

Acadl Cas9-KO Strategy

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Project Overview

Project Name

Acadl

Project type

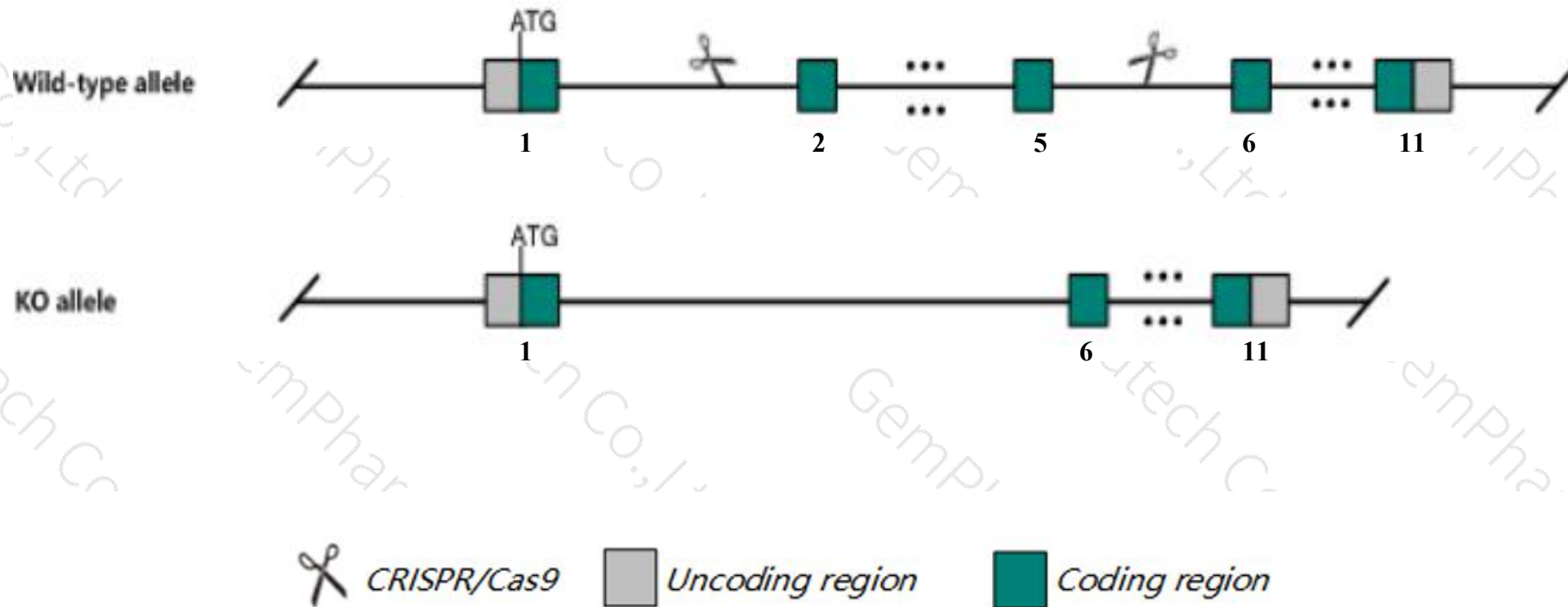
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Acadl* gene. The schematic diagram is as follows:



- The *Acadl* gene has 2 transcripts. According to the structure of *Acadl* gene, exon2-exon5 of *Acadl-201* (ENSMUST00000027153.5) transcript is recommended as the knockout region. The region contains 526bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Acadl* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Homozygous mutation of this gene results in reduced litter size, sudden death between 2-14 weeks of age, reduced serum glucose levels, lipid accumulation in the liver and heart, and cardiomyopathy. Heterozygous mutant animals exhibit reduced litter size.
- *Gm27934* and *Gm15793* gene will be deleted.
- The *Acadl* gene is located on the Chr1. If the knockout mice are crossed with other mice strains to obtain double gene positive homozygous mouse offspring, please avoid the two genes on the same chromosome.
- This Strategy is designed based on genetic information in existing databases. Due to the complexity of biological processes, all risk of the gene knockout on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

Gene information (NCBI)

Acadl acyl-Coenzyme A dehydrogenase, long-chain [*Mus musculus* (house mouse)]

