

Eif2ak3 Cas9-KO Strategy

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Reviewer:

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Project Overview

Project Name

Eif2ak3

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Eif2ak3* gene. The schematic diagram is as follows:



- The *Eif2ak3* gene has 5 transcripts. According to the structure of *Eif2ak3* gene, exon2 of *Eif2ak3-201* (ENSMUST00000034093.14) transcript is recommended as the knockout region. The region contains 130bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Eif2ak3* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Homozygous mutant mice develop exocrine pancreatic insufficiency and progressive diabetes mellitus. They are growth retarded, hyperglycemic, exhibit increased cell death in the pancreas, have decreased numbers of pancreatic beta cells and about half die before weaning.
- Knockout the region may affect the 5 terminal regulation function of *Gm23346* gene.
- The *Eif2ak3* gene is located on the Chr6. 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)

Elf2ak3 eukaryotic translation initiation factor 2 alpha kinase 3 [*Mus musculus* (house mouse)]

Gene ID: 13666, updated on 13-Aug-2019

Summary

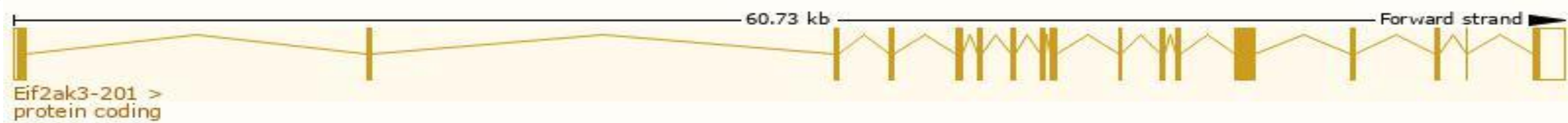
Official Symbol	Elf2ak3 provided by MGI
Official Full Name	eukaryotic translation initiation factor 2 alpha kinase 3 provided by MGI
Primary source	MGI:MGI:1341830
See related	Ensembl:ENSMUSG000000031668
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Pek; Perk
Summary	The protein encoded by this gene phosphorylates the alpha subunit of eukaryotic translation-initiation factor 2, leading to its inactivation, and thus to a rapid reduction of translational initiation and repression of global protein synthesis. This protein is thought to modulate mitochondrial function. It is a type I membrane protein located in the endoplasmic reticulum (ER), where it is induced by ER stress caused by malformed proteins. Mutations in a similar gene in human are associated with Wolcott-Rallison syndrome. [provided by RefSeq, Sep 2015]
Expression	Ubiquitous expression in placenta adult (RPKM 10.8), colon adult (RPKM 7.9) and 28 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

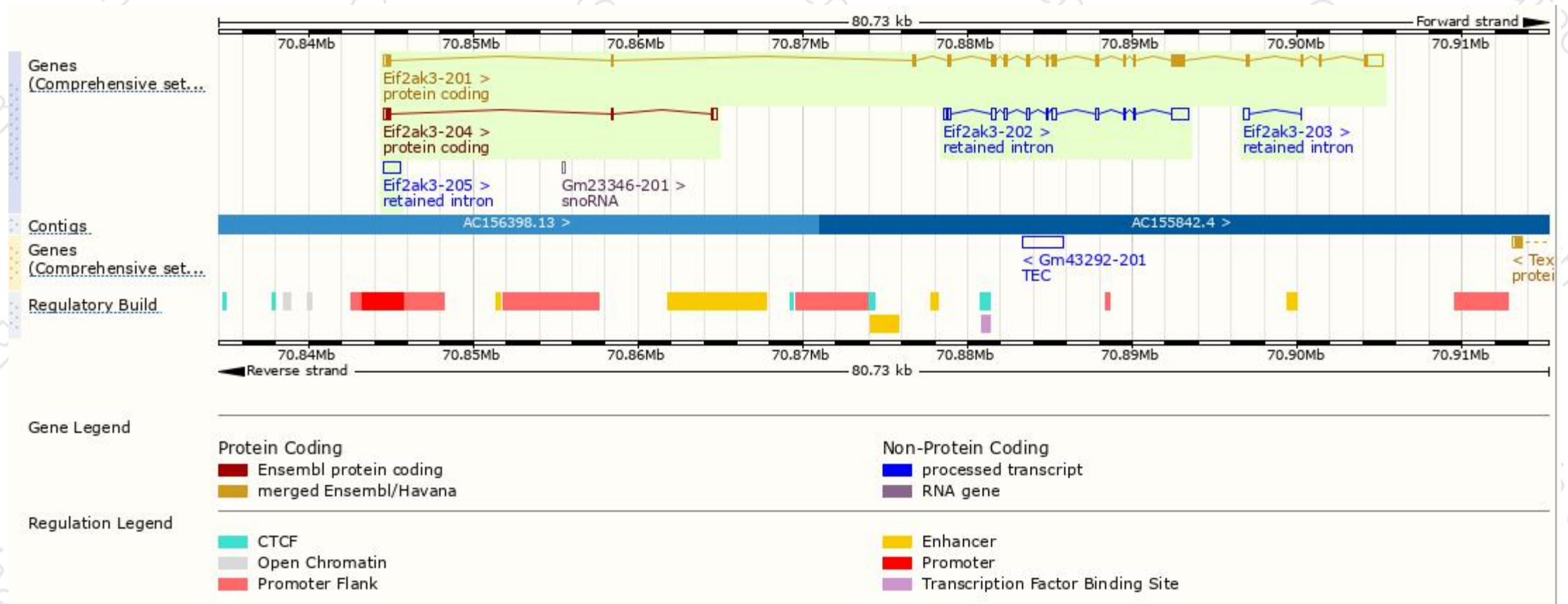
The gene has 5 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Eif2ak3-201	ENSMUST00000034093.14	4513	1114aa	Protein coding	CCDS20223	E9QQ30	TSL:1 GENCODE basic APPRIS P1
Eif2ak3-204	ENSMUST00000162950.1	927	152aa	Protein coding	CCDS85063	A0A0R4J1Y1	TSL:1 GENCODE basic
Eif2ak3-202	ENSMUST00000159401.1	2625	No protein	Retained intron	-	-	TSL:1
Eif2ak3-205	ENSMUST00000199251.1	1064	No protein	Retained intron	-	-	TSL:NA
Eif2ak3-203	ENSMUST00000161316.1	347	No protein	Retained intron	-	-	TSL:3

