

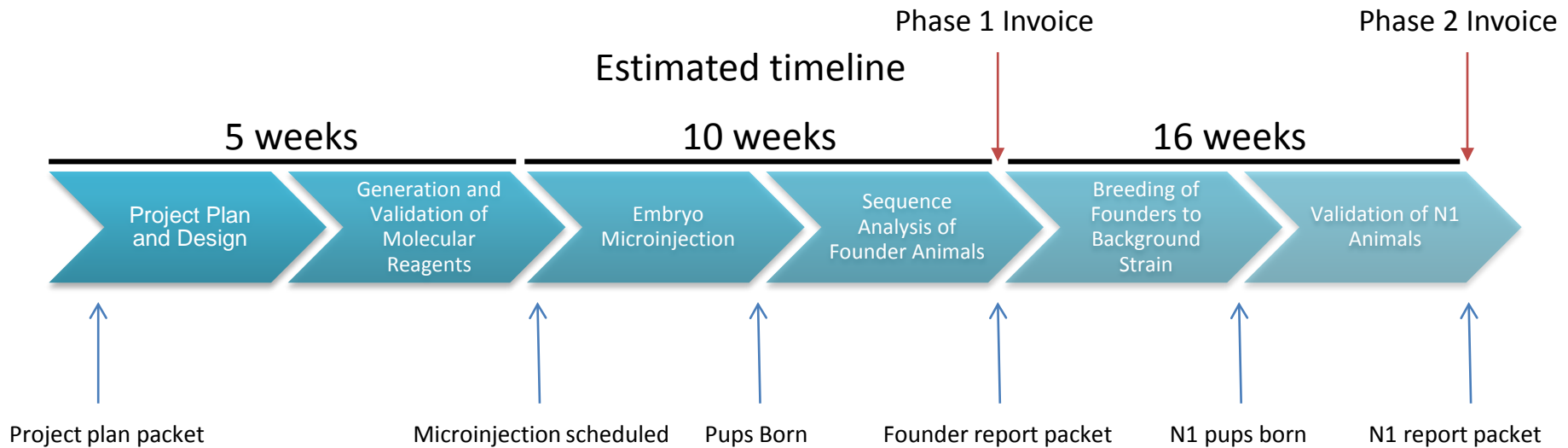
# *Camsap1* KO with CRISPR/Cas9

## Founder Report

# Project Goal

The Jackson Laboratory will delete exons 2-3 of mouse *Camsap1* gene.

# Deletion Knockout Mouse Production Workflow



JAX Communications

Requestor		David Curiel, Washington University
Gene	Name	Camsap1 (calmodulin regulated spectrin-associated protein 1)
	Location	Chr2:25926838-25983282 bp, - strand <a href="http://www.informatics.jax.org/marker/MGI:3036242">http://www.informatics.jax.org/marker/MGI: 3036242</a>
	Transcript ID	<a href="http://www.ensembl.org">ENSMUST00000091268.10</a> <a href="http://www.ensembl.org">http://www.ensembl.org</a>
	Supplemental Information	
Previously Described Phenotypes		N/A <a href="http://www.informatics.jax.org/">http://www.informatics.jax.org/</a>
Model Desired		<input type="checkbox"/> KO; Deletion exons 2-3
Strain (JAX Registry #)		C57BL/6J (JR#000664)
CRISPR	Guides	IDT0612_Camsap1_Up_crRNA1 GGCCAGCATAATCTGAATGA IDT0613_Camsap1_Up_crRNA2 GTGCCTCTGTCGTGCTAATG IDT0614_Camsap1_Down_crRNA1 TTGCTTAACTCTCAGCGCTC IDT0615_Camsap1_Down_crRNA2 CACATGACATGGCAAGCCTG

# Mouse *Camsap1* transcripts

**Gene: Camsap1** ENSMUSG00000026933

**Description** Calmodulin-regulated spectrin-associated protein 1 [Source:UniProtKB/Swiss-Prot;Acc:[A2AHC3](#)]

**Synonyms** 9530003A05Rik, PRO2405

**Location** [Chromosome 2: 25,926,838-25,983,282](#) reverse strand.  
GRCm38:CM000995.2

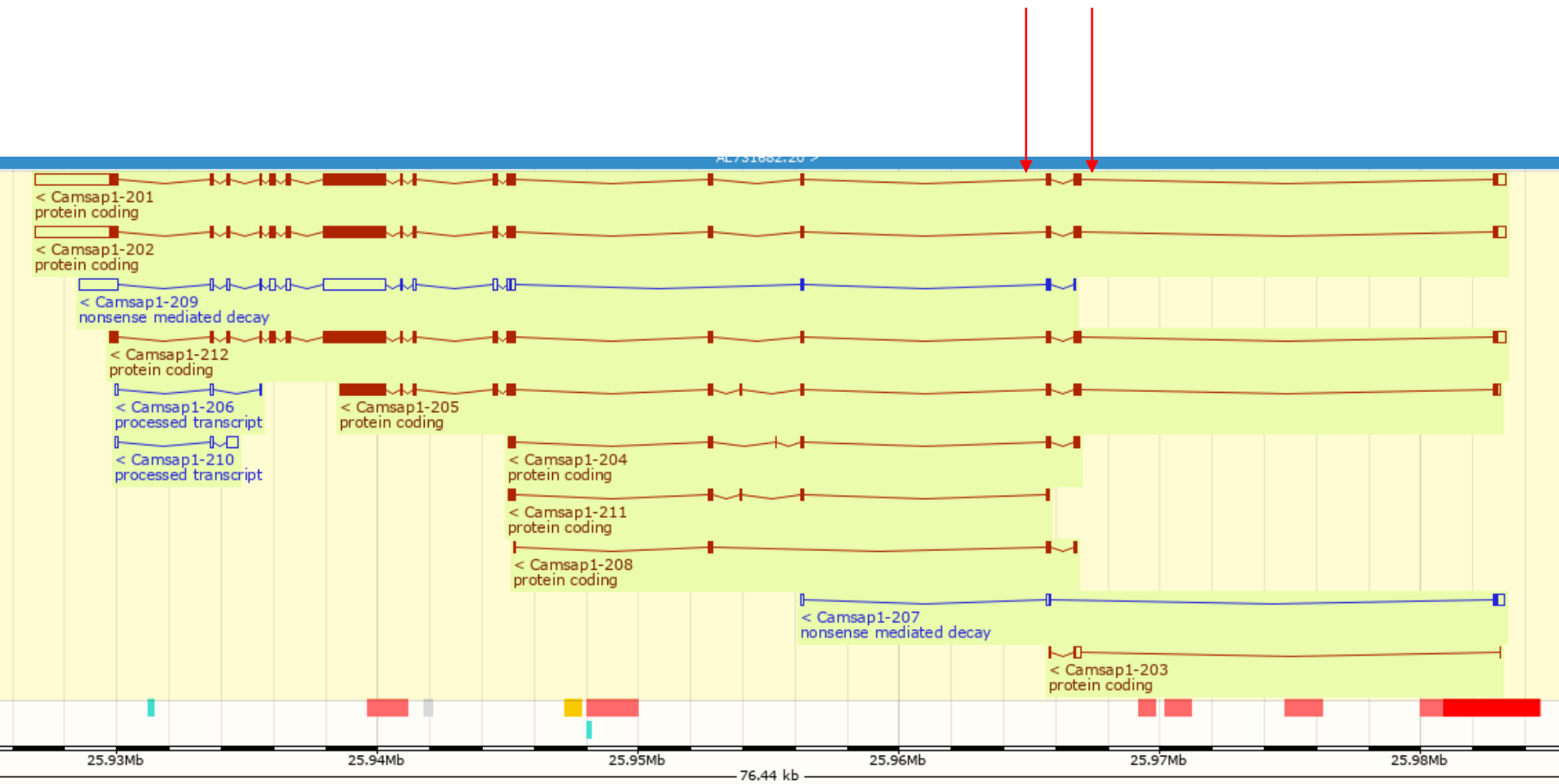
**About this gene** This gene has 12 transcripts ([splice variants](#)), [103 orthologues](#), [2 paralogues](#) and is a member of [1 Ensembl protein family](#).