Gene ID: 11363, updated on 13-Mar-2020

Summary

- Official Symbol** Acadl provided by MGI
- Official Full Name** acyl-Coenzyme A dehydrogenase, long-chain provided by MGI
- Primary source** MGI: MGI:87866
- See related** Ensembl: ENSMUSG00000026003
- Gene type** protein coding
- RefSeq status** REVIEWED
- Organism** *Mus musculus*
- Lineage** Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
- Also known as** LCAD; C79855; AA960361; AU018452
- Summary** This gene encodes a homotetrameric mitochondrial flavoprotein and is a member of the acyl-CoA dehydrogenase family. Members of this family catalyze the first step of fatty acid beta-oxidation, forming a C2-C3 trans-double bond in a FAD-dependent reaction. As beta-oxidation cycles through its four steps, each member of the acyl-CoA dehydrogenase family works at an optimum fatty acid chain-length. This enzyme has its optimum length between C12- and C16-acylCoA. In mice, deficiency of this gene can cause sudden death, cardiomyopathy as well as fasting and cold intolerance. [provided by RefSeq, Nov 2012]
- Expression** Broad expression in heart adult (RPKM 89.2), liver E18 (RPKM 50.6) and 22 other tissues [See more](#)
- Orthologs** [human](#) [all](#)

Genomic context

Location: 1 C3; 1 33.64 cM [See Acadl in Genome Data Viewer](#)

Exon count: 11

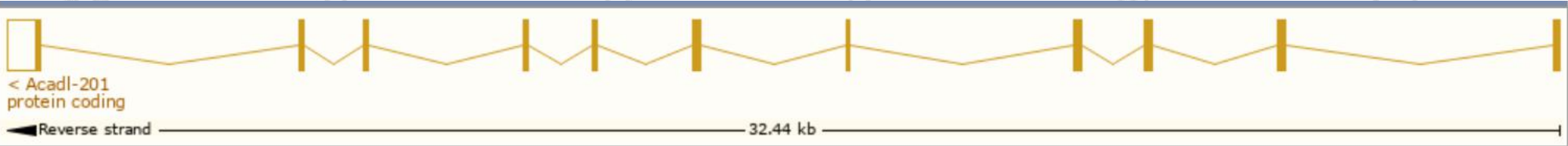
Annotation release	Status	Assembly	Chr	Location
108	current	GRCm38.p6 (GCF_000001635.26)	1	NC_000067.6 (66830839..66863309, complement)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	1	NC_000067.5 (66877427..66909841, complement)

Transcript information (Ensembl)

