

# ***Fuca1*** Cas9-KO Strategy

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# Project Overview

**Project Name**

***Fuca1***

**Project type**

**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

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



- The *Fucal* gene has 5 transcripts. According to the structure of *Fucal* gene, exon2-exon5 of *Fucal*-201 (ENSMUST00000030434.4) transcript is recommended as the knockout region. The region contains 580bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Fucal* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Strain differences are probably due to a structural variant in *Fuca1*.  
Strains A/J, BDP, LP, P, SEA/Gn and 129/J have high FUCA activity and high heat stability; C57BL/6, C3H/He, DBA/2, BALB/c and 22 other strains have low activity and low heat stability.
- Transcript *Fuca1*-203 may not be affected.
- The N-terminal of *Fuca1* gene will remain several amino acids ,it may remain the partial function of *Fuca1* gene.
- The *Fuca1* 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)

## Fuca1 fucosidase, alpha-L- 1, tissue [ *Mus musculus* (house mouse) ]

Gene ID: 71665, updated on 12-Aug-2019

Summary

- Official Symbol** Fuca1 provided by [MGI](#)
- Official Full Name** fucosidase, alpha-L- 1, tissue provided by [MGI](#)
- Primary source** [MGI:MGI:95593](#)
- See related** [Ensembl:ENSMUSG00000028673](#)
- Gene type** protein coding
- RefSeq status** VALIDATED
- Organism** [Mus musculus](#)
- Lineage** Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
- Also known as** Afuc; Fuca; 0610006A03Rik; 9530055J05Rik
- Expression** Ubiquitous expression in colon adult (RPKM 71.1), kidney adult (RPKM 50.6) and 28 other tissues [See more](#)
- Orthologs** [human](#) [all](#)

Genomic context

Location: 4 D3; 4 68.01 cM

See Fuca1 in [Genome Data Viewer](#)

Exon count: 8

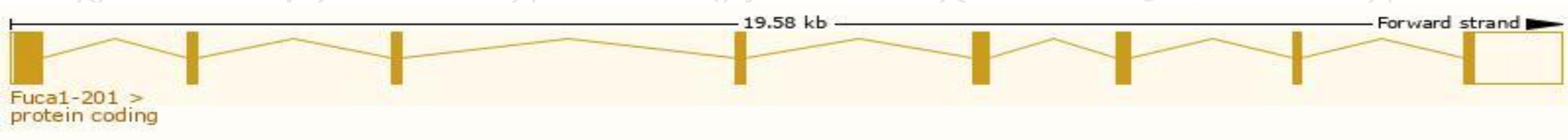
Annotation release	Status	Assembly	Chr	Location
<a href="#">108</a>	current	GRCm38.p6 ( <a href="#">GCF_000001635.26</a> )	4	NC_000070.6 (135920726..135940300)
Build 37.2	previous assembly	MGSCv37 ( <a href="#">GCF_000001635.18</a> )	4	NC_000070.5 (135476641..135496215)