**Transcripts** Hide transcript table

Show/hide columns (1 hidden)								Filter		
Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	RefSeq	Flags		
Camsap1-202	<a href="#">ENSMUST00000114167.8</a>	7981	<a href="#">1582aa</a>	Protein coding	<a href="#">CCDS50538</a>	<a href="#">A0A0A0MQE5</a>	<a href="#">NM_001276359</a> <a href="#">NM_001276360</a> <a href="#">NM_001276361</a> <a href="#">NP_001263288</a> <a href="#">NP_001263289</a> <a href="#">NP_001263290</a>	TSL:5	GENCODE basic	APPRIS P2
Camsap1-201	<a href="#">ENSMUST00000091268.10</a>	7978	<a href="#">1581aa</a>	Protein coding	-	<a href="#">A2AHC3</a>	-	TSL:5	GENCODE basic	APPRIS ALT2
Camsap1-212	<a href="#">ENSMUST00000183461.7</a>	5090	<a href="#">1581aa</a>	Protein coding	-	<a href="#">A2AHC3</a>	-	TSL:5	GENCODE basic	APPRIS ALT2
Camsap1-205	<a href="#">ENSMUST00000134882.7</a>	3354	<a href="#">1077aa</a>	Protein coding	-	<a href="#">A2AHC4</a>	-	CDS 3' incomplete		TSL:5
Camsap1-204	<a href="#">ENSMUST00000134054.7</a>	795	<a href="#">265aa</a>	Protein coding	-	<a href="#">F6Q2D3</a>	-	CDS 5' and 3' incomplete		TSL:3
Camsap1-211	<a href="#">ENSMUST00000151593.7</a>	530	<a href="#">177aa</a>	Protein coding	-	<a href="#">F6W3X2</a>	-	CDS 5' and 3' incomplete		TSL:5
Camsap1-208	<a href="#">ENSMUST00000142028.1</a>	491	<a href="#">164aa</a>	Protein coding	-	<a href="#">F6QF29</a>	-	CDS 5' and 3' incomplete		TSL:5
Camsap1-203	<a href="#">ENSMUST00000127823.1</a>	378	<a href="#">47aa</a>	Protein coding	-	<a href="#">V9GWZ6</a>	-	CDS 3' incomplete		TSL:3
Camsap1-209	<a href="#">ENSMUST00000143977.7</a>	5464	<a href="#">112aa</a>	Nonsense mediated decay	-	<a href="#">V9GX07</a>	-	CDS 5' incomplete		TSL:5
Camsap1-207	<a href="#">ENSMUST00000139937.1</a>	667	<a href="#">73aa</a>	Nonsense mediated decay	-	<a href="#">V9GX00</a>	-	TSL:5		
Camsap1-210	<a href="#">ENSMUST00000148146.1</a>	597	No protein	Processed transcript	-	-	-	TSL:5		
Camsap1-206	<a href="#">ENSMUST00000134970.7</a>	316	No protein	Processed transcript	-	-	-	TSL:5		

Project Goal: Delete exons 2-3

# Mouse *Camsap1* transcripts



Project Goal: Delete exons 2-3

# Camsap1 – Guides Intron 1-2

ACTTTGAAAGAAGATAAGCAGAGCTCCCTTCTCAGAATGAATGTCATTGTACCATAGCCCTTCTTTAATCCGATGGCATCTTGGTTTCCTTTGAGCTCTCTAGCATCCCAGGAAATTTGTGCTTGCCTCCACCATCATTAGATT  
TGAAACCTTTCTTCTATTTCGTCTCGAGGGAAGAGTCTTACTTACAGTAACATGGTATCGGGGAAGAAATTAGGCTACCGTAGAACCAAAGGAACTCGAGAGATCGTAGGGTCTTTAAACACGAACGCAGGGTGGTAGTAAGTCTAA

AGTAAGTCTAA

Camsap1

GTGCCTCTGTCGTGCTAATG

ATGCTGGCCTTTGCACAAATGCCTCATTGTGCCTCTGTCGTGCTAATGAGGCTGTTAGTTGACCCTAGATCTTTGTGTGTGTGTGGTACCTTGGCTGGGATTTTGTGGACGGTCTTTTGTGTGTTCTCATCTGGCTGGTATG  
TACGACCGAAACGTGTTTACGGAGTAACACGGAGACAGCAGGATTACTCCGACAATCAACTGGGATCTAGAAACACACAACACACACCATGGAACCGACCCTAAAACGACCTGCCACGAAAACACACAAGAGTAGACCGACCACTAC

TACGACCGG

Camsap1

CTTGAGACTGGACTGTGCATGTCCATTCACCCAGTGCTCTCTCTCCTGCCATAGACAACATCCCTGAGGACCTCCGAGACCCGTTTTACATCGACCAGTATGAGCAGGAGCACATTAAGCCACCCGTTATCAAGCTTCTCCTGTCCAG  
GAACTCTGACCTGACACGTACAGGTAAGTGGGTACGAGAGAGAGGACGGTATCTGTTGTAGGGACTCCTGGAGGCTCTGGGCAAAATGTAGCTGGTCATACTCGTCCTCGTGTAAATTCGGTGGGCAATAGTTCGAAGAGGACAGGTC

54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84  
D N I P E D L R D P F Y I D Q Y E Q E H I K P P V I K L L L S S

Camsap1

Camsap1-001 Exon 2

IDT0612\_Camsap1\_Up\_crRNA1 GGCCAGCATAATCTGAATGA

IDT0613\_Camsap1\_Up\_crRNA2 GTGCCTCTGTCGTGCTAATG

# Camsap1 – Guides Intron 3-4

CCTTGGCGGGGAAGGCAAGGCAGAAAAGTTTTCTTGCATTGGGACCTGCAAGATGTTTAGGATGCTGATTGCAGCCTCTGTTCCCAGAGTGGCCACATGGCGATGGTGGATGCCCTGATGATGGCCTACACTGTGGAGATGATCAGCATTGAGAAGTGGTGGCCAGTGTCAA  
GGAACCGCCCTTCCGTTCCGTCCTTTCAAAGAACGTAACCCCTGGAGCTTCTACAAATCCTACGACTAACGTGGAGACAAGGGTCTCACCGGTGTACCGCTACCACCTACGGGACTACTACCGGATGTGACACCTCTACTAGTCGTAACCTTCCACCACCGGTACAGTT

142 144 146 148 150 152 154 156 158 160 162 164 166 168  
S G H M A M V D A L M M A Y T V E M I S I E K V V A S V K

Camsap1

Camsap1-001 Exon 3

GGCCTTTTCTACATTCAGCGCCTCAAAGAACTTCTTTATGACCTCGAGGATGCCATGGTATTCTGGATCAATAAGGTGAGTGCTTGTAGCTCTTTCCTGCTGATTGAGAGCTGTCTGCTTCTTGTCTCCATATTGGGACTTGCCACTAGAGTTTGTCAATTTGGAAGTCA  
CGCGAAAAGATGTAAGTCGCGGAGTTTTCTTGAAGGAATCTGGAGCTCCTACGGTACCATAAGACCTAGTTATTCCACTCAGAACAAAATCGAGAAACGGACTAACTCTCGACAGACGAAGAACAAGAGGTATAACCCCTGAACGGTGATCTCAAACAGTAAACCTTGACGT

170 172 174 176 178 180 182 184 186 188 190 192 194  
R F S T F S A S K E L P Y D L E D A M V F W I N K

Camsap1

Camsap1-001 Exon 3

TGGTACTTTATCCAGCTAGGTGTCCAATAGACAGTCCTTATTCCTGAGCGCTGAGAGTTAAGCAAATGGGTGTGGGTTTGTGTATGAGGATGTACATATGTGTGGTTACAACATAATGGGTTTCATTTTTAGCTTAAGGTAATATATAATGCTTGTTCATGATTTTTT  
ACCATGAAATAGGTGATCCACAGTTATCTGTGAGGAATAAGGACTCGGACTCTCAATTCGTTTACCCACACCCAAACACATACTCCTACATGTATACACACACCAATGTTGATTACCCAAAGTAAAAATCGAATTCATGAATATATATTACGAACAAGTACTAAAAAA

CTCGGACTCTCAATTCGT

Camsap1

CACATGACATGGCAAGCCTG

GCTGATAGTTATTGGGAGGAGTCAAGTTTTCTTGTGTCTGTTATCAGTGTGATCTGTGTGTACACATGATTTCATGTGAGAGTACAGATACACATGACATGGCAAGCCTGTGGAAGAAAATCTCAGGTATTGGTCTTTGTCTTCTACCTTGTGAGAGAAGTCCAC  
CGACTATCAATAACCCCTCCTCAGTTCAAAGAACACAGACAAAATAGTCACACATAGACACACATGTGTACATAAGTACACTCTCATGTCTATGTGTACTGTACCGTTCGGACACCTTCTTTTAGAGTCCATAACCAGAAACAGAAGATGGAACAACTCTTCCAGGTG

Camsap1

IDT0614\_Camsap1\_Down\_crRNA1 TTGCTTAACTCTCAGCGCTC  
IDT0615\_Camsap1\_Down\_crRNA2 CACATGACATGGCAAGCCTG



# Camsap1 – Potential Off-Target Sites

## Camsap1\_Up\_crRNA1 GGCCAGCATAATCTGAATGA

Sequence	PAM	Score	Gene	Locus
GGCCAGCATAATCTGAATGA	TGG	100.0		chr2:+25967159
AGCCAGC <b>TTT</b> ATCTGAATGA	GAG	2.7		chrX:-145410881

