GemPharmatech™

Irs2 Cas9-CKO Strategy

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Design Date: 2024-1-9

Overview

Target Gene Name

- Irs2

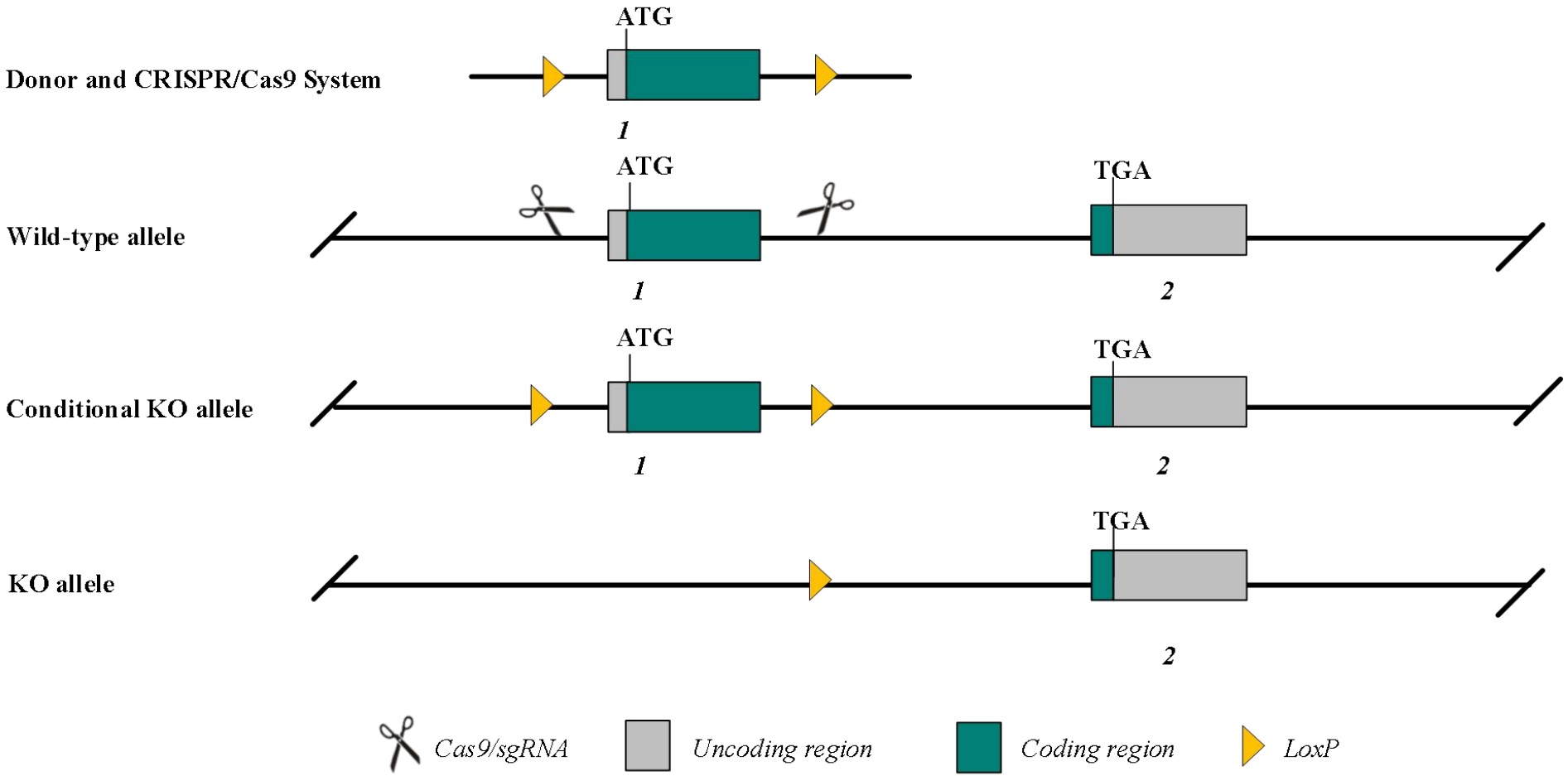
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Irs2* gene.

Technical Information

- The *Irs2* gene has 1 transcript. According to the structure of *Irs2* gene, exon 1 of *Irs2*-201 (ENSMUST00000040514.8) transcript is recommended as the knockout region. The region contains start codon ATG. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Irs2* gene. The brief process is as follows: CRISPR-Cas9 system and Donor 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 on-target amplicon sequencing. A stable F1-generation mouse strain was obtained by mating positive F0-generation mice with C57BL/6JGpt mice and confirmation of the desired mutant allele was carried out by PCR and on-target amplicon sequencing.
- The flox mice will be knocked out after mating with mice expressing Cre recombinase, resulting in the loss of function of the target gene in specific tissues and cell types.

