Efr3a Cas9-CKO Strategy

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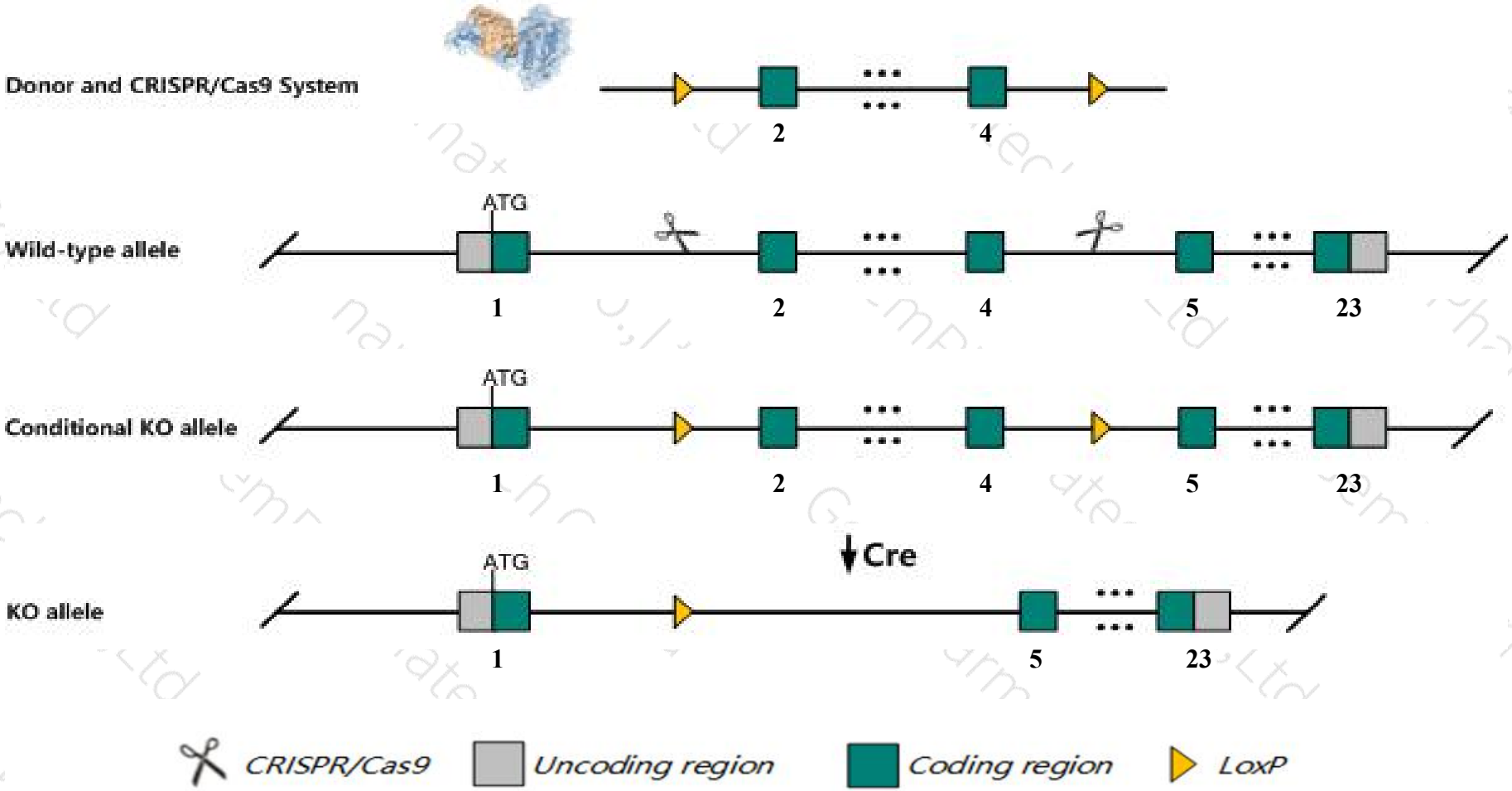
Project Overview

Project Name	***Efr3a***
Project type	**Cas9-CKO**
Strain background	**C57BL/6JGpt**

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Efr3a* gene. The schematic diagram is as follows:



Technical routes

- The *Efr3a* gene has 14 transcripts. According to the structure of *Efr3a* gene, exon2-exon4 of *Efr3a-201* (ENSMUST00000015146.15) transcript is recommended as the knockout region.The region contains 356bp coding sequence. Knock out the region will result in disruption of protein function.

