

Cela2a Cas9-KO Strategy

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Reviewer:

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Project Overview

Project Name

Cela2a

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Cela2a* gene. The schematic diagram is as follows:



- The *Cela2a* gene has 3 transcripts. According to the structure of *Cela2a* gene, exon3-exon5 of *Cela2a-201* (ENSMUST00000102481.3) transcript is recommended as the knockout region. The region contains 364bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Cela2a* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, mice homozygous for a knock-out allele exhibit altered cardiac sympathovagal balance, reduced heart rate, and decreased cardiac output, stroke volume and heart ventricular size.
- The KO region contains functional region of the *Ctrc* gene. Knockout the region may affect the function of *Ctrc* gene.
- The *Cela2a* gene is located on the Chr4. 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)

Cela2a chymotrypsin-like elastase family, member 2A [*Mus musculus* (house mouse)]

Gene ID: 13706, updated on 12-Aug-2019

Summary

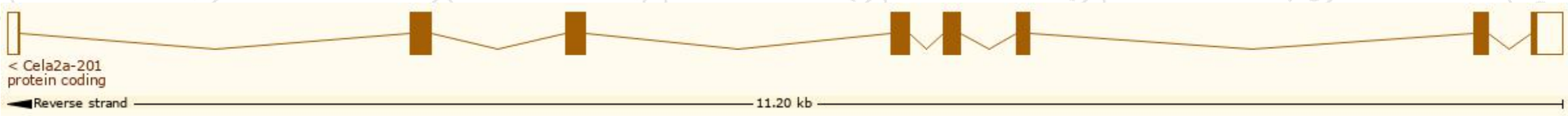
Official Symbol	Cela2a provided by MGI
Official Full Name	chymotrypsin-like elastase family, member 2A provided by MGI
Primary source	MGI:MGI:95316
See related	Ensembl:ENSMUSG00000058579
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Ela2; Ela-2; Ela2a
Summary	This gene encodes a serine protease enzyme that hydrolyzes elastin. This gene is highly expressed in the pancreatic acinar cells where the encoded preproprotein undergoes processing including signal peptide cleavage to generate an inactive zymogen. The removal of N-terminal activation peptide from the zymogen by trypsin generates active elastase enzyme. This gene is also expressed in the mouse epidermis where it participates in pro-filaggrin processing. [provided by RefSeq, Jul 2016]
Expression	Biased expression in small intestine adult (RPKM 15206.1), spleen adult (RPKM 7098.1) and 2 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

