Shc1 Cas9-KO Strategy

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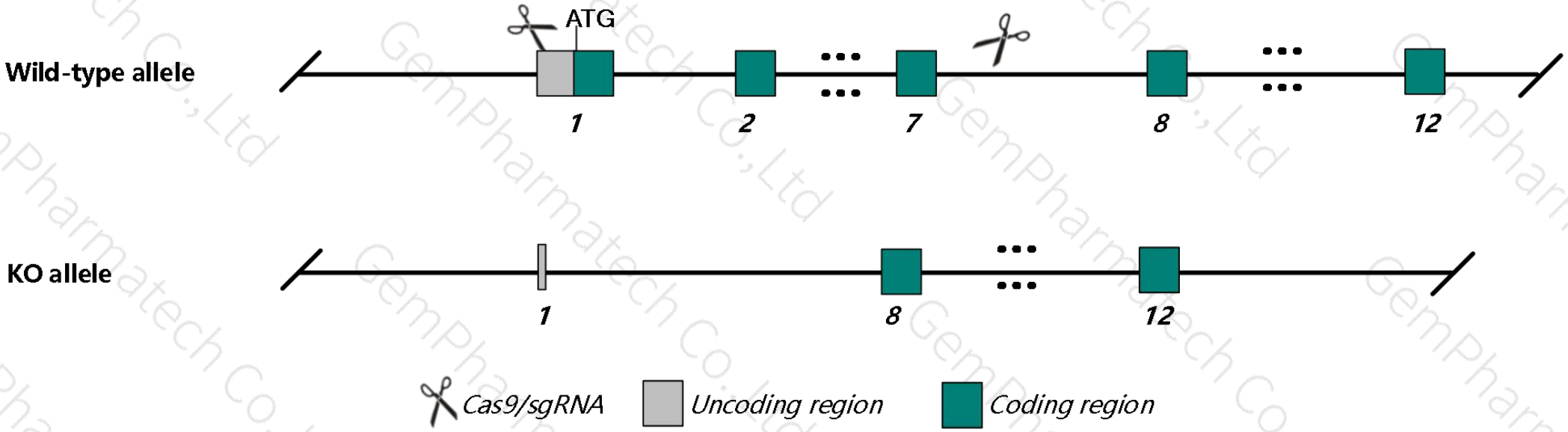
Project Overview

Project Name	***Shc1***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Shc1* gene. The schematic diagram is as follows:



Technical routes

➢ The *Shc1* gene has 10 transcripts. According to the structure of *Shc1* gene, exon1-exon7 of *Shc1-202*(ENSMUST00000094378.9) transcript is recommended as the knockout region.The region contains start codon ATG.Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Shc1* gene. The brief process is as follows: CRISPR/Cas9 system were microinjected into the fertilized eggs of C57BL/6JGpt mice.Fertilized eggs were transplanted to obtain positive F0 mice which were confirmed by PCR and sequencing. A stable F1 generation mouse model was obtained by mating positive F0 generation mice with C57BL/6JGpt mice.

Notice

➢ According to the existing MGI data,homozygotes with a targeted mutation of the exon encoding the CH2 region show an extended life span, reduced cellular sensitivity to oxidative stress and UV irradiation, and resistance to diet-induced atherogenesis. Homozygotes lacking all three isoformsdie around E11.5 with cardiovascular defects.

➢ The distance between *Cks1b* and *Shc1-202* is about 3kb, and the 5-terminal regulation of *Cks1b* may be affect.