The strategy is based on the design of *Eif2ak3-201* transcript,The transcription is shown below



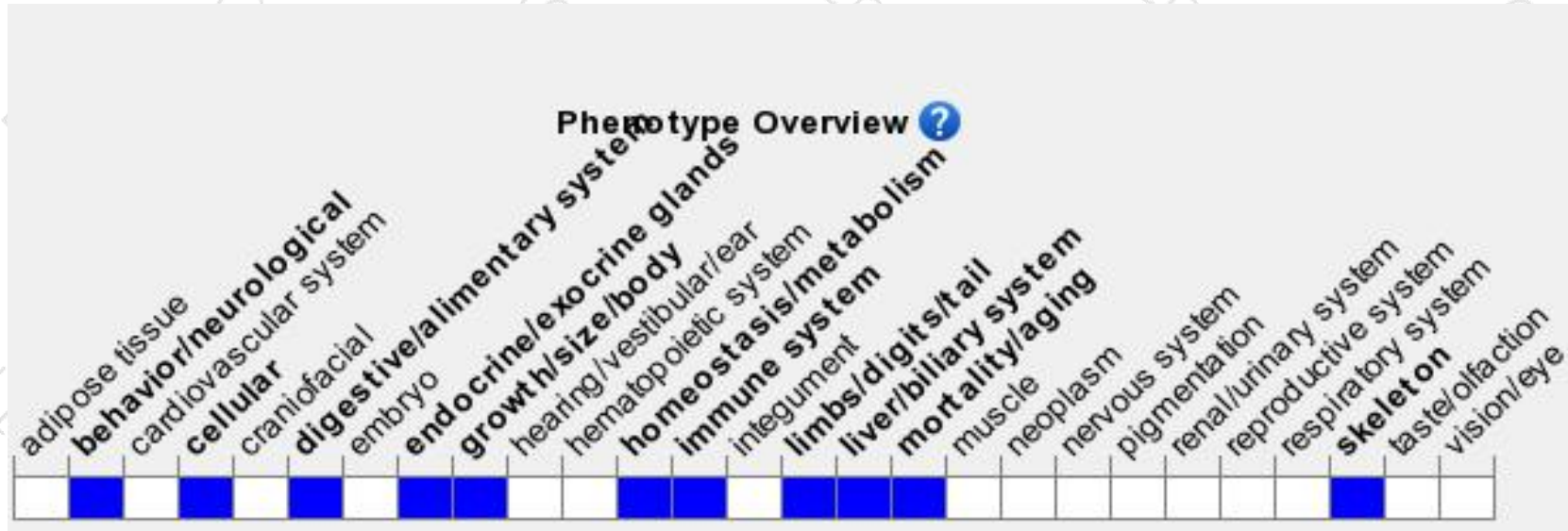
Genomic location distribution



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, Homozygous mutant mice develop exocrine pancreatic insufficiency and progressive diabetes mellitus. They are growth retarded, hyperglycemic, exhibit increased cell death in the pancreas, have decreased numbers of pancreatic beta cells and about half die before weaning.

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

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