GemPharmatech™

Abcd3 Cas9-CKO Strategy

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Reviewer: Xingkai Xiao

Design Date: 2024-10-15

Overview

Target Gene Name

- *Abcd3*

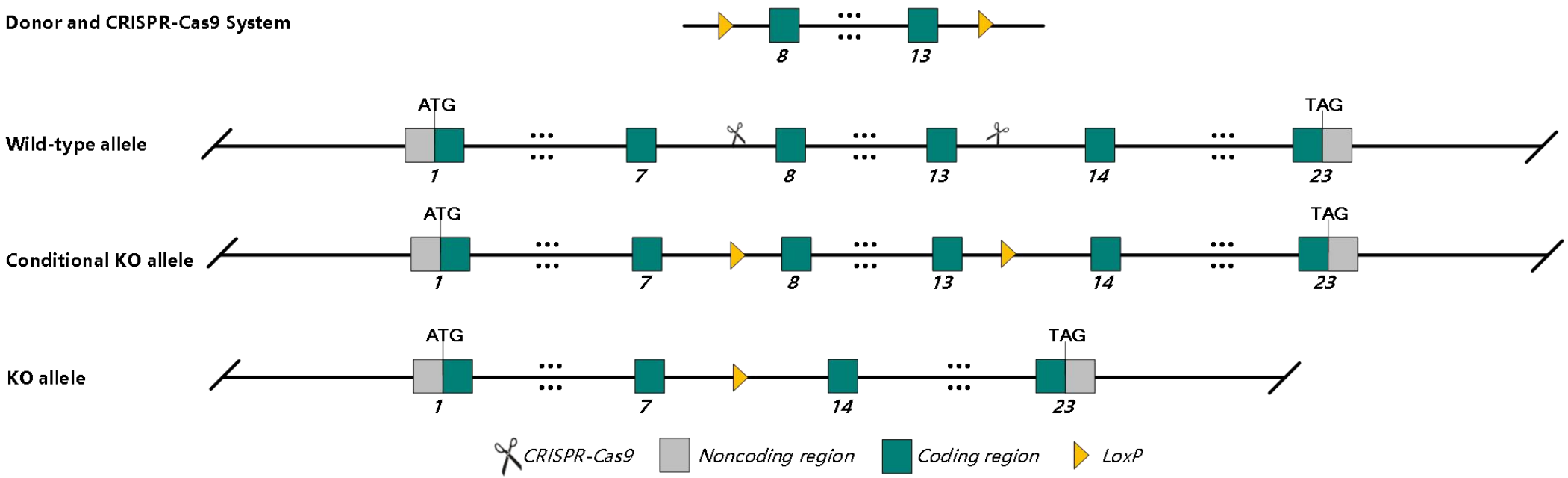
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy