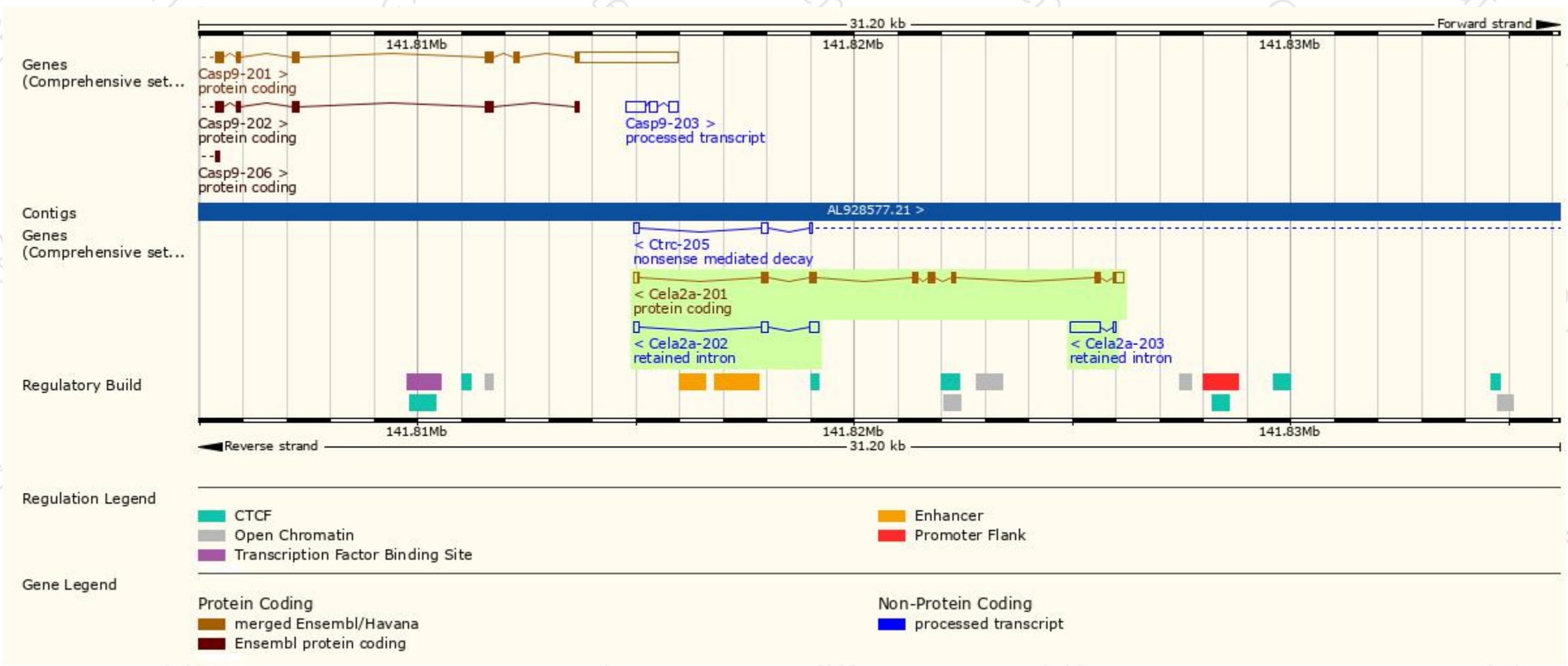
The gene has 3 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Cela2a-203	ENSMUST00000155826.1	732	No protein	Retained intron	-	-	TSL:1
Cela2a-202	ENSMUST00000127962.1	468	No protein	Retained intron	-	-	TSL:2
Cela2a-201	ENSMUST00000102481.3	1070	271aa	Protein coding	CCDS18884	P05208	TSL:1 GENCODE basic APPRIS P1

The strategy is based on the design of *Cela2a-201* transcript, the transcription is shown below:



Genomic location distribution

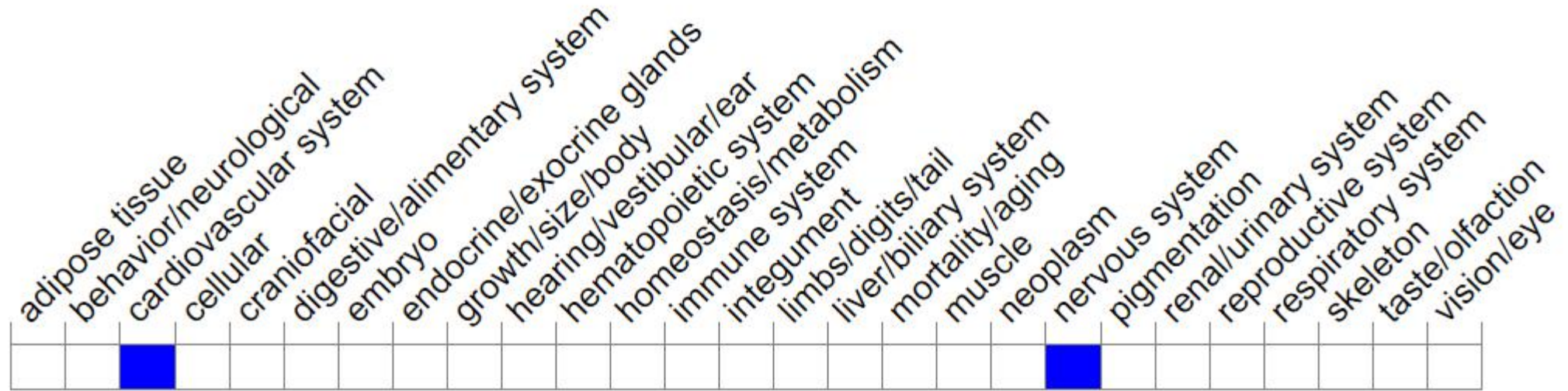


Protein domain



Mouse phenotype description(MGI)

Phenotype Overview ?



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

According to the existing MGI data, mice homozygous for a knock-out allele exhibit altered cardiac sympathovagal balance, reduced heart rate, and decreased cardiac output, stroke volume and heart ventricular size.

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

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