## Camsap1\_Up\_crRNA2 GTGCCTCTGTCGTGCTAATG

Sequence	PAM	Score	Gene	Locus
GTGCCTCTGTCGTGCTAATG	AGG	100.0		chr2:-25967106
<b>TTT</b> CCTCTG <b>AT</b> GTCGTAATG	AAG	0.9		chr10:+71234704

## Camsap1\_Down\_crRNA1 TTGCTTAACTCTCAGCGCTC

Sequence	PAM	Score	Gene	Locus
TTGCTTAACTCTCAGCGCTC	AGG	100.0		chr2:+25965519
TT <b>AG</b> TTA <b>AG</b> TCTCAGCGCTC	AGG	1.6		chr7:+7108203

## Camsap1\_Down\_crRNA2 CACATGACATGGCAAGCCTG

Sequence	PAM	Score	Gene	Locus
CACATGACATGGCAAGCCTG	TGG	100.0		chr2:-25965284
CAT <b>TT</b> GACATGGCAAGC <b>CTT</b>	TGG	1.7		chr12:-16841910

Off-target scoring: low frequency of off-target editing when score is <1.5 with a canonical PAM (NGG) or <2.0 with a non-canonical PAM (NAG)

\*Recommend off-target analysis for highlighted off-target sites

# Camsap1 KO – Mutation Strategy

```

TGTTTGCCAT GTTCTGTTST GGTAGCAGAC TTGGCGTACT TCCTAAACAA AAGCTGTTTG GTCTCTGCTT GGTACCTGAC CTTGACTTTG GAAAGAAGAT
ACCAACGGTA CAAGACAACA CCATCGTCTG AACCCGATGA AGGATTTTGT TTCGACAAAC CAGAGACGAA CCATGGACTG GAACTGAAAC CTTTCTTCTA

AAGCAGAGCT CCCTTCTCAG AATGAATGTC ATTGTACCAT AGCCCCCTTCT TTAATCCGAT GGCATCTTGG TTTCTTTTGA GCTCTCTAGC ATCCCAGGAA
TTGCTCTCGA GGGAAAGATG TTACTITACAG TAACATGGTA TCGGGGAAGA AAITAGGCTA CCGTAGAAC AAAGGAAACT CGAGAGATCG TAGGGTCTTT

ATTTGTGCTT GCGTCCCAAC ATCATTGAGA TTATGCTGGC CTTTGACAAA ATGCCCTCATT GTGCCTCTGT CGTGCTAATG AGGCTGTTAG TTGACCCTAG
TAAACACGAA CGCAGGGTGG TAGTAAGTCT AATACGACCG GAAACGTGTT TACGGAGTAA CACGGAGACA GCACGATTAC TCCGACAATC AACTGGGATC

ATCTTTGTGT GTTGTGTGTG GTACCTTGGC TGGGATTTTG CTGGACGGTG CTTTTGTGTG TTCTCATCTG GCTGGTGATG CTTGAGACTG GACTGTGCAT
TAGAAACACA CAACACACAC CATGGAACCG ACCCTAAAAC GACCTGCCAC GAAACACAC AAGAGTAGAC CGACCACTAC GAACTCTGAC CTGACACGTA

GTCCATTAC CCAGTGCTCT CTCTCTGCC ATAGACAACA TCCCTGAGGA CCTCCGAGAC CCGTTTTTACA TCGACCAGTA TGAGCAGGAG CACATTAAGC
CAGGTAAGTG GGTACAGGAG GAGAGGACGG TATCTGTTGT AGGGACTCCT GGGGGCTCTG GGCAAAATGT AGCTGGTACT ACTCGTCTC GTGTAATTCG

CACCCGTTAT CAAGCTTCTC CTGTCAGTGT AGCTGTATTG CCGTGCTGTC AGCCTCATCC TAAAGGGGGA CCAGGTGGCT ACCTTGCACG GACACCAGTC
GTGGCAATA GTTCGAAGAG GACAGGTAC TCGACATAAC GGCACAGAC TCGGAGTAGG ATTTTCCCTT GGTCCACCGA TGGAAACGTT GTGTGGTCTG

TGTCATCCAG GCCCTGTCCC GGAAGGGCAT CTATGTGATG GAGAGTGATG ATACCCCTGT GACAGATGCT GACCTCAGCC AGGCACCTAT TAAGATGTTG
ACAGTAGGTC CGGGACAGGG CCTTCCCGTA GATACACTAC CTCTCACTAC TATGGGGACA CTGTCTACGA CTGGAGTCGG TCCGTGGATA ATTCTACCAC

AGTGTGCGG GCGTGGTGG GCGATGCTT TAATCCAGC ACTTGAGAG CAGAGGCAGG TGGATTTCTG AGTTGAGGC CAGCCTGGTC TACAAAGTGA
TCACAACGGC CCGCACCACC GCGTACGGAA ATTAGGGTCG TGAACCTCC GTCTCCGTC ACCTAAAGAC TCAAGCTCCG GTCGGACCAG ATGTTTCACT
    
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primers

guide PAM

Exon 2

700bp

```

TTTCTTGAT TGGACCTGC AAGATGTTA GGATGCTGAT TGCAGCCTCT GTTCCCAGAG TGGCCACATG GCGATGGTGG ATGCCCTGAT GATGGCCTAC
AAAGAACGTA ACCCTGGACG TTCTACAAAT CCTACGACTA ACGTCGGAGA CAAGGGTCTC ACCGGTGTAC CGCTACCACC TACGGGACTA CTACCGGATG

ACTGTGGAGA TGATCAGCAT TGAGAAGGTG GTGGCCAGTG TCAAGCGCTT TTCTACATTC AGCGCCTCAA AAGAACTTCC TTATGACCTC GAGGATGCCA
TGACCACCTCT ACTAGTCGTA ACTCTTCCAC CACCCGTCAC AGCTTCGCGAA AAGATGTAAG TCCGGGAGTT TTCTTGAAGG AATACTGGAG CTCTACGGT

TGGTATTCTG GATCAATAAG GTGAGTGCTT GTTTAGCTCT TTGCTTGATT GAGAGCTGTC TGCTTCTTG TCTCCATATT GGGACTTGCC ACTAGAGTTT
ACCATAGAC CTAGTTATTC CACTCACGAA CAAATCGAGA AACGGACTAA CTCTCGACAG ACGAAGAACA AGAGGTATAA CCCTGAACGG TGATCTCAA

GTCATTTGGA ACTGCATGGT ACTTTATCCA GCTAGGTGTC CAATAGACAG TCCTTATTCC TGAGCGCTGA GAGTTAAGCA ATGGGGTGTG GGTTTGTGTA
CAGTAAACCT TGACGTACCA TGAAATAGGT CGATCCACAG GTTATCTGTC AGGAATAAGG ACTCGCGACT CTCAATTCGT TACCACAC CCAAACACAT

TGAGGATGTA CATATGTGTG TGGTTACAAC TAATGGGTTT CAITTTTATG TTAAGGTAAT TATATATAAT GCTTGTTCAT GATTTTTTGC TGATAGTTAT
ACTCCTACAT GTATACACAC ACCAATGTTG ATTACCCAAA GTAAAAATCG AAITCCATGA ATATATATA CGAACAAGTA CTAAAAACG ACTATCAATA

TGGGGAGGAG TCAAGTTTCT TGTGTCTGTT TATCAGTGTG TATCTGTGTG TACACATGTA TTCATGTGAG AGTACAGATA CACACATGAC ATGGCAAGCC
ACCCCTCCTC AGTTCAAAGA ACACAGACAA ATAGTCACAC ATAGACACAC ATGTGTACAT AAGTACACTC TCATGTCTAT GTGTGACTG TACCGTTCGG

TGTGGAAAGAA AATCTCAGGT ATTGGTCTTT GCTCTTACAC TTGTTTGGAGA GAAGGTCCAC CTGCCATTTT GTTGTAGGAG CACTGAGATT GCTGCTGTG
ACACCTTCTT TTAGAGTCCA TAACCAGAAA CAGAAGATG AACAAACTCT CTTCAGGTG GACGGTAAAA CAACATCCTC GTGACTCTAA CGACGACAG
    