➢ The *Shc1* gene is located on the Chr3. 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）

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Shc1 src homology 2 domain-containing transforming protein C1 [*Mus musculus* (house mouse)]

Gene ID: 20416, updated on 6-Sep-2020

Summary

Official Symbol	Shc1 provided by MGI
Official Full Name	src homology 2 domain-containing transforming protein C1 provided by MGI
Primary source	MGI:MGI:98296
See related	Ensembl:ENSMUSG00000042626
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	Sh; p6; Shc; p66; ShcA; p66s; p66shc
Expression	Ubiquitous expression in subcutaneous fat pad adult (RPKM 33.0), ovary adult (RPKM 32.1) and 28 other tissues See more
Orthologs	human all

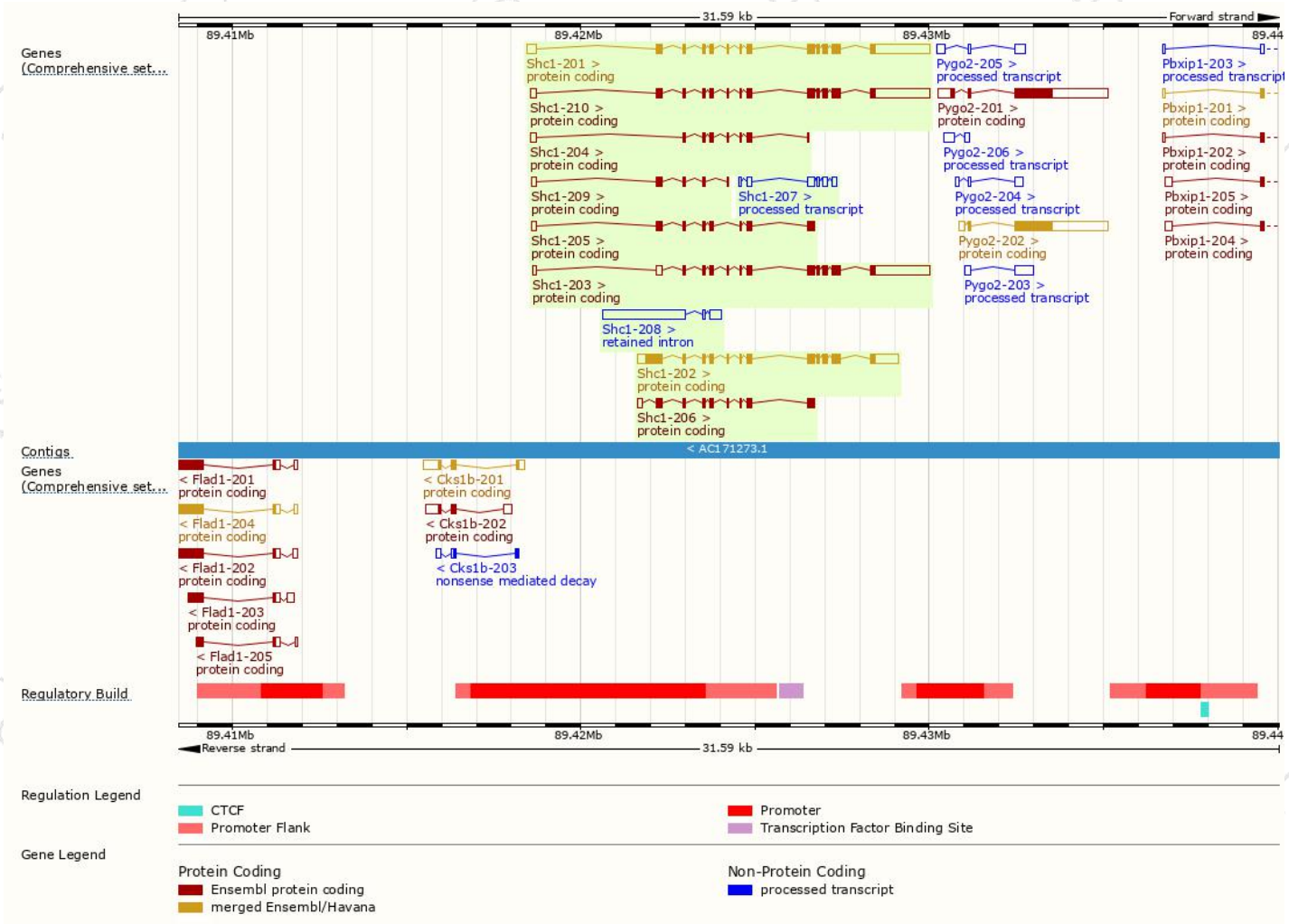
Transcript information（Ensembl）

The gene has 10 transcripts,all transcripts are shown below:

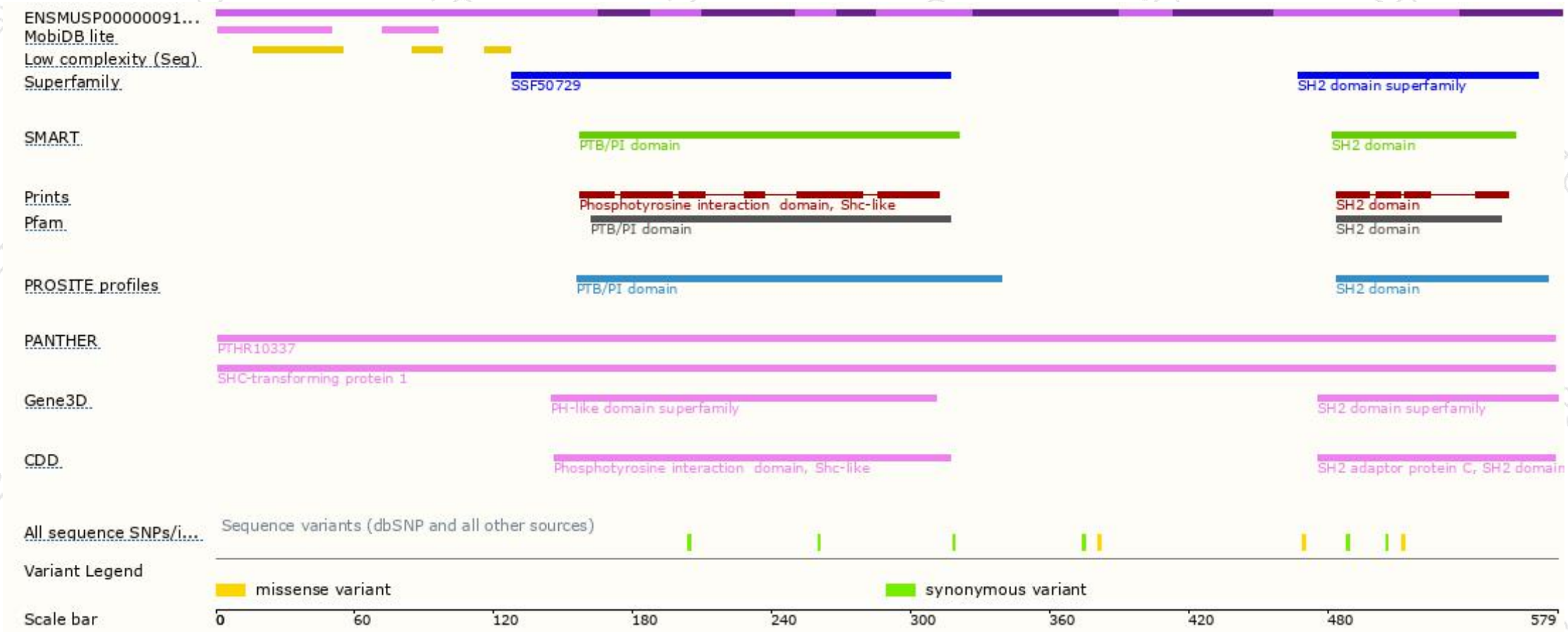
Name	Transcript ID	bp	Protein ▲	Biotype	CCDS	UniProt	Flags
Shc1-209	ENSMUST00000154791.7	497	118aa	Protein coding	-	D3YXZ9	CDS 3' incomplete TSL:3
Shc1-204	ENSMUST00000125036.7	679	172aa	Protein coding	-	D3YZV5	CDS 3' incomplete TSL:3
Shc1-205	ENSMUST00000128238.7	906	262aa	Protein coding	-	D3Z2I8	CDS 3' incomplete TSL:3
Shc1-206	ENSMUST00000137793.1	951	280aa	Protein coding	-	D3Z5U6	CDS 3' incomplete TSL:3
Shc1-203	ENSMUST00000107417.8	3079	424aa	Protein coding	-	P98083	TSL:1 GENCODE basic
Shc1-201	ENSMUST00000039110.11	3250	469aa	Protein coding	CCDS17508	P98083	TSL:1 GENCODE basic APPRIS P3
Shc1-210	ENSMUST00000191485.6	3154	469aa	Protein coding	CCDS17508	P98083	TSL:1 GENCODE basic APPRIS P3
Shc1-202	ENSMUST00000094378.9	2617	579aa	Protein coding	CCDS50962	P98083	TSL:1 GENCODE basic APPRIS ALT1
Shc1-207	ENSMUST00000146306.1	748	No protein	Processed transcript	-	-	TSL:3
Shc1-208	ENSMUST00000153334.1	2775	No protein	Retained intron	-	-	TSL:1

