Slc5a1 Cas9-KO Strategy

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Reviewer: Miaomiao Cui

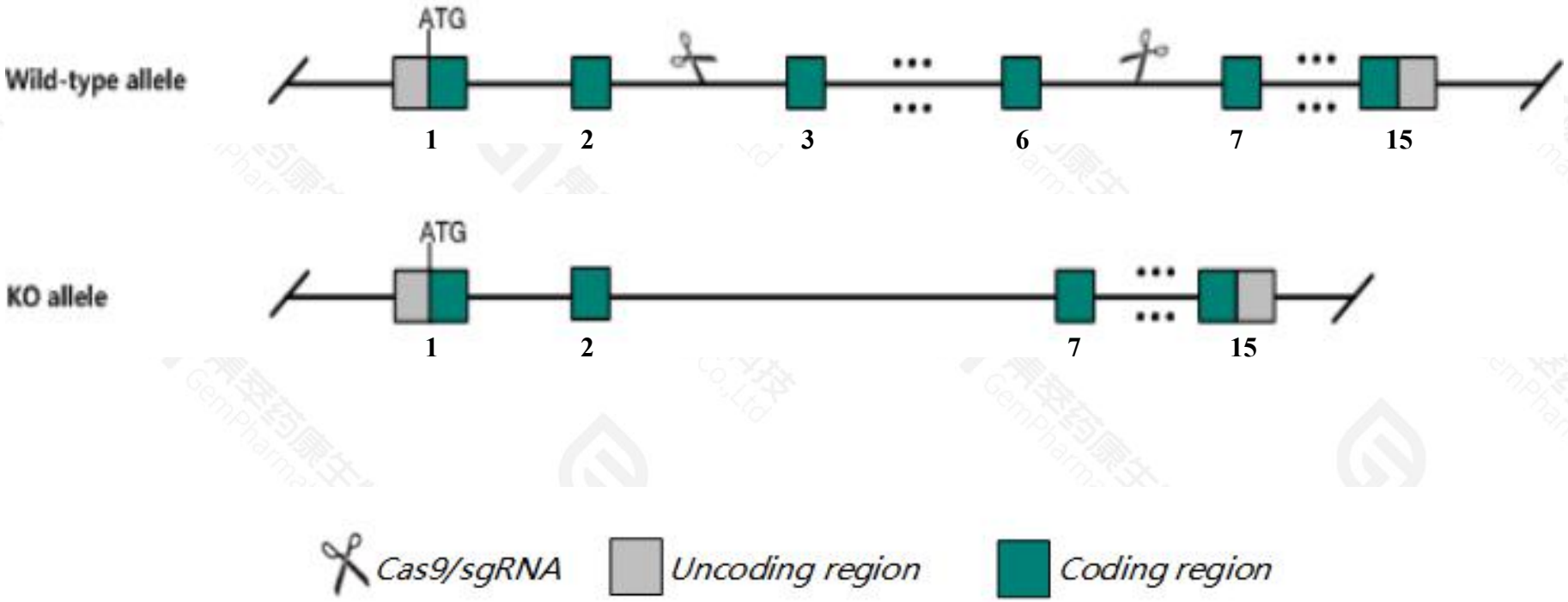
Design Date: 2021-5-26

Project Overview

Project Name	***Slc5a1***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Slc5a1* gene. The schematic diagram is as follows:



Technical routes

➢ The *Slc5a1* gene has 1 transcript. According to the structure of *Slc5a1* gene, exon3-exon6 of *Slc5a1-201*(ENSMUST00000011178.5) transcript is recommended as the knockout region.The region contains 376bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Slc5a1* gene. The brief process is as follows: sgRNA was transcribed in vitro.Cas9 and sgRNA 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

➢ *5033423K11Rik* gene will be deleted.

➢ According to the existing MGI data,mice homozygous for a knock-out allele exhibit lethality unless maintained on a glucose-galatose-free diet, distended intestine, impaired glucose transport across the brush border membrane and impaired renal glucose reabsorption.

➢ The *Slc5a1* gene is located on the Chr5. 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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Slc5a1 solute carrier family 5 (sodium/glucose cotransporter), member 1 [Mus musculus (house mouse)]

Gene ID: 20537, updated on 23-Feb-2021

Summary

Official Symbol	Slc5a1 provided by MGI
Official Full Name	solute carrier family 5 (sodium/glucose cotransporter), member 1 provided byMGI
Primary source	MGI:MGI:107678
See related	Ensembl:ENSMUSG00000011034
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	Sgl, Sglt1
Expression	Biased expression in duodenum adult (RPKM 227.7), small intestine adult (RPKM 214.0) and 3 other tissuesSee more
Orthologs	human all