```

Exon 3

WT= 2143 bp  
KO= ~450 bp

#5: Product of length 2143 (rating: 171)

Contains region of the molecule from 15919 to 18061

Tm: 79.1 C TaOpt: 55.6 C GC: 47.6

Sense Primer:

GTGGTAGCAGACTTGGCGTA

Similarity: 100.0%

Length: 20 Tm: 50.4 C GC: 55.0

dH: -149.6 kcal/mol dS: -386.8 cal/mol dG: -32.5 kcal/mol

Antisense Primer:

GGTGGACCTTCTCTCAAACAAG

Similarity: 100.0%

Length: 22 Tm: 52.0 C GC: 50.0

dH: -159.9 kcal/mol dS: -414.4 cal/mol dG: -34.6 kcal/mol

Tm Difference: 1.7

GC Difference: 5.0

## PRIMERS

9113\_Camsap1\_genof1: GTGGTAGCAGACTTGGCGTA

9114\_Camsap1\_genor1: GGTGGACCTTCTCTCAAACAAG

# Founder Genotyping Summary

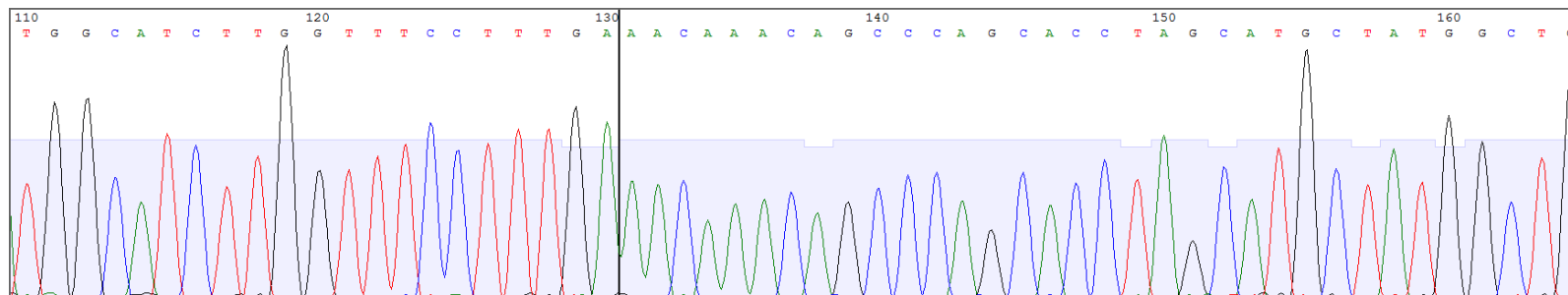
Req#:514798 Stock#: 407706 Founders				GET3647_Camsap1-SEQ			
#	Mouse Id	Sex	Date of Birth	wild	het	hom	Comment
1	1928	Male	3-Nov-18		-/+		1015bp deletion + 7bp insertion
2	1931	Male	3-Nov-18		-/+		1640bp deletion + 1bp insertion
3	1953	Male	3-Nov-18		-/+		1182bp deletion
4	1957	Male	3-Nov-18		-/+		1587bp deletion

Strain#: 407706

Request#: 514798

Animal ID: 1928 - Male

1015 bp del + 7bp insertion



WT: TGGCATCTTGGTTTCCTTTGAGCTCTCTAGCATCCCAGGAAATTTGTGCTTGCCT  
KO: TGGCATCTTGGTTTCCTTTGA AACAAACAGCCAGCACCTAGCATGCTATGGCTG

Predicted translation product from this allele:

GCCAACCTGCAGTGGATCTGTGCGAAGGCCTATGGCCTAGAGTGGCCACATGGCGATGGTGGATGCCCTGATGATGGCCTACACTGTGGAGATGATCAGCATTGAGAAGGT  
CGGTTGGACGTCACCTAGACACGTTCCGGATACCGGATCTCACCGGTGTACCGCTACCACCTACGGGACTACTACCGGATGTGACACCTCTACTAGTCGTAACCTCTCCA  
40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76  
A N L Q W I C A K A Y G L E W P H G D G G C P D D G L H C G D D Q H \* E G



Strain#: 407706

Request#: 514798

Animal ID: 1928 - Male

1015 bp del + 7bp insertion

AAGCAGAGCT	CCCTTCTCAG	AATGAATGTC	ATTGTACCAT	AGCCCCCTTCT	TTAATCCGAT	GGCATCTTGG	TTTCCTTTGA	GCTCTCTAGC	ATCCCAGGAA
TTCGTCCTCGA	GGGAAGAGTC	TTACTTACAG	TAACATGTA	TCGGGGAAGA	AATTAGGCTA	CCGTAGAACC	AAAGGAAACT	CGAGAGATCG	TAGGGTCCTT
ATTTGTGCTT	GCGTCCCACC	ATCATTGAGA	TTATGCTGGC	CTTTGCACAA	ATGCCTCATT	GTGCCTCTGT	CGTGCTAATG	AGGCTGTTAG	TTGACCCCTAG
TAAACACGAA	CGCAGGGTGG	TAGTAAGTCT	AATACGACCG	GAACAGTGT	TACGGAGTAA	CACGGAGACA	GCACGATTAC	TCCGACAATC	AACTGGGATC
ATCTTTGTGT	GTTGTGTGTG	GTACCTTGGC	TGGGATTTTG	CTGGACGGTG	CTTTTGTGTG	TTCTCATCTG	GCTGGTGTATG	CTTGAGACTG	GACTGTGCAT
TAGAAACACA	CAACACACAC	CATGGAACCG	ACCCTAAAC	GACCTGCCAC	GAAAACACAC	AAGAGTAGAC	CGACCACTAC	GAACTCTGAC	CTGACACGTA
GTCCATTAC	CCAGTGTCT	CTCTCCTGCC	ATAGACAACA	TCCCTGAGGA	CCTCCGAGAC	CCGTTTTACA	TCGACCAGTA	TGAGCAGGAG	CACATTAAGC
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CACCCGTTAT	CAAGTCTTCT	CTGTCCAGTG	AGCTGTATTG	CCGTGTCTGC	AGCCTCATCC	TAAAAGGGGA	CCAGGTGGCT	ACCTTGCAAG	GACACCAGTC
GTGGGCAATA	GTTCGAAGAG	GACAGGTAC	TCGACATAAC	GGCACAGACG	TCGGAGTAGG	ATTTTCCCT	GGTCCACCGA	TGGAACGTT	CTGTGGTCAG
TGTCATCCAG	GCCCTGTCCC	GGAAGGGCAT	CTATGTGATG	GAGAGTGATG	ATACCCTGT	GACAGATGCT	GACCTCAGCC	AGGCACCTAT	TAAGATGGTG
ACAGTAGGTC	CGGGACAGGG	CCTTCCCGTA	GATACACTAC	CTCTCACTAC	TATGGGGACA	CTGTCTACGA	CTGGAGTCCG	TCCGTGGATA	ATTCTACAC
AGTGTGCGG	GGCGTGGTG	CGCATGCCIT	TAATCCCAGC	ACTTGAGAGG	CAGAGGCAGG	TGGATTTCTG	AGTTCGAGGC	CAGCCTGGTC	TACAAAGTGA
TCACAACGGC	CCGCACCAC	GCGTACGGAA	ATTAGGGTCG	TGAACCTCC	GTCTCCGTCC	ACCTAAAGAC	TCAAGCTCCG	GTCCGACCAG	ATGTTTCACT
GTTCCAGGAC	AGCCAGGGCT	ATAGAGAAAC	TCTGTCTCGA	AAAACCAAAA	AAAAAAAAAA	AAAAAAAAAA	CCAAAAAAAA	AAAACCCCAA	AAAACAAAAC
CAAGGTCCCTG	TCGGTCCCGA	TATCTCTTTG	AGACAGAGCT	TTTTGGTTTT	TTTTTTTTTT	TTTTTTTTTT	GGTTTTTTTT	TTTTGGGGTT	TTTTGTTTTG
AAGATGGTGA	GTTGTCTGAC	AGGCAATTCCT	CTGTTCCCTT	GGCTGAGCAG	GCAAGACTCA	GTGCCCTTCC	ATTAGGGTCA	GATGGTGAGG	TTTGCCAAATG
TTCTACCCT	CAACAGACTG	TCCGTAAGGA	GACAAGGGAA	CCGACTCGTC	CGTTCTGAGT	CACGGGAAGG	TAATCCCAGT	CTACCACTCC	AAACGGTTAC
TGTATTGGTG	GACCTTAATG	ACAGACCTGC	ATTTTAAAGA	ATGTCATCAT	TCTGGAAGA	ACAGCTTGCT	TTTGGGTTTT	CTTCTCACTG	AAGAGACAGT
ACATAACCAC	CTGGAATTAC	TGCTGGACG	TAAAATTTCT	TACAGTAGTA	AGACCTTCT	TGTCGAACGA	AAACCCAAA	GAAGAGTGAC	TTCTCTGTCA