Gene Information

Irs2 insulin receptor substrate 2 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 384783, updated on 12-Dec-2023

Summary

Official Symbol	Irs2 provided by MGI
Official Full Name	insulin receptor substrate 2 provided by MGI
Primary source	MGI:MGI:109334
See related	Ensembl:ENSMUSG00000038894 AllianceGenome:MGI:109334
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	Irs-2
Summary	Enables phosphatidylinositol 3-kinase binding activity and protein kinase binding activity. Involved in several processes, including negative regulation of B cell apoptotic process; positive regulation of B cell proliferation; and positive regulation of insulin secretion. Acts upstream of or within several processes, including animal organ development; insulin receptor signaling pathway; and positive regulation of mesenchymal cell proliferation. Located in cytosol and plasma membrane. Part of protein-containing complex. Is expressed in several structures, including brain ventricular layer; hindlimb digit skin; jaw; metanephros; and thymus primordium. Used to study type 2 diabetes mellitus. Human ortholog(s) of this gene implicated in type 2 diabetes mellitus. Orthologous to human IRS2 (insulin receptor substrate 2). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in small intestine adult (RPKM 23.9), mammary gland adult (RPKM 19.4) and 28 other tissues See more
Orthologs	human all

NEW **Try the new Gene table**
Try the new Transcript table

Source: https://www.ncbi.nlm.nih.gov/

Transcript Information

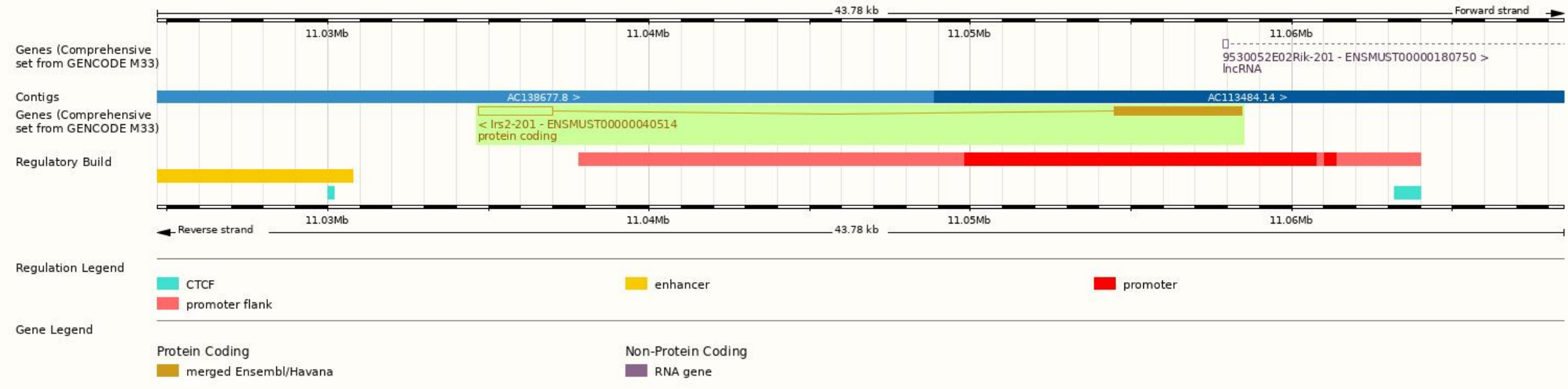
The gene has 1 transcript,and the transcript is shown below:

Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags			
ENSMUST00000040514.8	Irs2-201	6323	1321aa	Protein coding	CCDS52477	P81122	Ensembl Canonical	GENCODE basic	APPRIS P1	TSL:1

The strategy is based on the design of *Irs2*-201 transcript, the transcription is shown below:

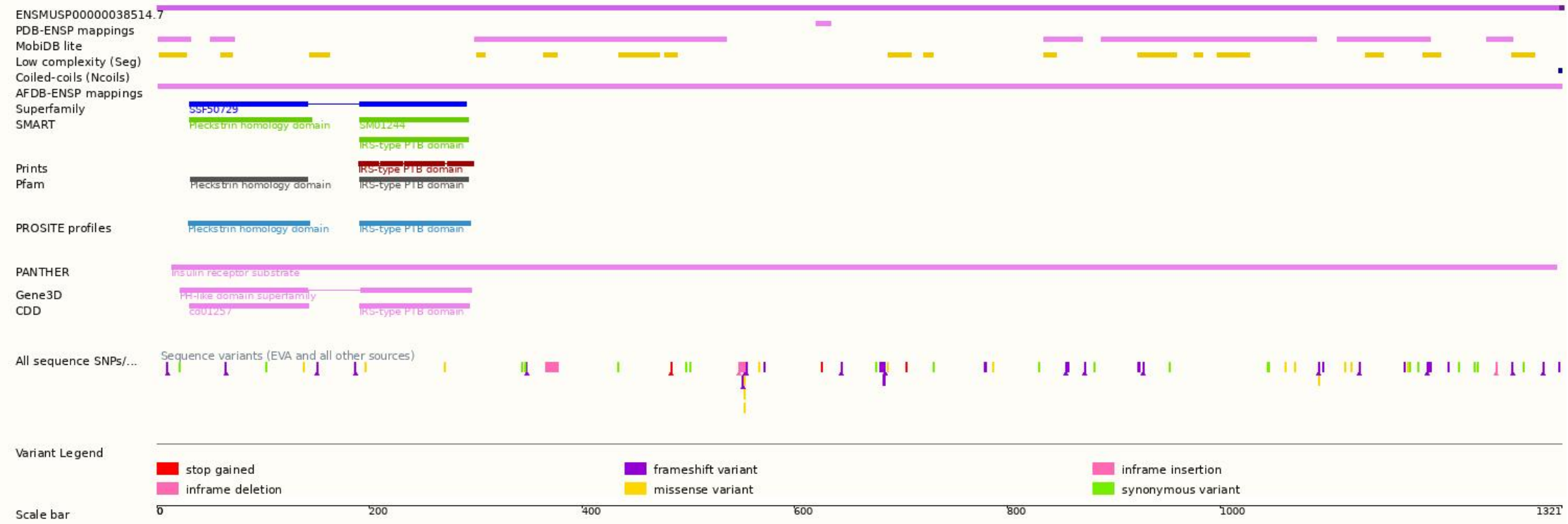
Source: https://www.ensembl.org

Genomic Information



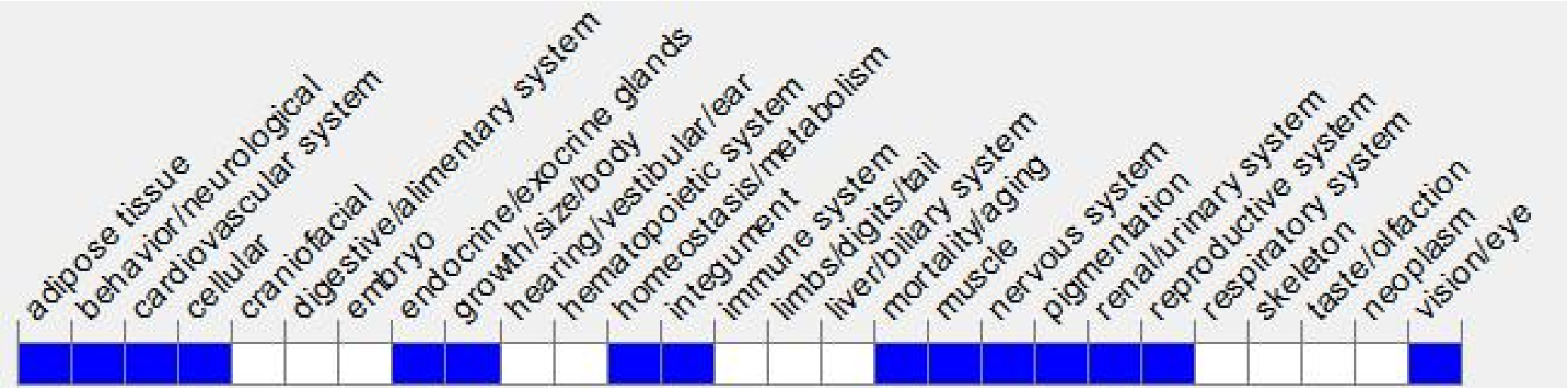
Source: : https://www.ensembl.org

Protein Information



Source: : https://www.ensembl.org

Mouse Phenotype Information (MGI)



- Homozygous disruption of this gene results in type 2 diabetes due to insulin resistance and pancreatic beta cell dysfunction, causes defects in leptin action, energy balance, lipid homeostasis and vascular wound healing, and leads to female infertility due to hypothalamic and ovarian dysfunction.

Source: https://www.informatics.jax.org

Important Information

- According to the existing MGI data, *Irs2* knockout homozygous mice died.
- The knockout region of this strategy contains the overlapping gene 9530052E02Rik (IncRNA), and its effect on it is unknown.
- *Irs2* is located on Chr8. If the knockout mice are crossed with other mouse strains to obtain double homozygous mutant offspring, please avoid the situation that the second gene is 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.