The strategy is based on the design of *Shc1-202* transcript,the transcription is shown below:

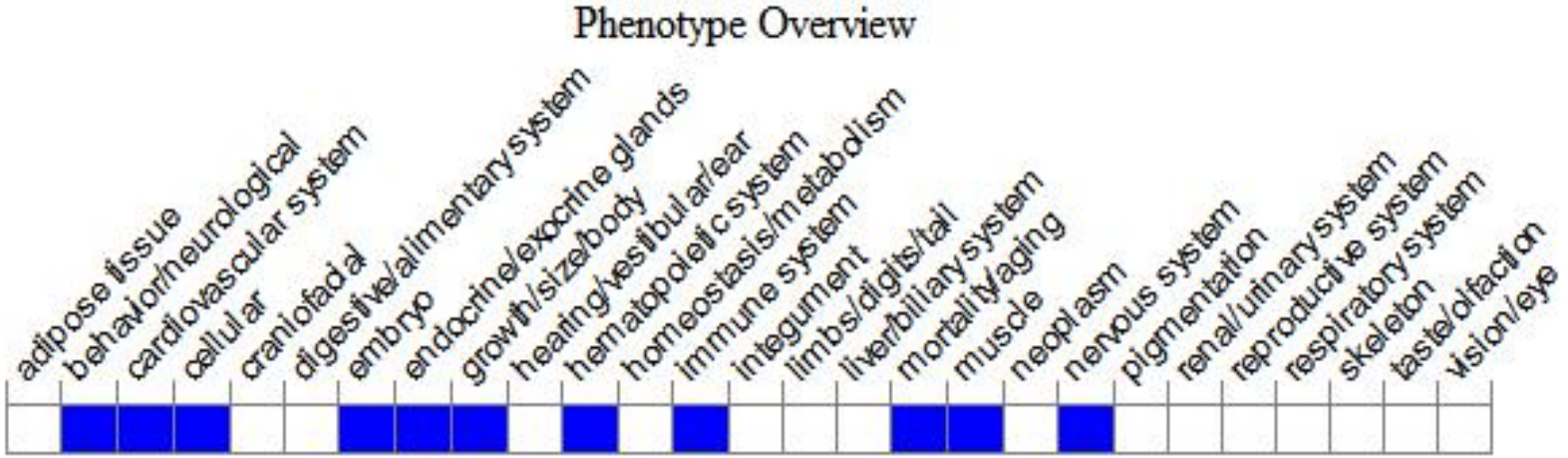
Genomic location distribution



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/).

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

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