Transcript information（Ensembl）

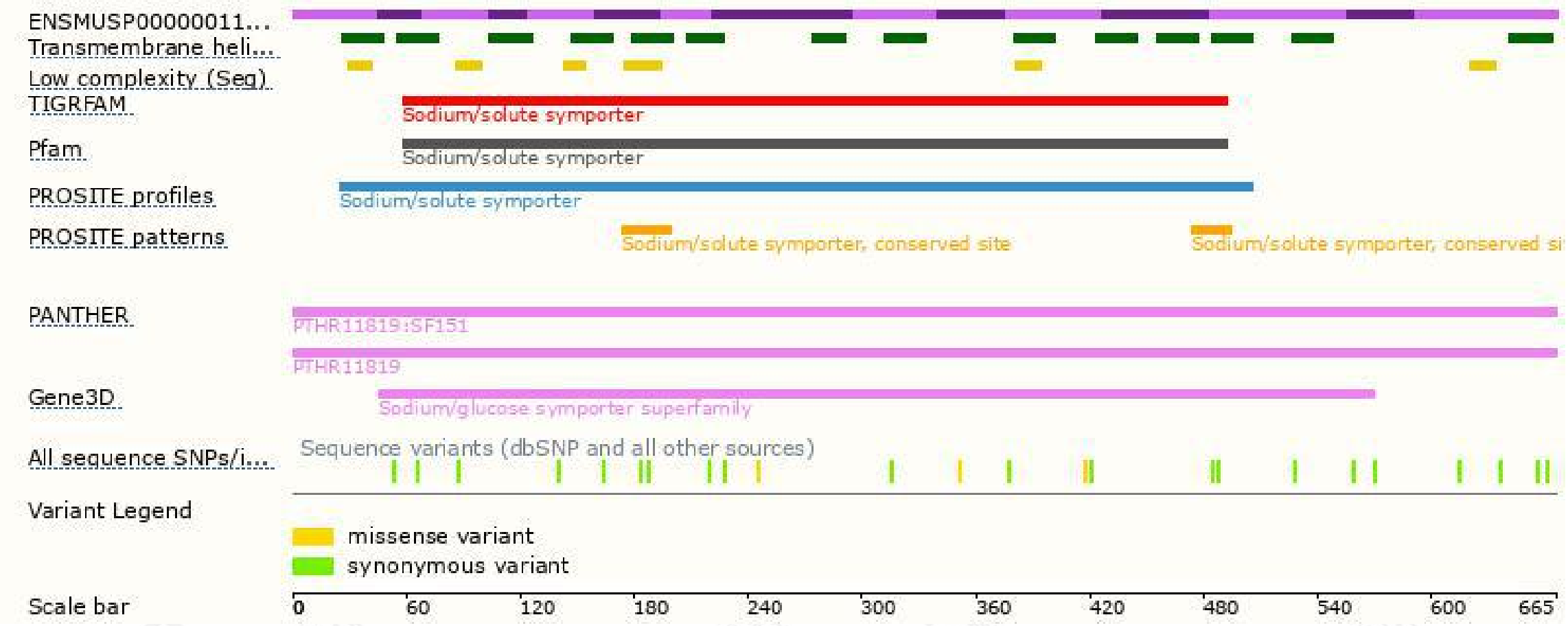
The gene has 1 transcript,and the transcript is shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Slc5a1-201	ENSMUST00000011178.5	4104	665aa	Protein coding	CCDS19199		TSL:1 , GENCODE basic , APPRIS P1 ,

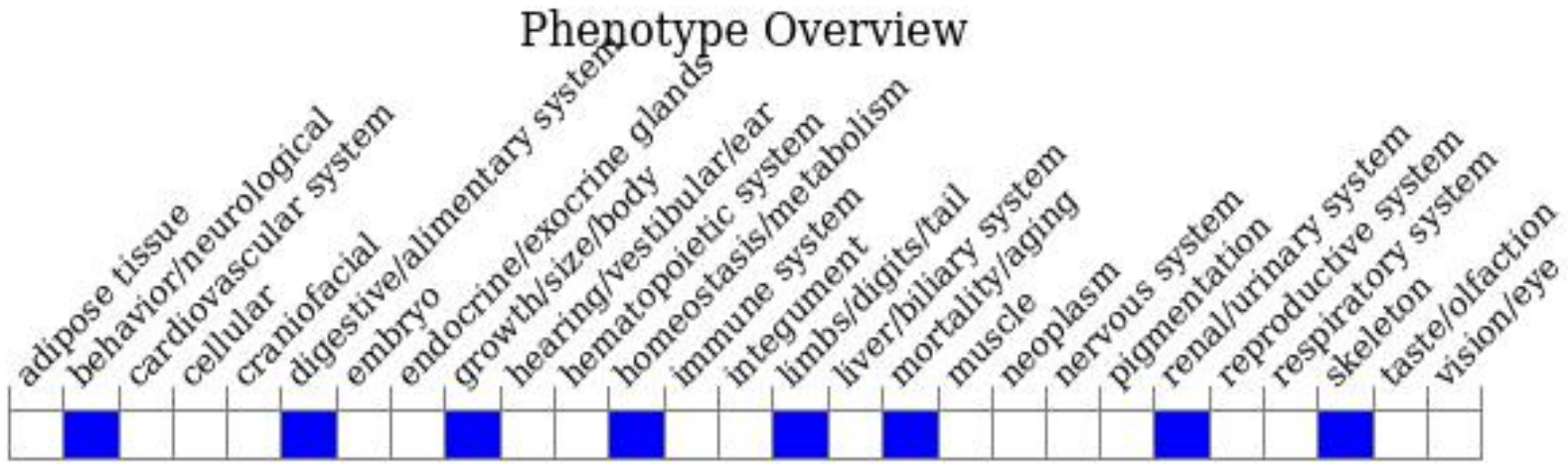
The strategy is based on the design of *Slc5a1-201* transcript,the transcription is shown below:

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,mice homozygous for a knock-out allele exhibit lethality unless maintained on a glucose-galatose-free diet, distended intestine, impaired glucose transport across the brush border membrane and impaired renal glucose reabsorption.

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

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