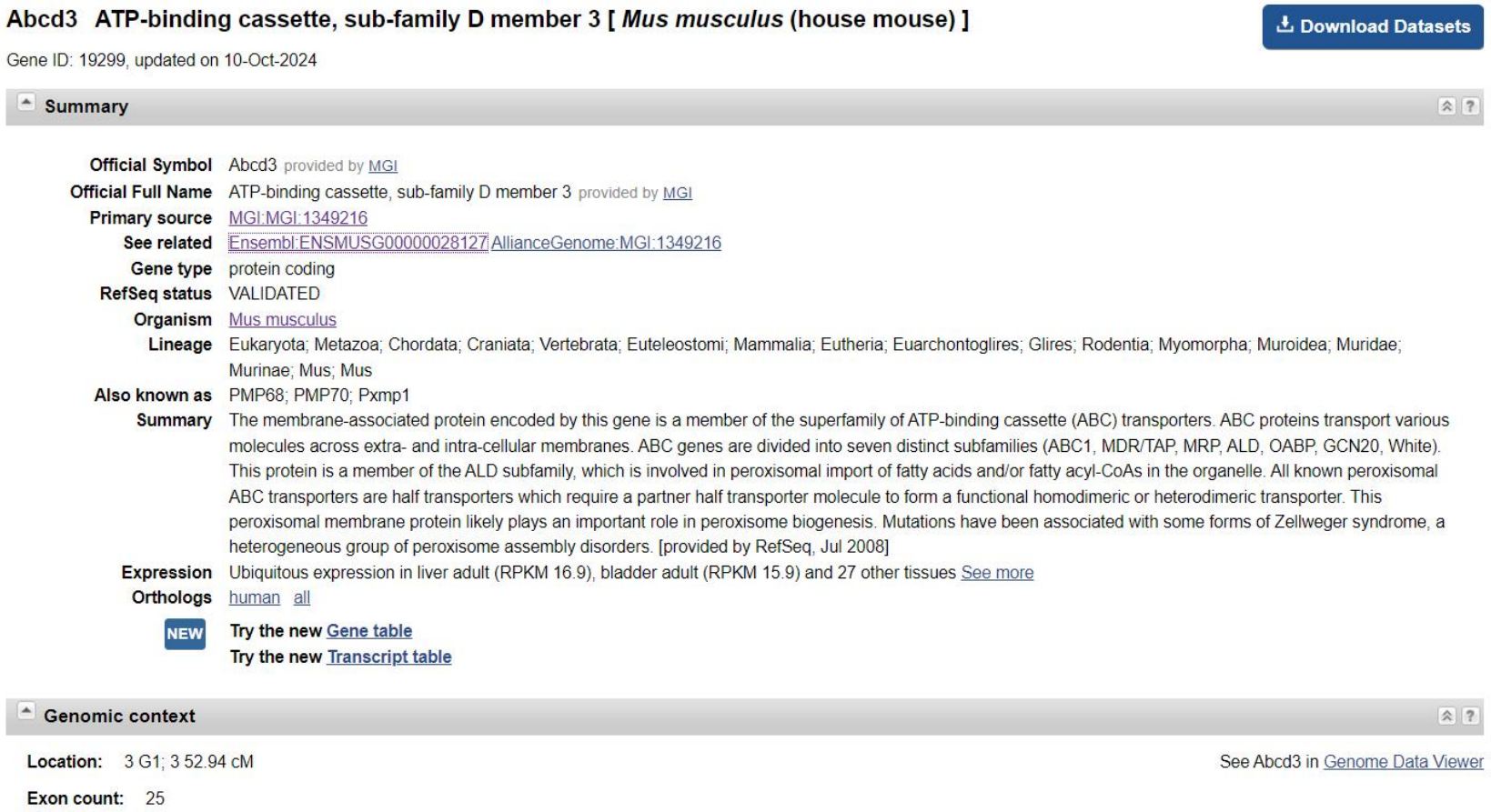


Schematic representation of CRISPR-Cas9 engineering used to edit the *Abcd3* gene.

Technical Information

- The *Abcd3* gene has 6 transcripts. According to the structure of *Abcd3* gene, exon 8-13 of *Abcd3*-201 (ENSMUST00000029770.8) is recommended as the knockout region. The region contains 530 bp of coding sequence. Knocking out the region will result in disruption of gene function.
- In this project we use CRISPR-Cas9 technology to modify *Abcd3* 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



Abcd3 ATP-binding cassette, sub-family D member 3 [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 19299, updated on 10-Oct-2024

Summary

Official Symbol	Abcd3 provided by MGI
Official Full Name	ATP-binding cassette, sub-family D member 3 provided by MGI
Primary source	MGI:MGI:1349216
See related	Ensembl:ENSMUSG00000028127 AllianceGenome:MGI:1349216
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	PMP68; PMP70; Pxmp1
Summary	The membrane-associated protein encoded by this gene is a member of the superfamily of ATP-binding cassette (ABC) transporters. ABC proteins transport various molecules across extra- and intra-cellular membranes. ABC genes are divided into seven distinct subfamilies (ABC1, MDR/TAP, MRP, ALD, OABP, GCN20, White). This protein is a member of the ALD subfamily, which is involved in peroxisomal import of fatty acids and/or fatty acyl-CoAs in the organelle. All known peroxisomal ABC transporters are half transporters which require a partner half transporter molecule to form a functional homodimeric or heterodimeric transporter. This peroxisomal membrane protein likely plays an important role in peroxisome biogenesis. Mutations have been associated with some forms of Zellweger syndrome, a heterogeneous group of peroxisome assembly disorders. [provided by RefSeq, Jul 2008]
Expression	Ubiquitous expression in liver adult (RPKM 16.9), bladder adult (RPKM 15.9) and 27 other tissues See more
Orthologs	human all