- In this project we use CRISPR/Cas9 technology to modify *Efr3a* 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 sequencing. A stable F1 generation mouse model was obtained by mating positive F0 generation mice with C57BL/6JGpt mice.

- 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.

Notice

- According to the existing MGI data,mice homozygous for a conditional allele activated in the nervous system exhibit decreased neuron apoptosis in the dentate gyrus resulting in increased adult hippocampal neurogenesis.
- *Efr3a-214* may not be affected .
- The *Efr3a* 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

Gene information （NCBI）

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Efr3a EFR3 homolog A [Mus musculus (house mouse)]

Gene ID: 76740, updated on 13-Mar-2020

Summary

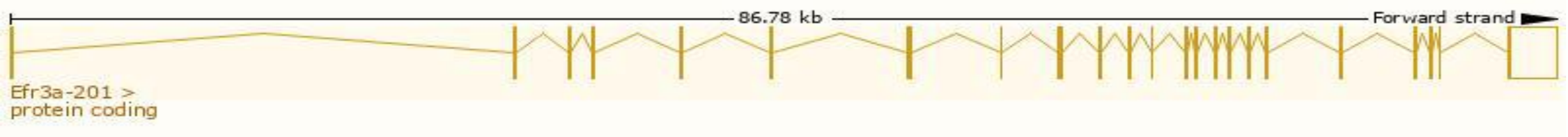
Official Symbol	Efr3a provided by MGI
Official Full Name	EFR3 homolog A provided by MGI
Primary source	MGI:MGI:1923990
See related	Ensembl:ENSMUSG00000015002
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	A130089M23Rik, BB071175, C76891, C920006C10Rik, D030063F01Rik, mKIAA0143
Expression	Ubiquitous expression in cerebellum adult (RPKM 23.6), cortex adult (RPKM 17.9) and 28 other tissues See more
Orthologs	human all