GTAGCAGGGC	ACACCCTGC	AGAGCCTTCC	TGCTGGATAT	CTGCACTCAG	CCAGAATCGG	TTGCTATGTT	CTCAGAGGCT	ATGCCTCTGC	AGATTAGCCC
CATCGTCCCG	TGTGGTGACG	TCTCGGAAGG	ACGACCTATA	GACGTGAGTC	GGTCTTAGCC	AACGATACAA	GAGTCTCCGA	TACGGAGACG	TCTAATCGGG
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TCGTGGATCG	TACGATACCG	ACAAAAGTGA	GTCACCCAC	TACACACCCA	CTTCTCTTTC	GAGACTTCTC	TGACTTCCAT	CTCACACTAT	GTTTCTCTCG
CCTGGTGCCA	TTCCAGAGCC	TTTGGGGCAG	AGGAAGCGGG	CAGCCTCTTC	TCACAGCTTT	TTTTCCAGGG	CTACAAAGCA	AATTTATAGT	CTGCTGGTAA
GGACCACGGT	AAGGTCTCGG	AAACCCCGTC	TCCTTCGCCC	GTCGGAGAAG	AGTGTGCAAA	AAAAGGTCCC	GATGTTTTCGT	TAAATATCA	GACGACCATT
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CTCTAATCCT	GGTACTCGGT	AATGACGTAT	CGTCTTGTCA	CGGTCCCTAC	CTGTCCGGAG	TCGGTACAGA	CAGGAACCCG	CCCTTCCGTT	CGTCTTTCA
TTTCTTGCAT	TGGACCTTGC	AAGATGTTA	GGATGCTGAT	TGCACCTCT	GTTCCAGAG	TGGCCACATG	CGCATGGTGG	ATGCCCTGAT	GATGGCCTAC
AAAGAACGTA	ACCCTGGACG	TTCTACAAAT	CTTACGACTA	ACGTCCGAGA	CAAGGGTCTC	ACCGGTGTAC	CGCTACCACC	TACGGGACTA	CTACCGGATG
ACTGTGGAGA	TGATCAGCAT	TGAGAAGGTG	GTGGCCAGTG	TCAAGCCTT	TTCTACATTC	AGCGCCTCAA	AAGAACTTCC	TTATGACCTC	GAGGATGCCA
TGACACCTCT	ACTAGTCGTA	ACTCTTCCAC	CACCGGTAC	AGTTCGCGAA	AAGATGTAAG	TCGCGGAGT	TTCTTGAAGG	AATACTGGAG	CTCCTACGGT
TGGTATTCTG	GATCAATAAG	GTGAGTGCIT	GTTTAGCTCT	TTGCCTGATT	GAGAGCTGTC	TGCTTCTTGT	TCTCCATATT	GGGACTTGCC	ACTAGAGTTT
ACCATAAGAC	CTAGTTATT	CACTCACGAA	CAAATCGAGA	AACGGACTAA	CTCTCGACAG	ACGAAGAACA	AGAGGTATAA	CCCTGAACGG	TGATCTCAA
GTCATTGGA	ACTGCATGGT	ACTTTATCCA	GCTAGGTGTC	CAATAGACAG	TCCTTATTCC	TGAGCGCTGA	GAGTTAAGCA	AATGGGTGTG	GGTTTGTGTA
CAGTAAACCT	TGACGTACCA	TGAAATAGGT	CGATCCACAG	GTTATCTGTC	AGGAATAAGG	ACTCGCGACT	CTCAATTCGT	TTACCCACAC	CCAAACACAT
TGAGGATGTA	CATATGTGTG	TGGTTACAAC	TAATGGGTTT	CATTTTTAGC	TTAAGTACT	TATATATAAT	GCTTGTTCAT	GATTTTTTGC	TGATAGTTAT
ACTCTACAT	GTATACACAC	ACCAATGTTG	ATTACCCAAA	GTAAAAATCG	AATTCCATGA	ATATATATTA	CGAACAAGTA	CTAAAAACG	ACTATCAATA

Exon 2

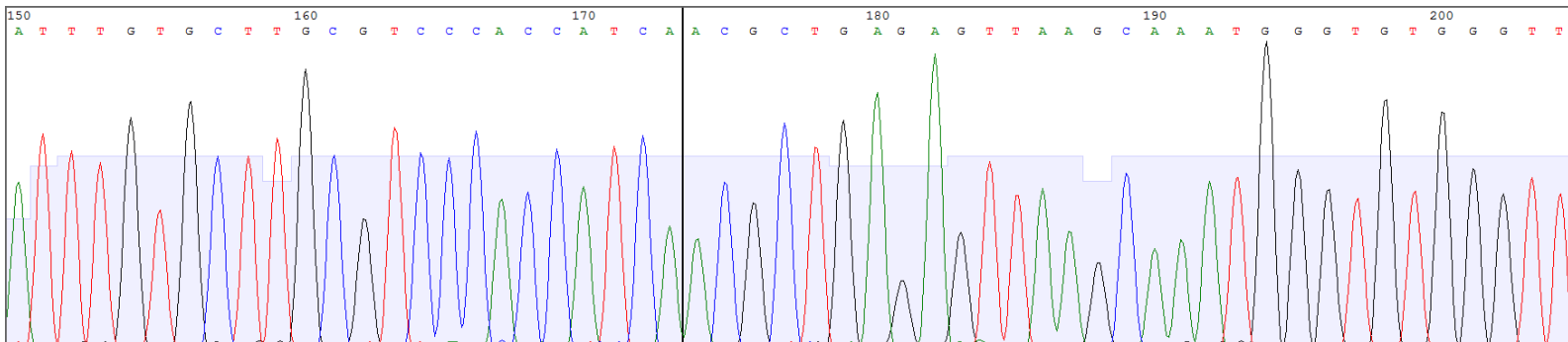
guide PAM

Deleted Region

Exon 3

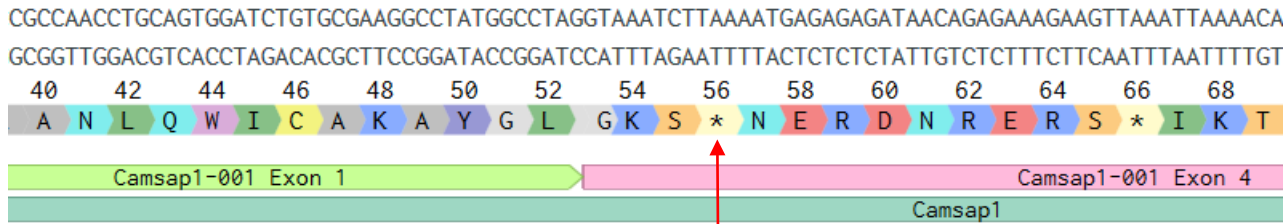
Strain#: 407706  
Request#: 514798  
Animal ID: 1931 - Male

1640 bp del + 1bp insertion



WT: A T T T G T G C T T G C G T C C C A C C A T C A T T C A G A T T A T G C T G G C C T T T G C A C A A T G C C  
KO: A T T T G T G C T T G C G T C C C A C C A T C A **A C G C T G A G A G T T A A G C A A T G G G T G T G G G T T**

Predicted translation product from this allele:



Stop

Strain#: 407706

Request#: 514798

Animal ID: 1931 - Male

1640 bp del

AAGCAGAGCT	CCCTTCTCAG	AATGAATGTC	ATTGTACCAT	AGCCCTTCT	TTAATCCGAT	GGCATCTTGG	TTTCCTTTGA	GCTCTCTAGC	ATCCAGGAA
TTCGCTCTCGA	GGGAAGAGTC	TTACTTACAG	TAACATGTA	TCGGGGAAGA	AATTAGGCTA	CCGTAGAACC	AAAGGAAACT	CGAGAGATCG	TAGGGTCCCT
ATTTGTGCTT	GCGTCCCACC	ATCAATCAGA	TTATGCTGGC	CTTTGCACAA	ATGCCTCATT	GTGCCTCTGT	CGTGCTAATG	AGGCTGTTAG	TTGACCCTAG
TAAACACGAA	CGCAGGGTGG	TAGTAACTCT	AATACGACCG	GAACAGTGT	TACGGAGTAA	CACGGAGACA	GCACGATTAC	TCCGACAATC	AACTGGGATC
ATCTTTGTGT	GTTGTGTGTG	GTACCTTGGC	TGGGATTTTG	CTGGACGGTG	CTTTTGTGTG	TTCTCATCTG	GCTGGTGATG	CTTGAGACTG	GACTGTGCAT
TAGAAACACA	CAACACACAC	CATGGAACCG	ACCCTAAAAC	GACCTGCCAC	GAAAACACAC	AAGAGTAGAC	CGACCACTAC	GAACTCTGAC	CTGACACGTA
GTCCATTAC	CCAGTGTCT	CTCTCTGCC	ATAGACAACA	TCCCTGAGGA	CCTCCGAGAC	CCGTTTTACA	TCGACCAGTA	TGAGCAGGAG	CACATTAAGC
CAGGTAAGTG	GGTCACGAGA	GAGAGGACGG	TATCTGTGTG	AGGGACTCCT	GGAGGCTCTG	GGCAAAATGI	AGCTGGTCAI	ACTCGTCCCT	GTGTAATTCG
CACCCGTTAT	CAAGTCTTCT	CTGTCCAGTG	AGCTGTATTG	CCGTGTCTGC	AGCCTCATCC	TAAAAGGGGA	CCAGGTGGCT	ACCTTGCAAG	GACACCAGTC
GTGGGCAATA	GTTCGAAGAG	GACAGGTAC	TCGACATAAC	GGCACAGACG	TCGGAGTAGG	ATTTTCCCT	GGTCCACCGA	TGGAACGTT	CTGTGGTCAG
TGTCATCCAG	GCCCTGTCCC	GGAAGGGCAT	CTATGTGATG	GAGAGTGATG	ATACCCTGT	GACAGATGCT	GACCTCAGCC	AGGCACCTAT	TAAGATGGTG
ACAGTAGGTC	CGGGACAGGG	CCTTCCCGTA	GATACACTAC	CTCTCACTAC	TATGGGGACA	CTGTCTACGA	CTGGAGTCGG	TCCGTGGATA	ATTCTACAC
AGTGTGCGG	GGCGTGGTG	CGCATGCCIT	TAATCCCAGC	ACTTGAGAGG	CAGAGGCAGG	TGGATTTCTG	AGTTCGAGGC	CAGCCTGGTC	TACAAAGTGA