NEW **Try the new Gene table**

Try the new Transcript table

Genomic context

Location: 3 G1; 3 52.94 cM

See Abcd3 in Genome Data Viewer

Exon count: 25

https://www.ncbi.nlm.nih.gov/gene/19299

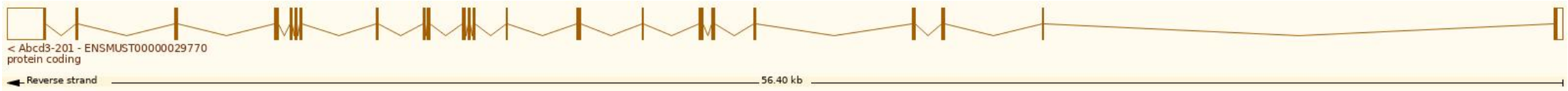
Transcript Information

The gene has 6 transcripts, all transcripts are shown below:

Show/hide columns (1 hidden) Filter

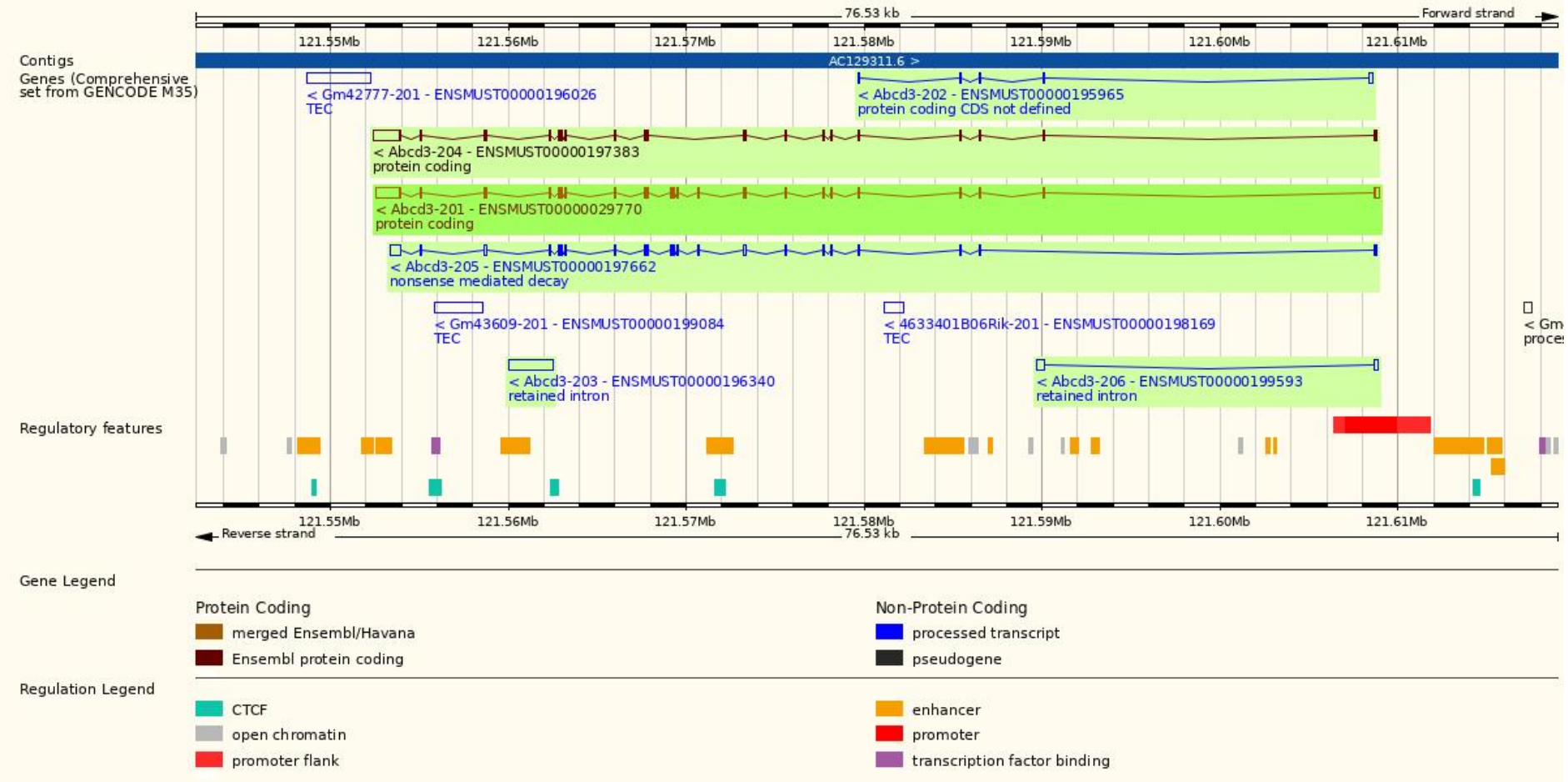
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000029770.8	Abcd3-201	3489	659aa	Protein coding	CCDS17806	P55096	Ensembl Canonical, GENCODE basic, APPRIS P1, TSL:1
ENSMUST00000197383.5	Abcd3-204	3156	549aa	Protein coding		A0A0G2JDI9	GENCODE basic, TSL:5
ENSMUST00000197662.5	Abcd3-205	2467	58aa	Nonsense mediated decay		A0A0G2JGA4	TSL:5
ENSMUST00000195965.2	Abcd3-202	478	No protein	Protein coding CDS not defined		-	TSL:5
ENSMUST00000196340.2	Abcd3-203	2489	No protein	Retained intron		-	TSL:NA
ENSMUST00000199593.2	Abcd3-206	638	No protein	Retained intron		-	TSL:1

