Kcnh3 Cas9-KO Strategy

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Reviewer: Xiaojing Li

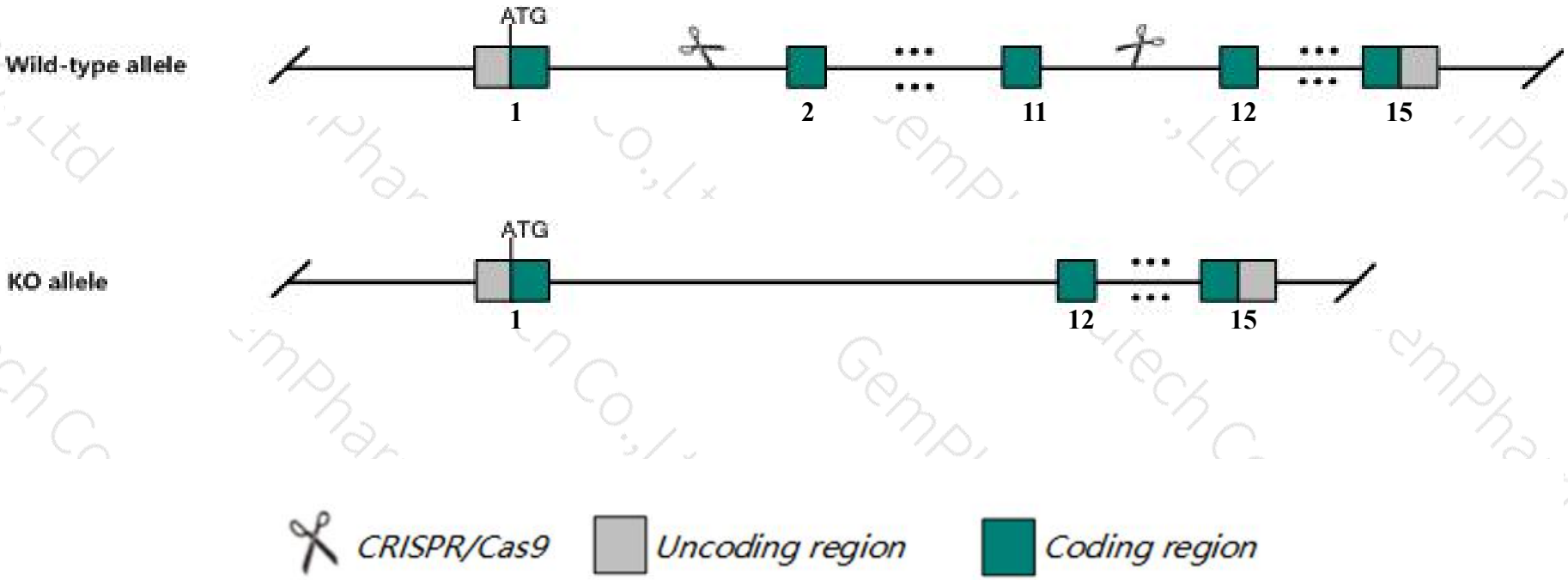
Design Date: 2020-2-17

Project Overview

Project Name	***Kcnh3***
Project type	**Cas9-KO**
Strain background	**C57BL/6JGpt**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Kcnh3* gene. The schematic diagram is as follows:



Technical routes

➢ The *Kcnh3* gene has 4 transcripts. According to the structure of *Kcnh3* gene, exon2-exon11 of *Kcnh3-201* (ENSMUST00000041415.4) transcript is recommended as the knockout region.The region contains 2093bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Kcnh3* gene. The brief process is as follows: CRISPR/Cas9 system

Notice

➢ According to the existing MGI data,Mice homozygous for a knock-out allele exhibit abnormal long term object recognition memory, spatial reference memory, spatial working memory, and long term potentiation. Mice homozygous for a different knock-out allele exhibit neuron hyperexcitability and seizures.