TCACAACGGC	CCGCACCACC	GCGTACGGAA	ATTAGGGTCG	TGAACCTCC	GTCTCCGTCC	ACCTAAAGAC	TCAAGCTCCG	GTCCGACCAG	ATGTTTCACT
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TGTATTGGTG	GACCTTAATG	ACAGACCTGC	ATTTTAAAGA	ATGTCATCAT	TCTGGAAGA	ACAGCTTGCT	TTTGGGTTTT	CTTCTCACTG	AAGAGACAGT
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CATCGTCCCG	TGTGGTGACG	TCICGGAAGG	ACGACCTATA	GACGTGAGTC	GGTCTTAGCC	AACGATACAA	GAGTCTCCGA	TACGGAGACG	TCTAATCGGG
AGCACCTAGC	ATGCTATGGC	TGTTTTCACT	CAGTGGGGTG	ATGTGTGGGT	GAAAGAAAAG	CTCTGAAGAG	ACTGAAGGTA	GAGTGTGATA	CAAAGAGAGC
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CCTGGTGCCA	TTCCAGAGCC	TTTGGGGCAG	AGGAAGCGGG	CAGCCTCTTC	TCACAGCTTT	TTTTCCAGGG	CTACAAAAGCA	AATTTATAGT	CTGCTGGTAA
GGACCACGGT	AAGGTCTCGG	AAACCCCGTC	TCCTTCGCCC	GTCGGAGAAG	AGTGTGCAAA	AAAAGGTCCC	GATGTTTTCGT	TTAAATATCA	GACGACCATT
GAGATTAGGA	CCATGGACCA	TTACTGCATG	GCAGAACAGT	GCCAGGGATG	GACAGGCCTC	AGCCAGTGTCT	GTCCTTGGCG	GGGAAGGCAA	GGCAGAAAGT
CTCTAATCCT	GGTACTGTT	AATGACGTTA	CGTCTTGTCA	CGGTCCCTAC	CTGTCCGGAG	TCGGTACAGA	CAGGAACCCG	CCCTTCCGTT	CGTCTTTCA
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AAAGAACGTA	ACCCTGGACG	TTCTACAAAT	CTTACGACTA	ACGTCCGAGA	CAAGGGTCTC	ACCGGTGTAC	CGCTACCACC	TACGGGACTA	CTACCGGATG
ACTGTGGAGA	TGATCAGCAT	TGAGAAGGTG	GTGGCCAGTG	TCAAGCCTT	TTCTACATTC	AGCGCCTCAA	AAGAACTTCC	TTATGACCTC	GAGGATGCCA
TGACACCTCT	ACTAGTCTGA	ACTCTTCCAC	CACCGGTAC	AGTTCGCGAA	AAGATGTAAG	TCGCGGAGT	TTCTTGAAGG	AATACTGGAG	CTCTACGGT
TGGTATTCTG	GATCAATAAG	GTGAGTGCIT	GTTTAGCTCT	TTGCCTGATT	GAGAGCTGTC	TGCTTCTTGT	TCTCCATATT	GGGACTTGCC	ACTAGAGTTT
ACCATAAGAC	CTAGTTATT	CACTCAGGAA	CAAATCGAGA	AACGGACTAA	CTCTCGACAG	ACGAAGAACA	AGAGGTATAA	CCCTGAACGG	TGATCTCAA
GTCATTGGA	ACTGCATGGT	ACTTTATCCA	GCTAGGTGTC	CAATAGACAG	TCCTTATTCC	TGACCGCTGA	GAGTTAAGCA	AATGGGTGTG	GGTTTGTGTA
CAGTAAACCT	TGACGTACCA	TGAAATAGGT	CGATCCACAG	GTTATCTGTC	AGGAATAAGG	ACTCCGACT	CTCAATTCGT	TTACCCACAC	CCAAACACAT
TGAGGATGTA	CATATGTGTG	TGGTTACAAC	TAATGGGTTT	CATTTTTAGC	TTAAGTACT	TATATATAAT	GCTTGTTCAT	GATTTTTTGC	TGATAGTTAT
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Exon 2

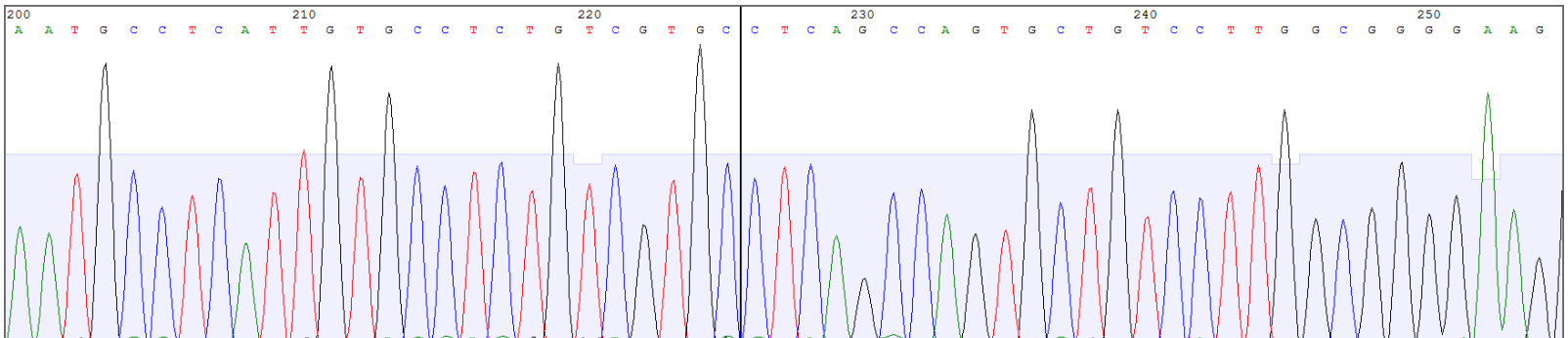
guide PAM

Deleted Region

Exon 3

Strain#: 407706  
 Request#: 514798  
 Animal ID: 1953 - Male

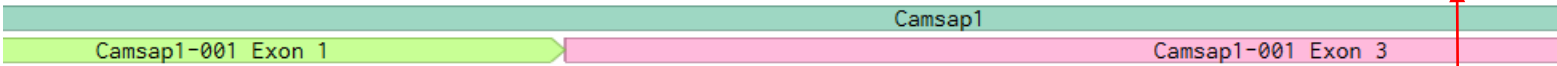
1182 bp del



**WT:** AATGCCTCATTGTGCCTCTGTCGTGCTAATGAGGCTGTTAGTTGACCCTAGATCT  
**KO:** AATGCCTCATTGTGCCTCTGTCGTGCTCAGCCAGTGCTGTCCTTGGCGGGAAG

Predicted translation product from this allele:

:GCCAACCTGCAGTGGATCTGTGCCAAGGCCTATGGCCTAGAGTGGCCACATGGCGATGGTGGATGCCCTGATGATGGCCTACACTGTGGAGATGATCAGCATTGAGAAGGT  
 :CGTTGGACGTCACCTAGACACGCTTCCGGATACCGGATCTCACCGGTGTACCGCTACCACCTACGGGACTACTACCGGATGTGACACCTCTACTAGTCGTAACCTCTTCCA  
 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76  
 A N L Q W I C A K A Y G L E W P H G D G G C P D D G L H C G D D Q H \* E G



Missense translation

Stop



Strain#: 407706

Request#: 514798

Animal ID: 1953 - Male

1182 bp del

AAGCAGAGCT CCCTTCTCAG AATGAATGTC ATTGTACCAT AGCCCCTTCT TTAATCCGAT GGCATCTTGG TTTCCTTTGA GCTCTCTAGC ATCCAGGAA  
TTCGCTCGA GGGAAAGATC TTACTTACAG TAACATGGTA TCGGGGAAGA AATTAGGCTA CCGTAGAACC AAAGGAAACT CGAGAGATCG TAGGGTCCTT

ATTTGTGCTT GCGTCCCACC ATCATTGAGA TTATGCTGGC CTTTGACAAA ATGCCTCATT **GTGCTCTGT** **CGTGTAAATG** **AGGCTGTAG** TTGACCCTAG  
TAAACACGAA CGCAGGGTGG TAGTAAAGTCT AATACGACCG GAAACGTGTT TACGGAGTAA **CACGGAGACA** **GCACGATTAC** TCCGACAATC AACTGGGATC

ATCTTTGTGT GTTGTGTGTG GTACCTTGGC TGGGATTTTG CTGGACGGTG CTTTTGTGTG TTCTCATCTG GCTGGTGATG CTTGAGACTG GACTGTGCAT  
TAGAAACACA CAACACACAC CATGGAACCG ACCCTAAAC GACCTGCCAC GAAAACACAC AAGAGTAGAC CGACCACTAC GAACCTGTAC CTGACACGTA

GTCCATTAC CCAGTGCTCT CTCTCTGCC ATAGACAACA TCCCTGAGGA CCTCCGAGAC CCGTTTTACA TCGACCAGTA TGAGCAGGAG CACATTAAGC  
CAGGTAAGTG GGTACAGAGA GAGAGGACGG TATCTGTGTG AGGGACTCCT GGAGGCTCTG GGCAAAATGT AGCTGGTCAT ACTCGTCCTC GTGTAATTCG

CACCCGTTAT CAAGCTTCTC CTGTCCAGTG AGCTGTATTG CCGTGTCTGC AGCCTCATCC TAAAAGGGGA CCAGGTGGCT ACCTTGCAAG GACACCAGTC  