# Transcript information (Ensembl)

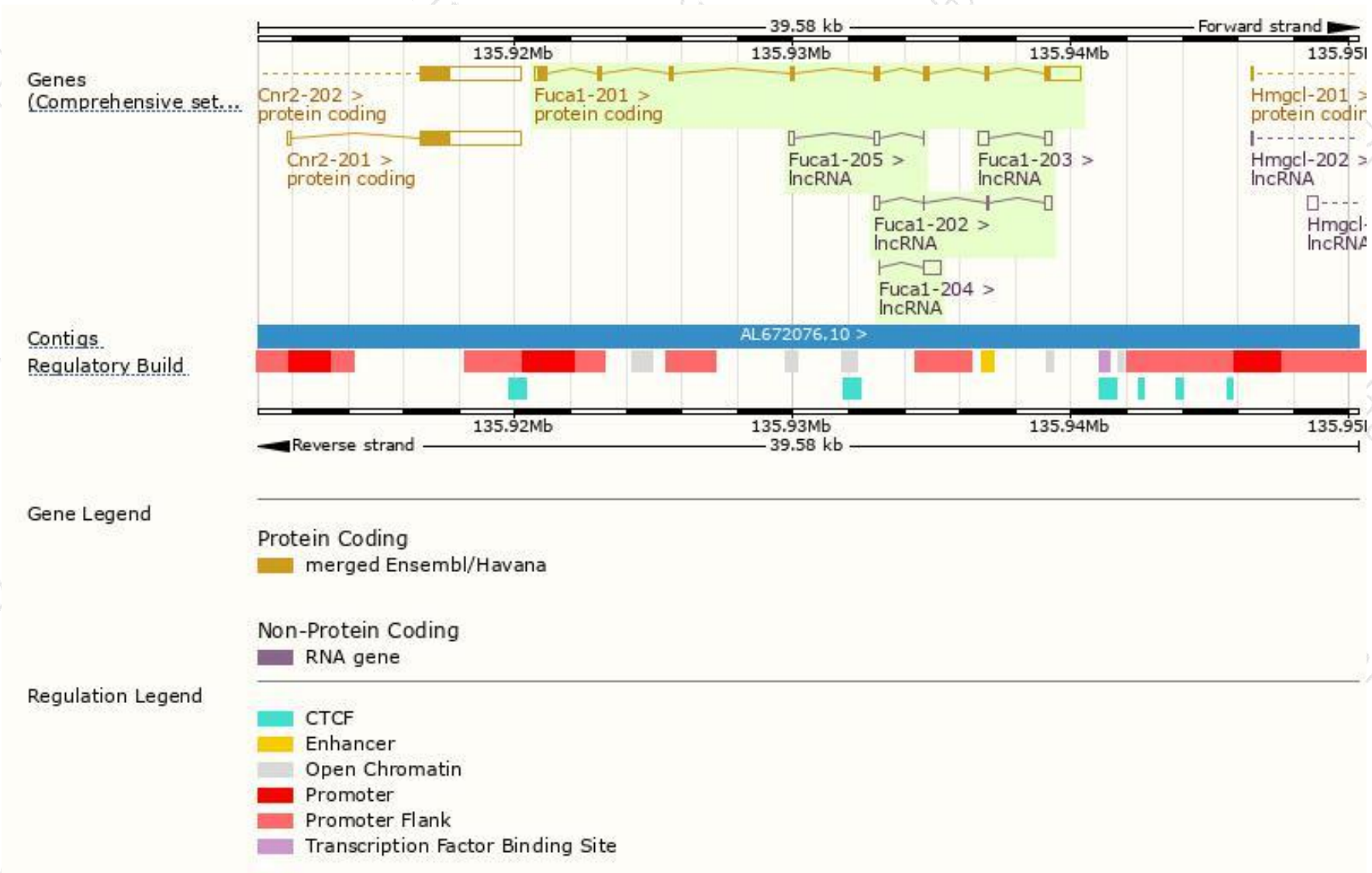
The gene has 5 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Fuca1-201	<a href="#">ENSMUST00000030434.4</a>	2525	<a href="#">452aa</a>	Protein coding	<a href="#">CCDS18794</a>	<a href="#">Q99LJ1</a>	TSL:1 GENCODE basic APPRIS P1
Fuca1-204	<a href="#">ENSMUST00000146290.1</a>	628	No protein	lncRNA	-	-	TSL:2
Fuca1-203	<a href="#">ENSMUST00000142111.1</a>	595	No protein	lncRNA	-	-	TSL:2
Fuca1-202	<a href="#">ENSMUST00000142033.7</a>	436	No protein	lncRNA	-	-	TSL:2
Fuca1-205	<a href="#">ENSMUST00000153592.1</a>	401	No protein	lncRNA	-	-	TSL:2

The strategy is based on the design of *Fuca1-201* transcript,The transcription is shown below

