACACTCAGTCAGTGACTTGTGTTGCAATGTAGAACCACCCAGGCTGAAATGTTAGAGCATC
TCTCTT CAGCTGTGCAATGGCAATACTGTCCACCTCATGAAGTTGCTGGTAGCTTACACATAGACAGCAGTTCTTGGCA
CCAACCAAACCTTCAATAAGCGCTGGCTATTGCTGTTATTCCACTGAGTGAGCCAAGTACCAAGTCCCTGAGTTGCTTT
GGGCCATCAACCCTCAAAGGTCATTTTCTCTTATGAACAACTAGCAATAGA AACTCTTCTAGTTTGACTGTGCCTATTTT
GTGCCAGAATTCCTCTTGGACATTTGATTCTGTTCCCTGGGTTTCTAGAATATCAAAAACCCCTAAAATTCAGTTTGAAGA
AGTCTCTGGCATGGTCTCGCTCCAGCCATATCCAAGTGGCGGTTGAAATAAATGAATAGAGTCACAGCCGCGGCTCAG
TGTGATGAGTTCAAGAGTAGGATTTGTATCAGATGGCTT CAGTGGTTGTTCTTGCTTCAATATCTCTTCCCTTCAGTGT
TTAGAGTCATGAAGTCAGGTCAGCTTCCCTCAGGAGCATATGTATGGACTCACGTGTGCATCATTTTCATACAGGTGTTTT
GTTACAGTGAGGTAGGTGACAAGAACAGGCCAGTTCCAGCATGCAACGAACATTCTCAGGTTTCCCCCTCCTATGTTGC
TTTTTTTCTCCTGATTTCTGTTGGGTGTGAATTTCCCTGTCGGGACCACCTATTCTGGTAACTCAGTTTTACGTGAGCAGT
GTCTGAGC