GTGGGCAATA GTTCGAAGAG GACAGGTAC TCGACATAAC GGCACAGACG TCGGAGTAGG ATTTTCCCTT GTGCCACCGA TGGAACGTTT CTGTGGTCAG

TGTCATCCAG GCCCTGTCCC GGAAGGGCAT CTATGTGATG GAGAGTGATG ATACCCTGT GACAGATGCT GACCTCAGCC AGGCACCTAT TAAGATGGTG  
ACAGTAGGTC CGGGACAGGG CCTTCCCCTA GATACACTAC CTCTCACTAC TATGGGGACA CTGTCTACGA CTGGAGTCGG TCCGTGGATA ATTCTACAC

AGTGTGCGG GGCCTGGTGG CGCATGCCCT TAATCCCAGC ACTTGAGAGG CAGAGGCAGG TGGATTTCTG AGTTCGAGGC CAGCCTGGTC TACAAAGTGA  
TCACAACGGC CCGCACCACC GCGTACGGAA ATTAGGGTCG TGAACCTCTC GTCTCCGTC ACCTAAAGAC TCAAGCTCCG GTCGGACCAG ATGTTTCACT

GTTCCAGGAC AGCCAGGGCT ATAGAGAAA TCTGTCTCGA AAAACCAAAA AAAAAAAAAA AAAAAAAAAA CCAAAAAAAAAA AAAACCCCAA AAAACAAAAC  
CAAGGTCCCTG TCGGTCCCGA TATCTCTTTG AGCAGAGACT TTTTGGTTTT TTTTTTTTTT TTTTTTTTTT GGTTTTTTTT TTTTGGGGTT TTTTGTTTG

AAGATGGTGA GTTGTCTGAC AGGCATTCTT CTGTCCCTTT GGCTGAGCAG GCAAGACTCA GTGCCCTTCC ATTAGGGTCA GATGGTGAGG TTTGCCAATG  
TTCTACCCT CAACAGACTG TCCGTAAGGA GACAAGGGAA CCGACTCGTC CGTTCTGAGT CACGGGAAGG TAATCCCAGT CTACCCTCC AAACGGTTAC

TGTATTGGTG GACCTTAATG ACAGACCTGC ATTTTAAAGA ATGTATCAT TCTGAAAAGA ACAGCTTGCT TTTGGGTTTT CTCTCACTG AAGAGACAGT  
ACATAACCAC CTGGAATTAC TGCTGGACG TAAAATTCT TACAGTAGTA AGACCTTCT TGTCGAACGA AAACCCAAA GAAGAGTGAC TTCTCTGTCA

GTAGCAGGGC ACACCCTGC AGAGCCTTCC TGCTGGATAT CTGCACTCAG CCAGAATCGG TTGCTATGTT CTCAGAGGCT ATGCTCTGC AGATTAGCCC  
CATCGTCCCG TGTGGTGAGG TCICGGAAGG ACGACCTATA GACGTGAGTC GGTCTTAGCC AACGATACAA GAGTCTCCGA TACGGAGACG TCTAATCGGG

AGCACCTAGC ATGCTATGGC TGTTTTCACT CAGTGGGGTG ATGTGTGGGT GAAGAGAAAG CTCTGAAGAG ACTGAAGGTA GAGTGTGATA CAAAGAGAGC  
TCGTGGATCG TACGATACCG ACAAAGTGA GTCACCCAC TACACACCCA CTTCTCTTTC GAGACTTCTC TGACTTCCAT CTCACACTAT GTTTCTCTCG

CCTGGTGCCA TTCCAGAGCC TTTGGGGCAG AGGAAGCGGG CAGCCTCTTC TCACAGCTTT TTTTCCAGGG CTACAAAACA AATTTATAGT CTGCTGGTAA  
GGACCACGGT AAGGTCTCGG AAACCCCGTC TCCTTCGCCC GTCGGAGAAG AGTGTGAAA AAAAGGTCCC GATGTTTTCT TTAATATCA GACGACCATT

GAGATTAGGA CCATGGACCA TTAATGCAAT GCAGAACAGT GCCAGGGATG GACAGGCTC AGCCAGTGCT GTCTTGGCG GGAAGGCAA GGCAGAAAGT  
CTCTAATCTT GGTACCTGTT AATGACGTAC CGTCTTGTCA CGGTCCCTAC CTGTCCGAG TCGGTCACGA CAGGAACCGC CCCTTCGTT CCGTCTTTCA

TTTCTGCAAT TGGGACCTGC AAGATGTTTA GGATGCTGAT TGCAGCCTCT GTTCCAGAG TGGCCACATG GCGATGGTGG ATGCCCCTGAT GATGGCCTAC  
AAAGAACGTA ACCCTGGACG TTCTACAAT CCTACGACTA ACGTCCGAGA CAAGGCTCTC ACCGGTGTAC CGCTACCACC TACGGGACTA CTACCGGATG

ACTGTGGAGA TGATCAGCAT TGAGAAGGTG GTGGCCAGTG TCAAGCGCTT TTCTACATT AGCGCCTCAA AAGAACTTCC TTATGACCTC GAGGATGCCA  
TGACACCTCT ACTAGTCGTA ACCTTCCAC CACCGGTCAC AGTTCGCGAA AAGAIGTAAG TCGCGGAGTT TTCTGAAGG AATACTGGAG CTCCTACGGT

TGGTATTCTG GATCAATAAG GTGAGTGCTT GTTTAGCTCT TTGCCTGATT GAGAGCTGTC TGCTTCTTGT TCTCCATATT GGGACTTGCC ACTAGAGTTT  
ACCATAAGAC CTAGTTATT CACTCACGAA CAATCGAGA AACGGACTAA CTCTCGACAG ACGAAGAACA AGAGGTATAA CCCTGAACGG TGATCTCAA

GTCATTGGA ACTGCATGGT ACTTTATCCA GCTAGGTGTC CAATAGACAG TCCTTATTCC TGAGCGCTGA GAGTTAAGCA AATGGGTGTG GGTTTGTGTA  
CAGTAAACCT TGACGTACCA TGAATAGGT CGATCCACAG GTTATCTGTC AGGAATAAGG ACTCGCGACT CTCAATTCGT TACCCACAC CCAAACACAT

TGAGGATGTA CATATGTGTG TGTTTACAA TAATGGGTTT CATTITTAGC TTAAGTACT TATATATAAT GCTTGTTCAT GATTTTTTGC TGATAGTTAT  
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Exon 2

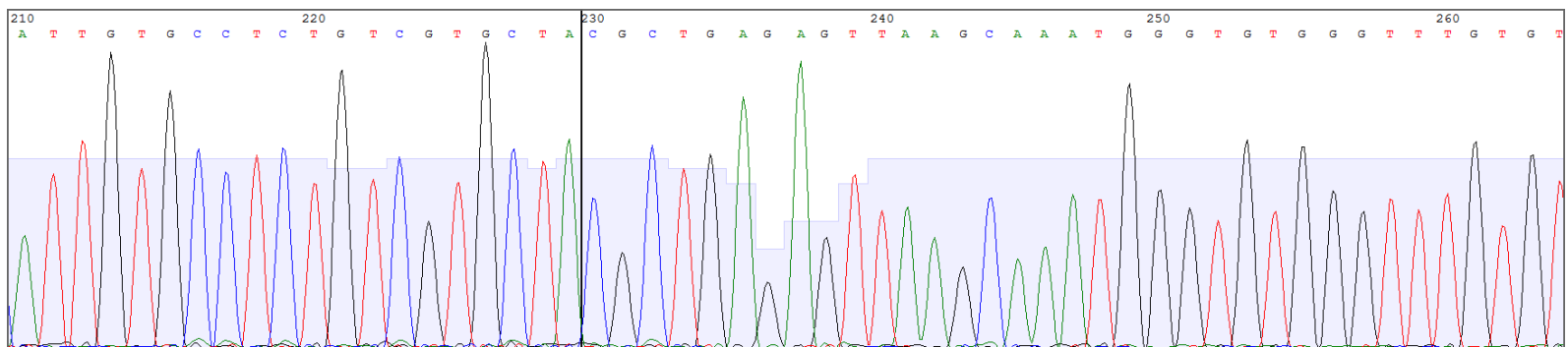
guide PAM

Deleted Region

Exon 3

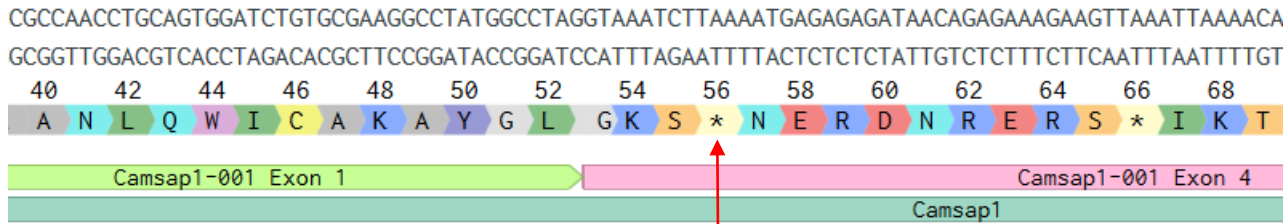
Strain#: 407706  
Request#: 514798  
Animal ID: 1957 - Male

1587 bp del



WT: ATTGTGCCTCTGTCTGCTAATGAGGCTGTTAGTTGACCCTAGATCTTTGTGTGT  
KO: ATTGTGCCTCTGTCTGCTA**CGCTGAGAGTTAAGCAAATGGGTGTGGGTTTGTGT**

Predicted translation product from this allele:



Stop

Strain#: 407706

Request#: 514798

Animal ID: 1957 - Male

1587 bp del

AAGCAGAGCT CCCTTCTCAG AATGAATGTC ATTGTACCAT AGCCCCTTCT TTAATCCGAT GGCATCTTGG TTTCCCTTGA GCTCTCTAGC ATCCCAGGAA  
 TTCGTCTCGA GGGAAAGAGTC TTACTTACAG TAACATGCTA TCGGGGAAGA AATTAGGCTA CCGTAGAACC AAAGGAAACT CGAGAGATCG TAGGGTCTTT