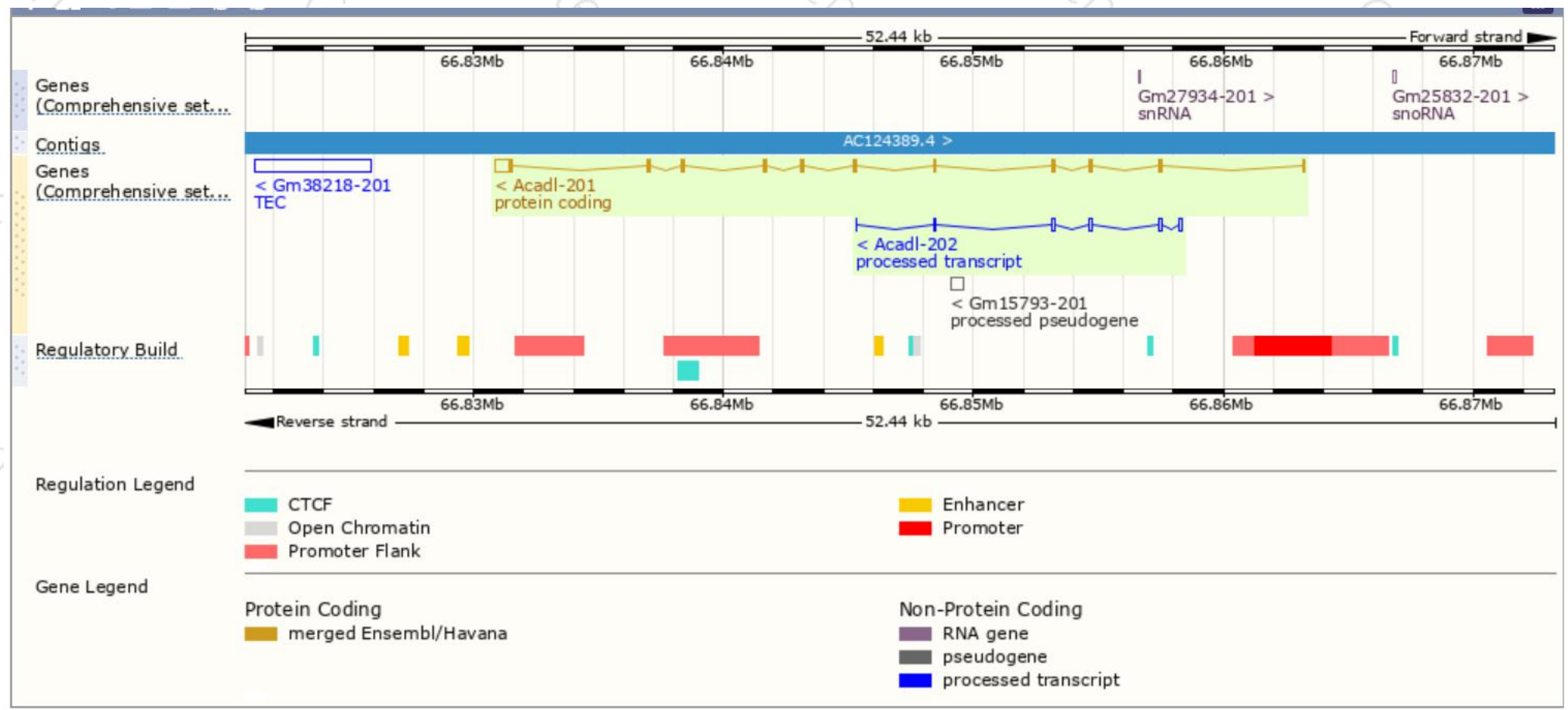
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Acadl-201	ENSMUST00000027153.5	1916	430aa	Protein coding	CCDS15023	A0A0R4J083	TSL:1 GENCODE basic APPRIS P1
Acadl-202	ENSMUST00000139208.1	649	No protein	Processed transcript	-	-	TSL:3

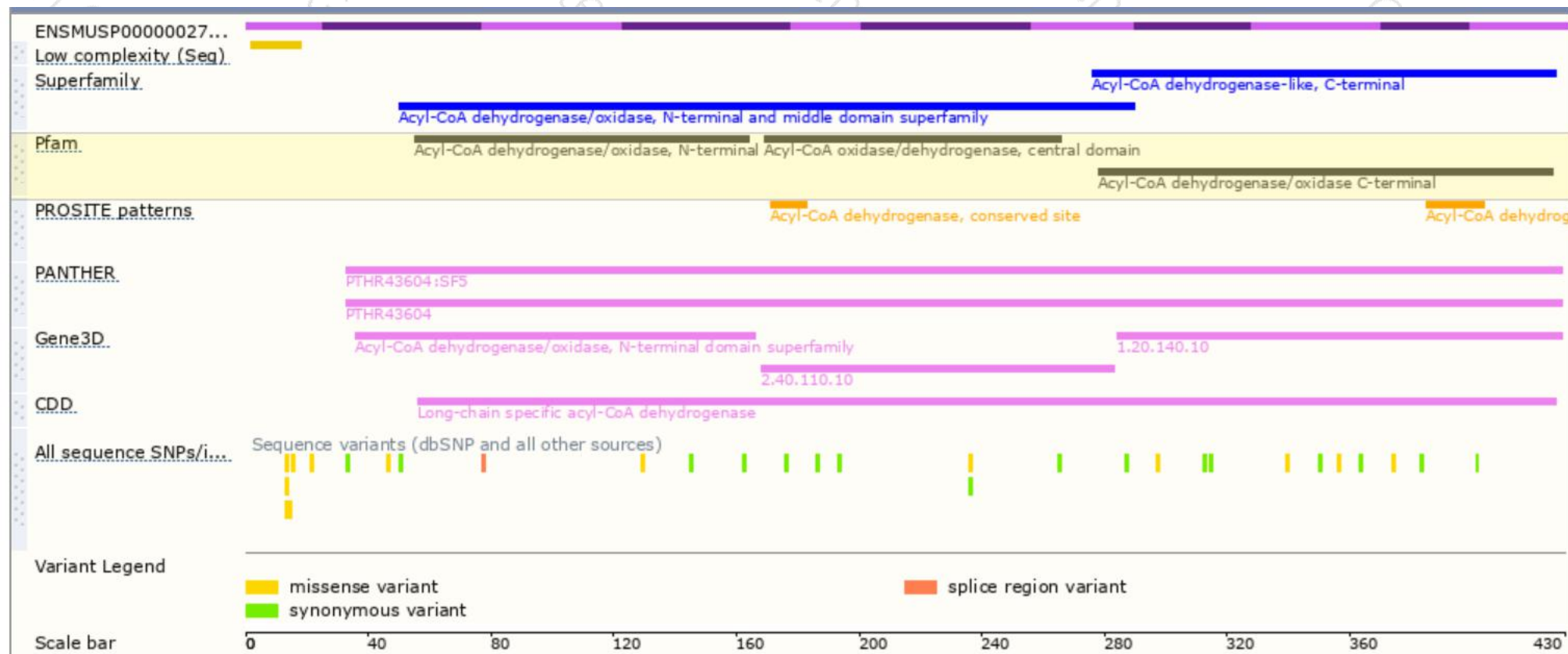
The strategy is based on the design of *Acadl-201* transcript,The transcription is shown below