Transcript information（Ensembl）

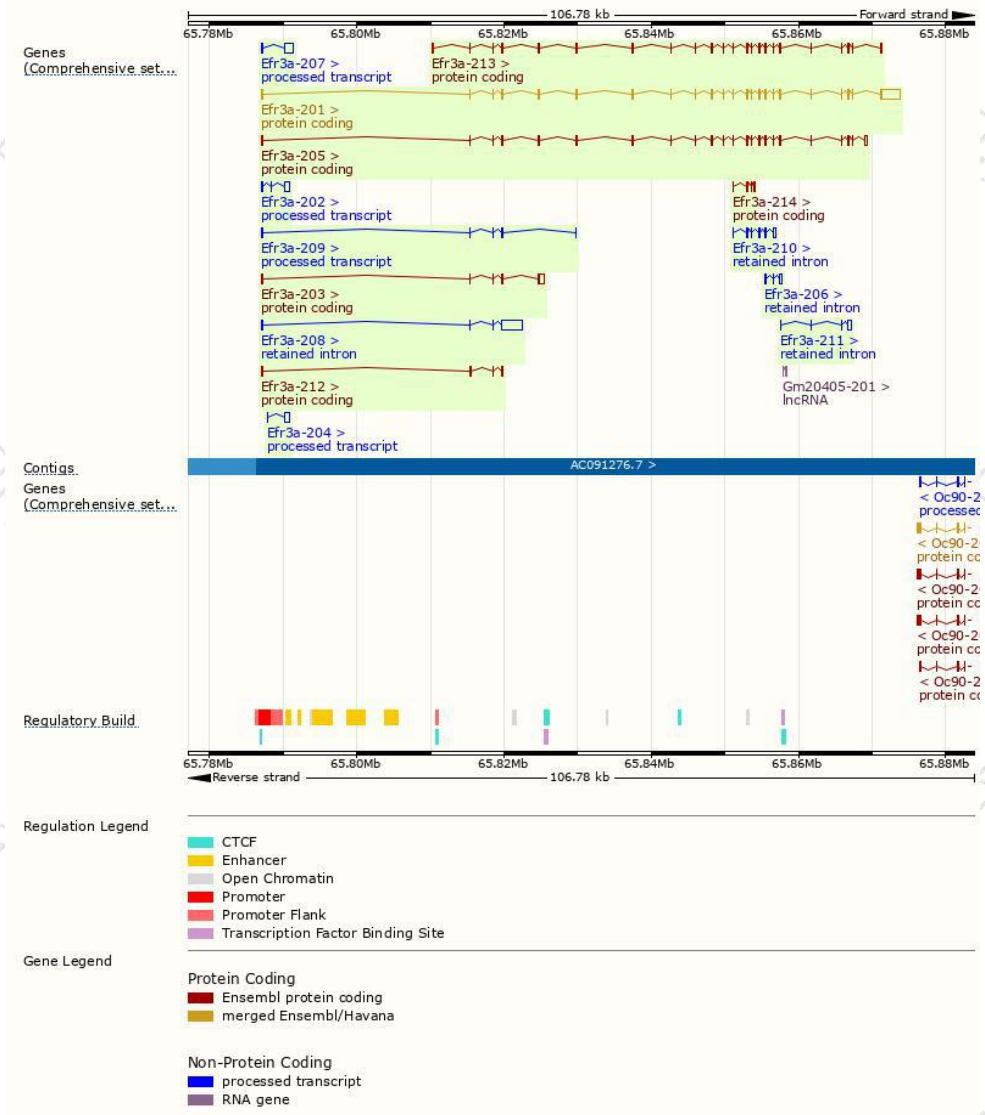
The gene has 14 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Efr3a-201	ENSMUST00000015146.15	5215	819aa	Protein coding	CCDS27507	Q8BG67	TSL:1 GENCODE basic APPRIS is a system to annotate alternatively spliced transcripts based on a range of computational methods to identify the most functionally important transcript(s) of a gene. APPRIS P1
Efr3a-205	ENSMUST00000173858.7	2848	821aa	Protein coding	-	Q8BG67	TSL:1 GENCODE basic
Efr3a-213	ENSMUST00000211878.1	2541	846aa	Protein coding	-	A0A1D5RLL3	TSL:5 GENCODE basic
Efr3a-203	ENSMUST00000172756.1	1411	174aa	Protein coding	-	Q8BWC5	TSL:1 GENCODE basic
Efr3a-212	ENSMUST00000174856.6	612	41aa	Protein coding	-	G3UX01	CDS 3' incomplete TSL:2
Efr3a-214	ENSMUST00000227340.1	518	112aa	Protein coding	-	A0A2I3BR57	CDS 5' incomplete
Efr3a-207	ENSMUST00000174135.1	1425	No protein	Processed transcript	-	-	TSL:1
Efr3a-202	ENSMUST00000096411.3	981	No protein	Processed transcript	-	-	TSL:1
Efr3a-204	ENSMUST00000173008.1	762	No protein	Processed transcript	-	-	TSL:3
Efr3a-209	ENSMUST00000174601.7	643	No protein	Processed transcript	-	-	TSL:3
Efr3a-208	ENSMUST00000174591.2	3225	No protein	Retained intron	-	-	TSL:1
Efr3a-210	ENSMUST00000174615.1	866	No protein	Retained intron	-	-	TSL:3
Efr3a-211	ENSMUST00000174749.1	691	No protein	Retained intron	-	-	TSL:3
Efr3a-206	ENSMUST00000173936.1	387	No protein	Retained intron	-	-	TSL:2