➢ The *Kcnh3* gene is located on the Chr15. 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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Kcnh3 potassium voltage-gated channel, subfamily H (eag-related), member 3 [Mus musculus (house mouse)]

Gene ID: 16512, updated on 31-Jan-2019

Summary

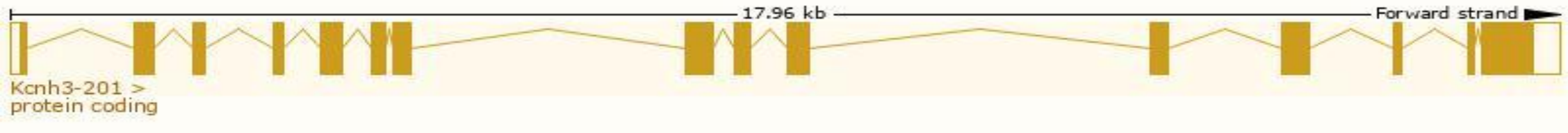
Official Symbol	Kcnh3 provided by MGI
Official Full Name	potassium voltage-gated channel, subfamily H (eag-related), member 3 provided byMGI
Primary source	MGI:MGI:1341723
See related	Ensembl:ENSMUSG00000037579
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	AU019351, C030044P22Rik, Elk2, Kv12.2, Melk2
Summary	The protein encoded by this gene is a voltage-gated potassium channel alpha subunit predominantly expressed in the forebrain. An increase in cognitive function was observed when this gene was knocked out, while deletion of the gene resulted in hippocampal hyperexcitability and epilepsy. [provided by RefSeq, Sep 2015]
Expression	Biased expression in frontal lobe adult (RPKM 30.6), cortex adult (RPKM 30.2) and 5 other tissuesSee more
Orthologs	human all

Transcript information（Ensembl）

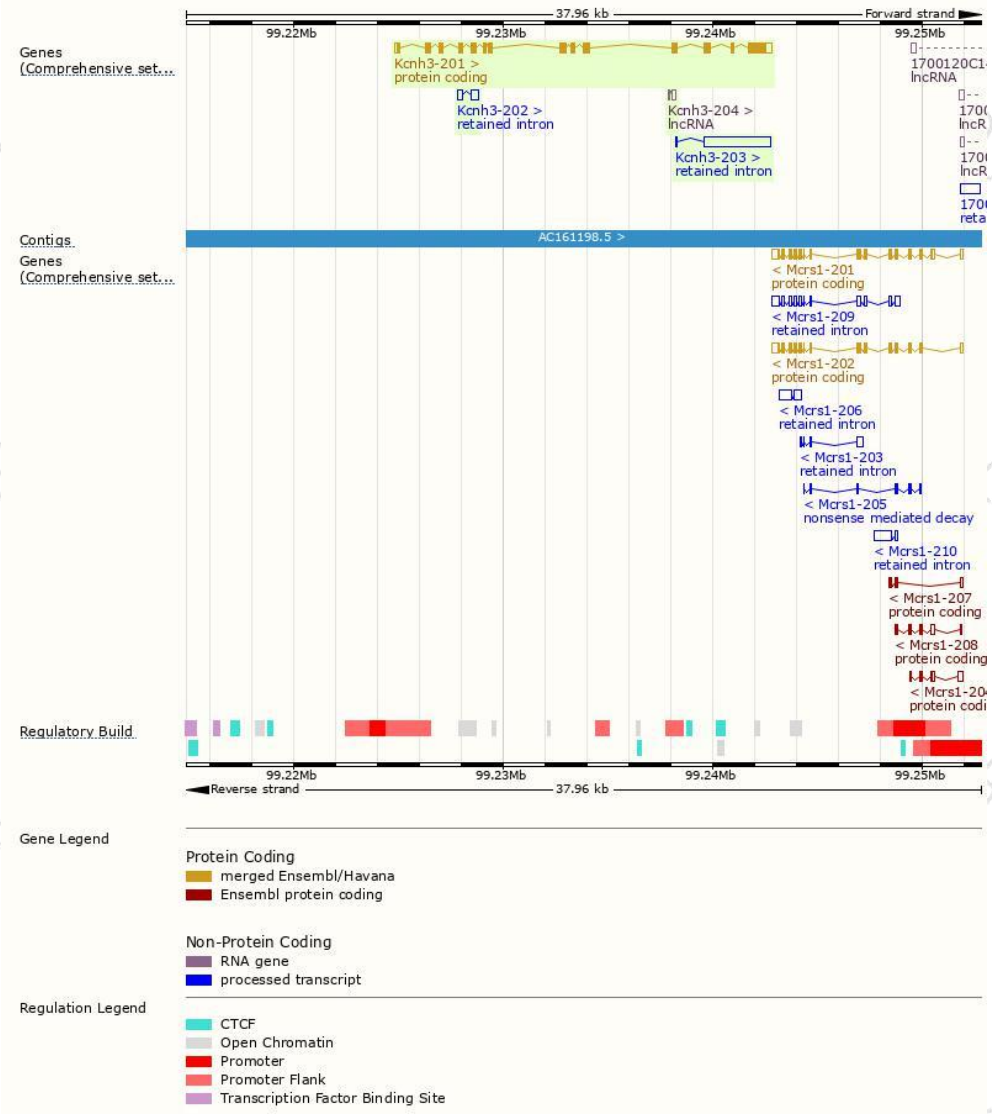
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Kcnh3-201	ENSMUST00000041415.4	3698	1095aa	Protein coding	CCDS27817	Q9WVJ0	TSL:1 GENCODE basic APPRIS P1
Kcnh3-203	ENSMUST00000230552.1	3225	No protein	Retained intron	-	-	
Kcnh3-202	ENSMUST00000228983.1	572	No protein	Retained intron	-	-	
Kcnh3-204	ENSMUST00000230973.1	217	No protein	lncRNA	-	-	