ATTTGTGCTT GCGTCCCACC ATCATTGAGA TTATGCTGGC CTTTGCACAA ATGCCTCATT **GTGCCTCTGT** **CGTGTCTATG** **AGGCTGTTAG** TTGACCCTAG  
 TAAACACGAA CGCAGGGTGG TAGTAAGTCT AATACGACCG GAAACGTGTT TACGGAGTAA **CACGGAGACA** **GCACGATAC** **TCCGACAATC** AACTGGGATC

ATCTTTGTGT GTTGTGTGTG GTACCTTGGC TGGGATTTTG CTGGACGGTG CTTTTGTGTG TTCTCATCTG GCTGGTGATG CTTGAGACTG GACTGTGCAT  
 TAGAAACACA CAACACACAC CATGGAACCG ACCCTAAAAC GACCTGCCAC GAAAACACAC AAGAGTAGAC CGACCACTAC GAACTCTGAC CTGACACGTA

GTCCATTAC CCAGTGTCT CTCTCTGCC ATAGACAACA TCCTGAGGA CCTCCGAGAC CCGTTTTACA TCGACCAGTA TGAGCAGGAG CACATTAAGC  
 CAGGTAAGTG GGTACGAGA GAGAGGACGG TATCTGTTGT AGGGACTCCT GGAGGCTCTG GGCAAAATGT AGCTGGTCAT ACTCGTCCCT GTGTAATTCC

CACCCGTTAT CAAGCTTCTC CTGTCCAGTG AGCTGTAATG CCGTGTCTGC AGCCTCATCC TAAAAGGGGA CCAGGTGGCT ACCTTGCAAG GACACCAGTC  
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TGTCATCCAG GCCCTGTCCC GGAAGGGCAT CTATGTGATG GAGAGTGATG ATACCCCTGT GACAGATGCT GACCTCAGCC AGGCACCTAT TAAGATGGTG  
 ACAGTAGGTC CGGGACAGGG CCTTCCCCTA GATACACTAC CTCTCACTAC TATGGGGACA CTGTCTACGA CTGGAGTCGG TCCGTGGATA ATCTACACAC

AGTGTGCGG GGCCTGGTGG CGCATGCCCT TAATCCCAGC ACTTGAGAGG CAGAGGCGAG TGGATTTCTG AGTTCGAGGC CAGCCTGGTC TACAAAGTGA  
 TCACAACGGC CCGCACCACC GCGTACGGAA ATTAGGGTGC TGAACCTCC GTCTCCGTCC ACCTAAAGAC TCAAGCTCCG GTCGGACCAG ATGTTTCACT

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 CAAGGTCCCTG TCGGTCGCCA TATCTGTTTG ACTCAGAGCT TTTTGGTTTT TTTTTTTTTT TTTTTTTTTT GGTTTTTTTTT TTTTGGGGTT TTTTGGTTTTG

AAGATGGTGA GTTGTCTGAC AGGCATTCCCT CTGTTCCCTT GGCTGAGCAG GCAAGACTCA GTGCCCTCC ATTAGGGTCA GATGGTGAGG TTTGCCAATG  
 TTCTACCACT CAACAGACTG TCCGTAAGGA GACAAGGGAA CCGACTCGTC CGTTCTGAGT CACGGGAAGG TAATCCCAGT CTACCACTCC AAACGGTTAC

TGTATTGGTG GACCTTAATG ACAGACCTGC ATTTTAAAGA ATGTCATCAT TCTGGAAGA ACAGCTTGCT TTTGGGTTTT CTTCTCACTG AAGAGACAGT  
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GTAGCAGGGC ACACCACTGC AGAGCCTTCC TGCTGGATAT CTGCACTCAG CCAGAATCGG TTGCTATGTT CTCAGAGGCT ATGCCTCTGC AGATTAGCCC  
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ACTGTGGAGA TGATCAGCAT TGAGAAGGTG GTGGCCAGTG TCAAGCGCTT TCTACATTC AGCGCCTCAA AAGAACTTCC TTATGACCTC GAGGATGCCA  
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GTCATTGGGA ACTGCATGGT ACTTTATCCA GCTAGGTGTC CAATAGACAG TCCTTATTCC **TGACCGCTGA** **GAGTTAAGCA** AATGGGTGTG GGTTTGTGTA  
 CAGTAAACCT TGACGTACCA TGAAATAGGT CGATCCACAG GTATCTGTG AGGAATAAGG **ACTCGGACT** **CTCAATTCG** **TACCCACAC** CCAAACACAT

TGAGGATGTA CATATGTGTG TGGTACAAC TAATGGGTTT CATTTTTACG TTAAGGTACT TATATATAAT GCTTGTTCAT GATTTTTTGC TGATAGTTAT  
 ACTCCTACAT GTATACACAC ACCAATGTTG ATTACCCAAA GTAAAAATCG AATTCCATGA ATATATATTA CGAACAAAGTA CTAAAAAACG ACTATCAATA

Exon 2

guide PAM

Deleted Region

Exon 3

# Important Project Details

- Please review this project plan and contact us within 5 business days if changes are required. **To ensure your project is expedited quickly, we will begin work in one week (7 days) unless we receive further instructions from you.**
- Once potential founder mice have been characterized, you will receive a **Founder Genotyping Packet** identifying founder(s) carrying the desired mutation for generation of N1 mice.
- Once founder(s) have been identified, you will be billed for Phase 1 of the project.
- We will breed founder animals to generate N1 mice with the desired mutation. During this time you will receive regular project updates.
- Once N1 animals are genotyped, you will receive the **N1 Genotyping Packet**. At this time, animals can be shipped to you or we can provide additional services such as cryopreservation or additional breeding to other JAX strains.
- Once the N1 Genotyping Packet is delivered, you will be billed for Phase 2 of this project.
- **We will hold your validated N1 mice for 2 weeks free of charge after which standard cage holding charges will be applied.**