The strategy is based on the design of *Abcd3*-201 transcript, the transcription is shown below:



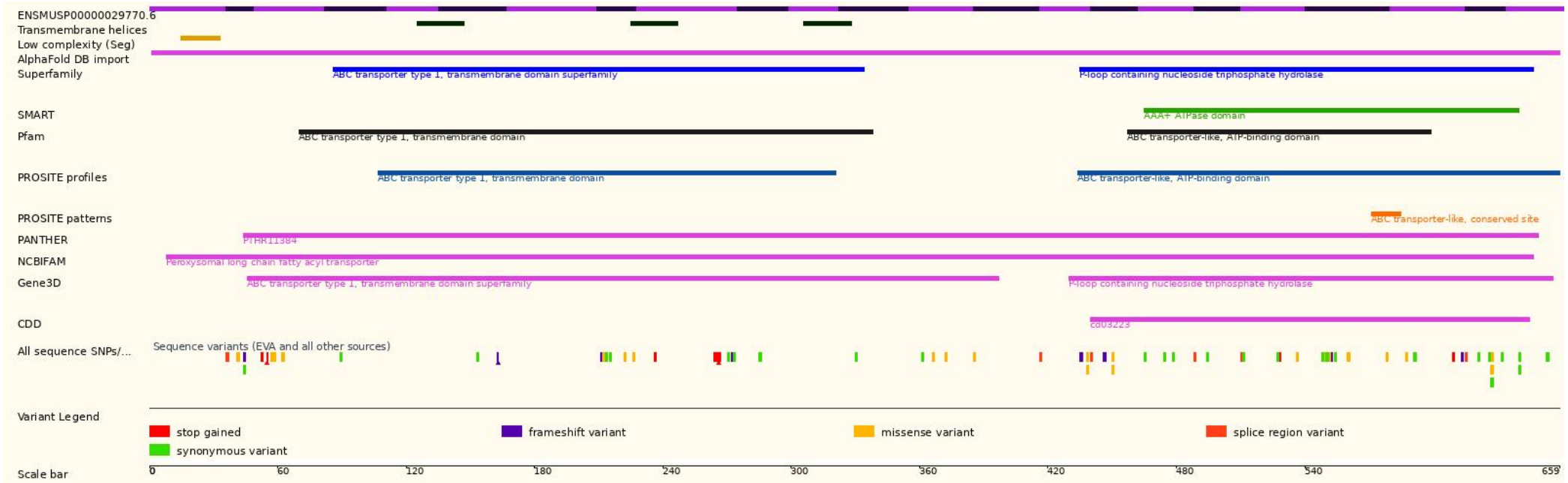
Source: http://asia.ensembl.org/

Genomic Information



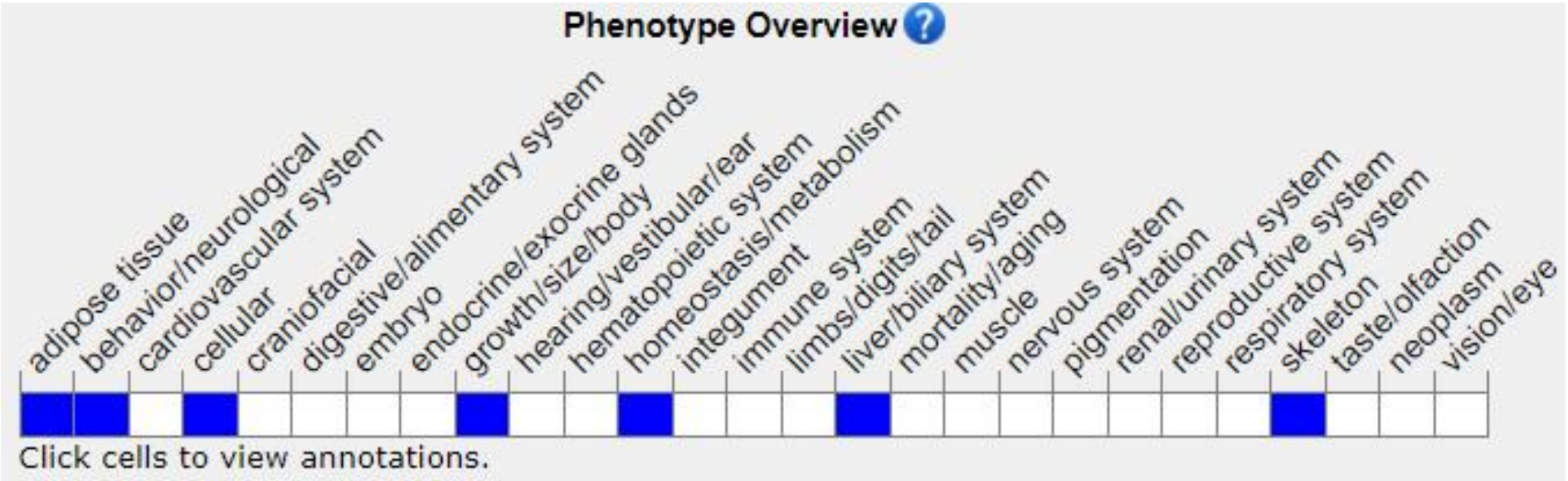
Source: http://asia.ensembl.org/

Protein Information



Source: https://www.ensembl.org

Mouse Phenotype Information (MGI)



Mice homozygous for a null mutation show enlarged livers, abnormal bile composition and peroxisome abnormalities.

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

Important Information

- According to the existing MGI data, mice homozygous for a null mutation show enlarged livers, abnormal bile composition and peroxisome abnormalities.
- *Abcd3* is located on Chr 3. 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.