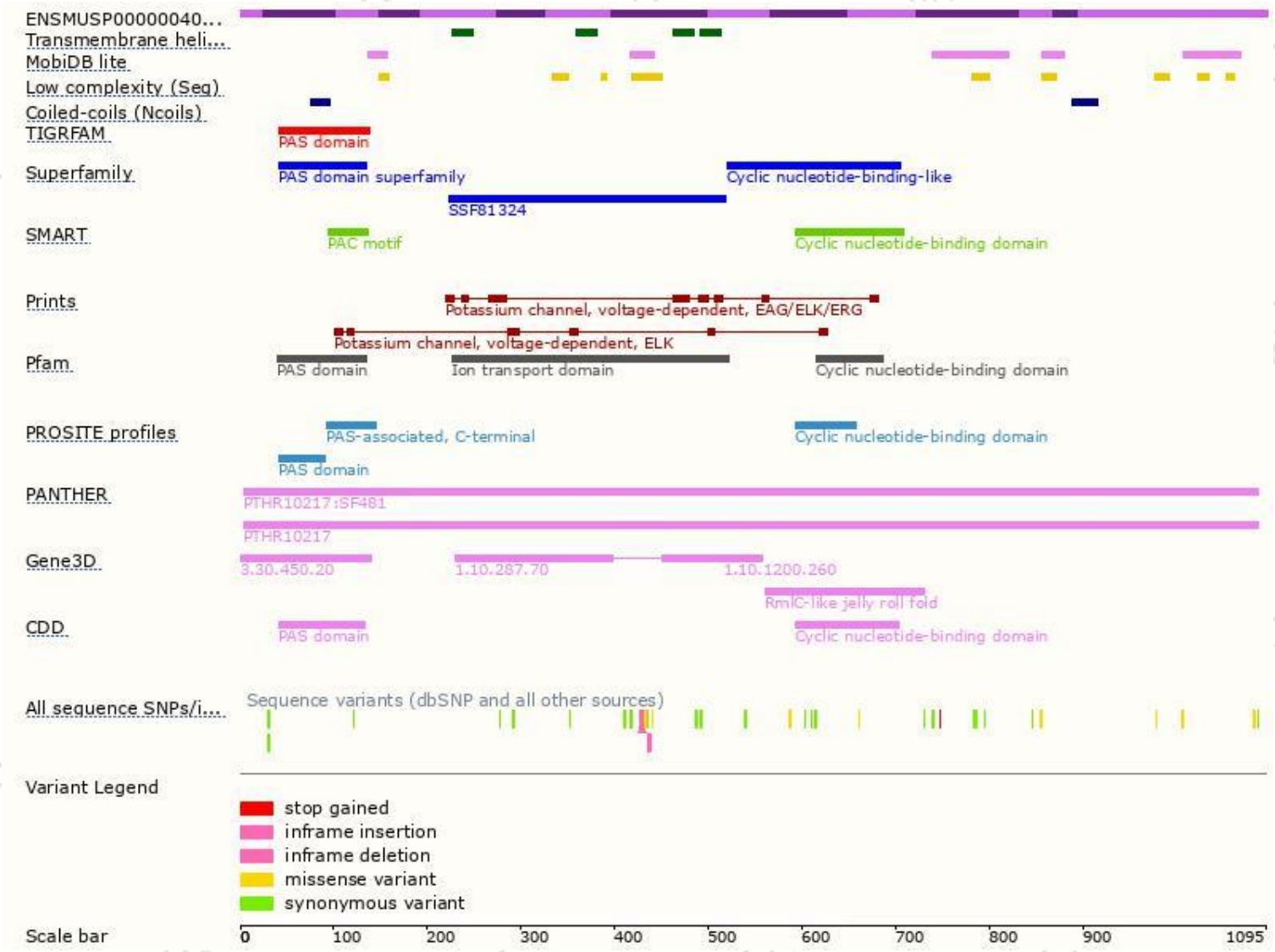
The strategy is based on the design of *Kcnh3-201* transcript,The transcription is shown below