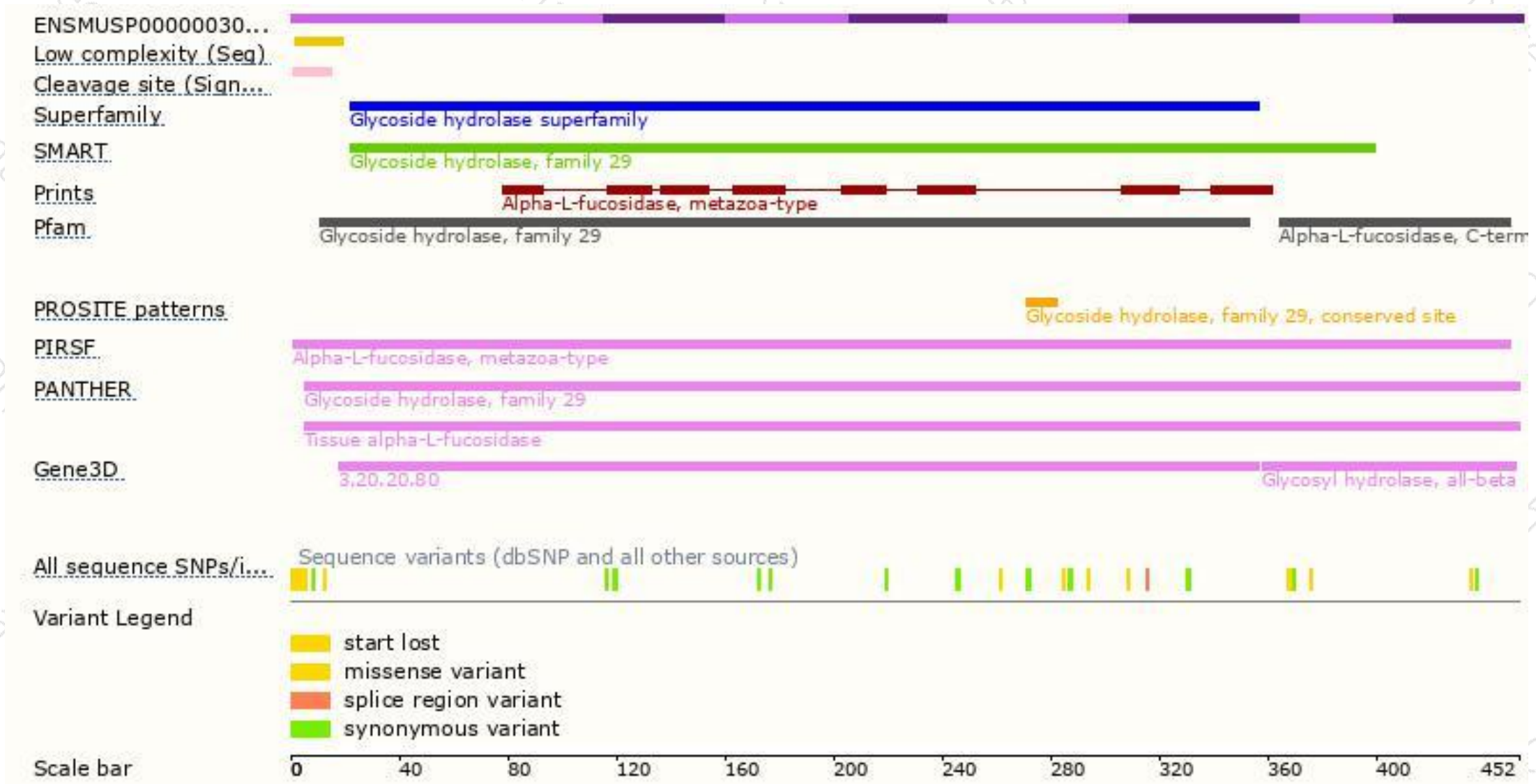


# Genomic location distribution

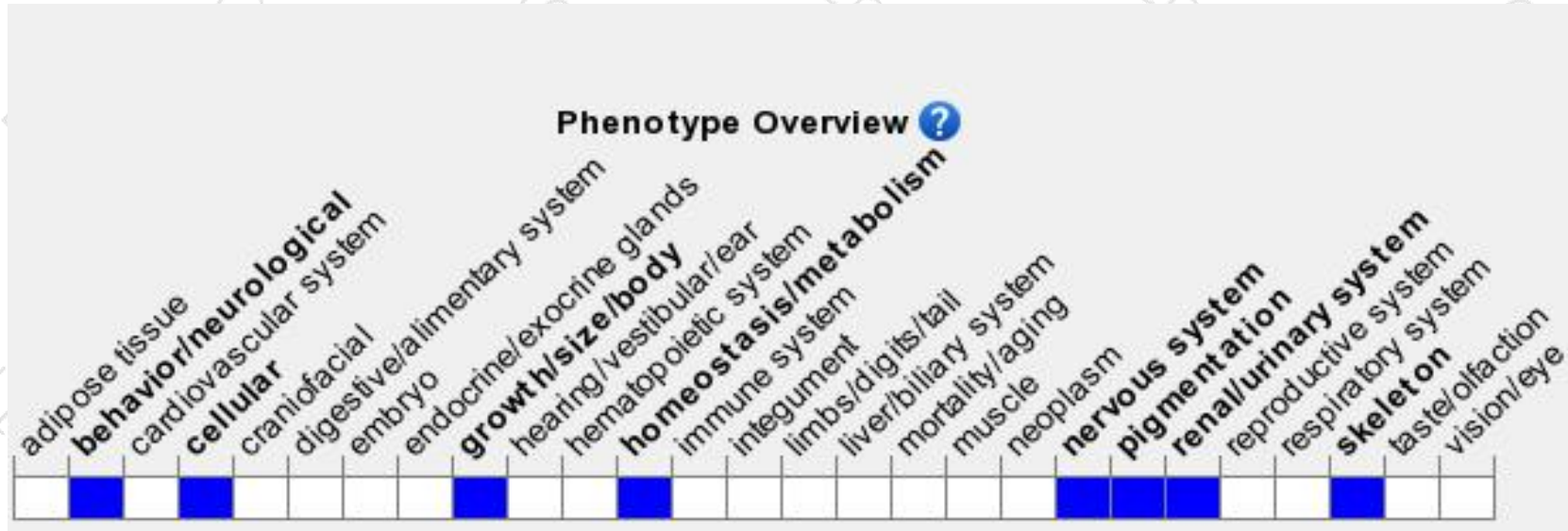




# Protein domain



# Mouse phenotype description(MGI )



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

According to the existing MGI data, Strain differences are probably due to a structural variant in *Fuca1*. Strains A/J, BDP, LP, P, SEA/Gn and 129/J have high *FUCA* activity and high heat stability; C57BL/6, C3H/He, DBA/2, BALB/c and 22 other strains have low activity and low heat stability.

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

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