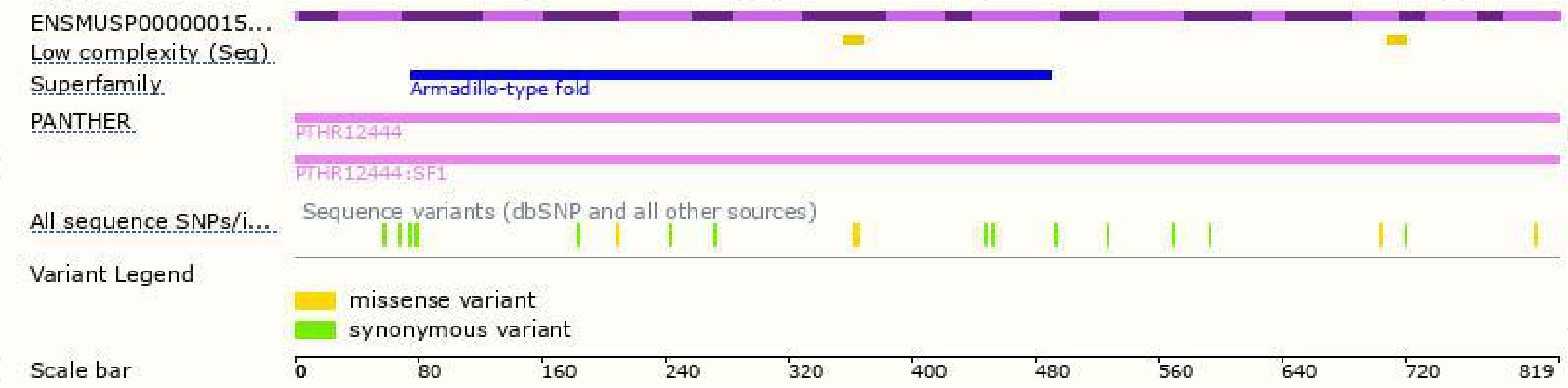
The strategy is based on the design of *Efr3a-201* transcript,the transcription is shown below:



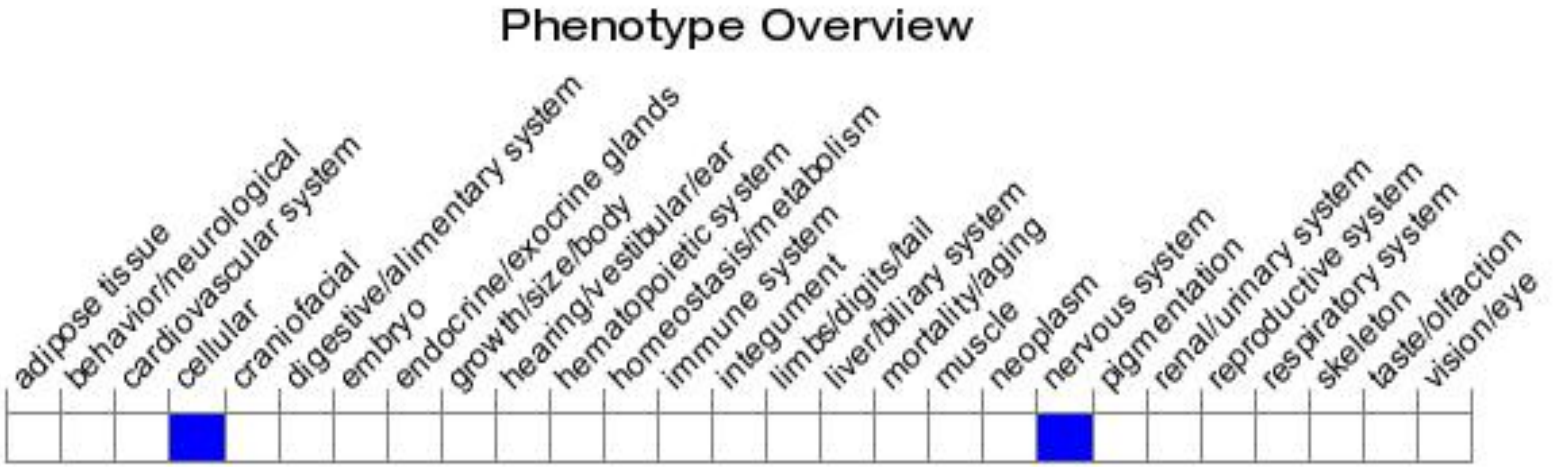
Genomic location distribution



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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