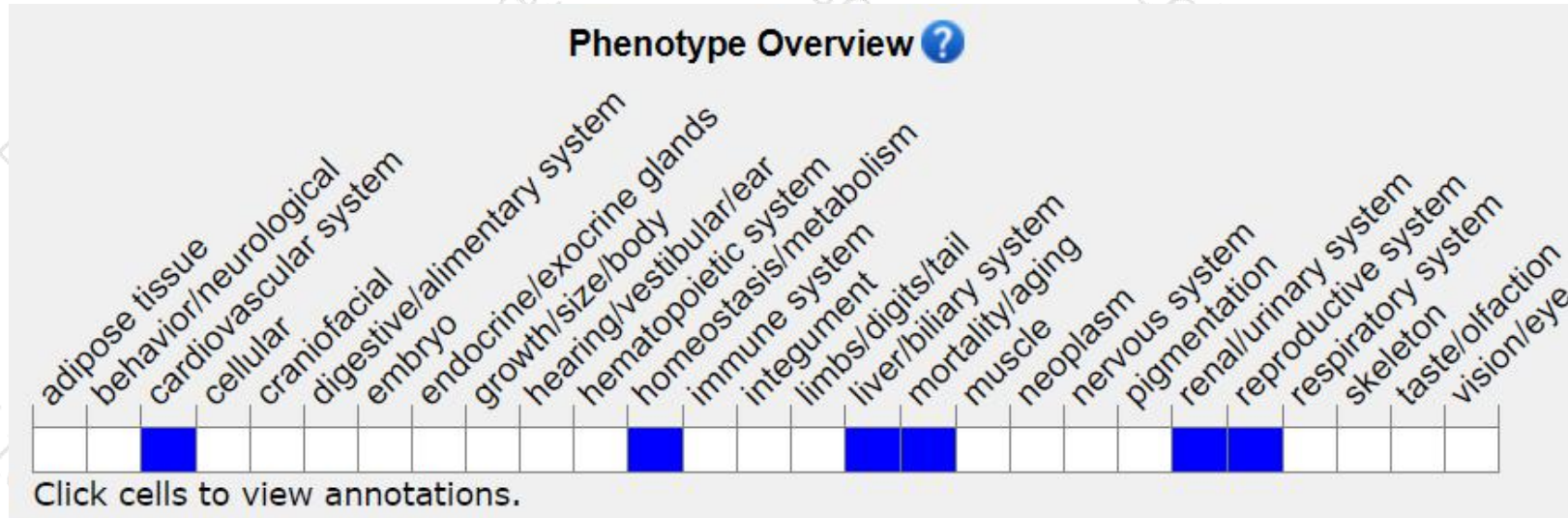
Genomic location distribution



Protein domain



Mouse phenotype description(MGI)



Phenotypes affected by the gene are marked in blue. Data quoted from MGI database(<http://www.informatics.jax.org/>).

Homozygous mutation of this gene results in reduced litter size, sudden death between 2-14 weeks of age, reduced serum glucose levels, lipid accumulation in the liver and heart, and cardiomyopathy. Heterozygous mutant animals exhibit reduced litter size.

If you have any questions, you are welcome to inquire.

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