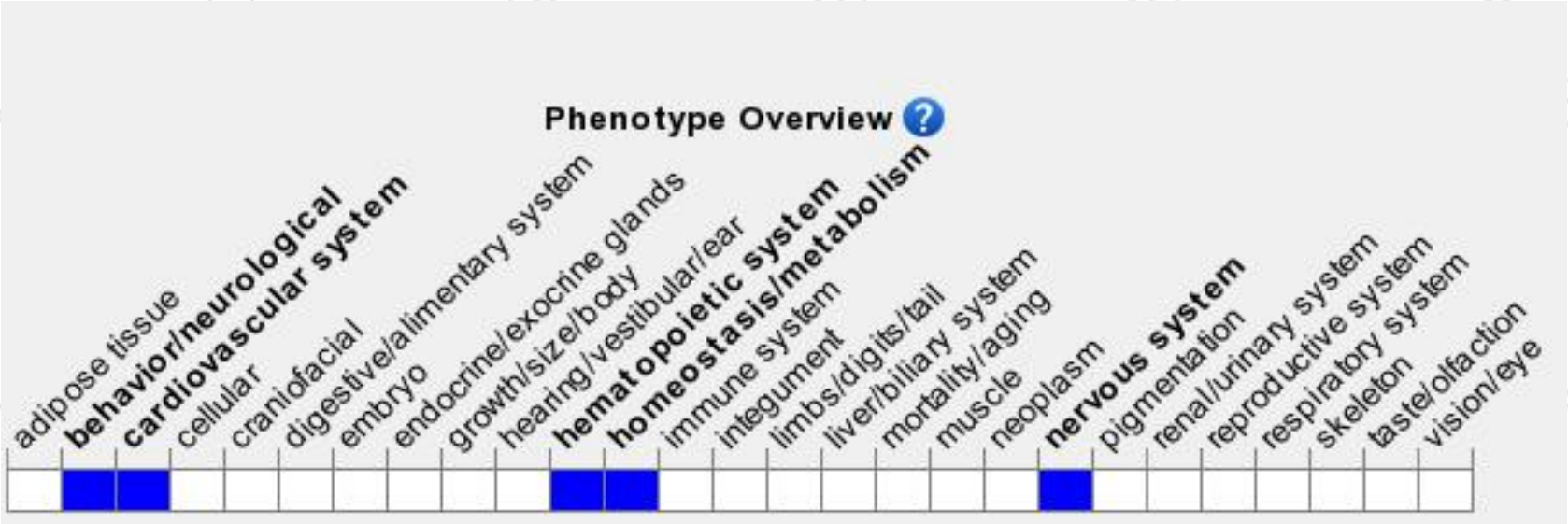
Genomic location distribution



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/).

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

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