

Inpp4a Cas9-CKO Strategy

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Reviewer:

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Design Date:

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Project Overview

Project Name

Inpp4a

Project type

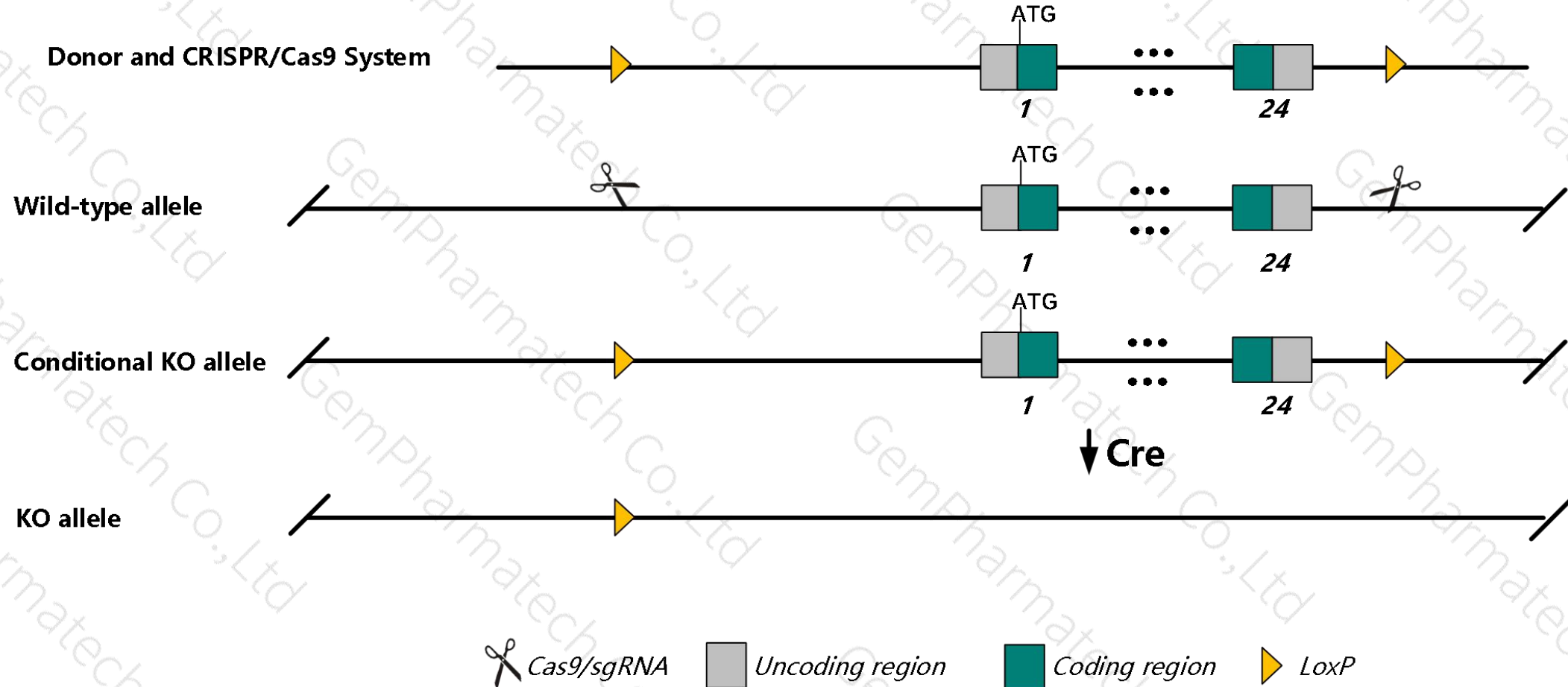
Cas9-CKO

Strain background

C57BL/6JGpt

Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Inpp4a* gene. The schematic diagram is as follows:



- The *Inpp4a* gene has 13 transcripts. According to the structure of *Inpp4a* gene, exon1-exon24 of *Inpp4a*-208 (ENSMUST00000137266.7) transcript is recommended as the knockout region. The region contains all of coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Inpp4a* 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.

- According to the existing MGI data, homozygotes for a spontaneous mutation exhibit small size, ataxia, loss of cerebellar and hippocampal CA1 neurons, and death by 24 days of age from seizures and/or malnutrition.
- Transcripts 210,212 may not be affected.
- The *Inpp4a* gene is located on the Chr1. 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)

Inpp4a inositol polyphosphate-4-phosphatase, type I [*Mus musculus* (house mouse)]

Gene ID: 269180, updated on 13-Mar-2020

Summary

Official Symbol	Inpp4a provided by MGI
Official Full Name	inositol polyphosphate-4-phosphatase, type I provided by MGI
Primary source	MGI:MGI:1931123
See related	Ensembl:ENSMUSG00000026113
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	107kDa; R74740; 9630012D15; D130048C09Rik
Expression	Ubiquitous expression in cerebellum adult (RPKM 12.1), frontal lobe adult (RPKM 10.4) and 26 other tissues See more
Orthologs	human all

Genomic context

Location: 1 B; 1 15.46 cM

Exon count: 27

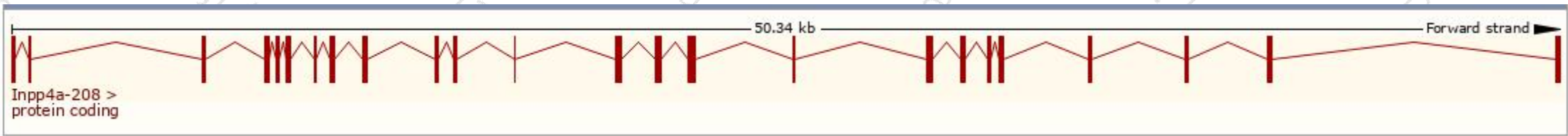
See Inpp4a in [Genome Data Viewer](#)

Transcript information (Ensembl)

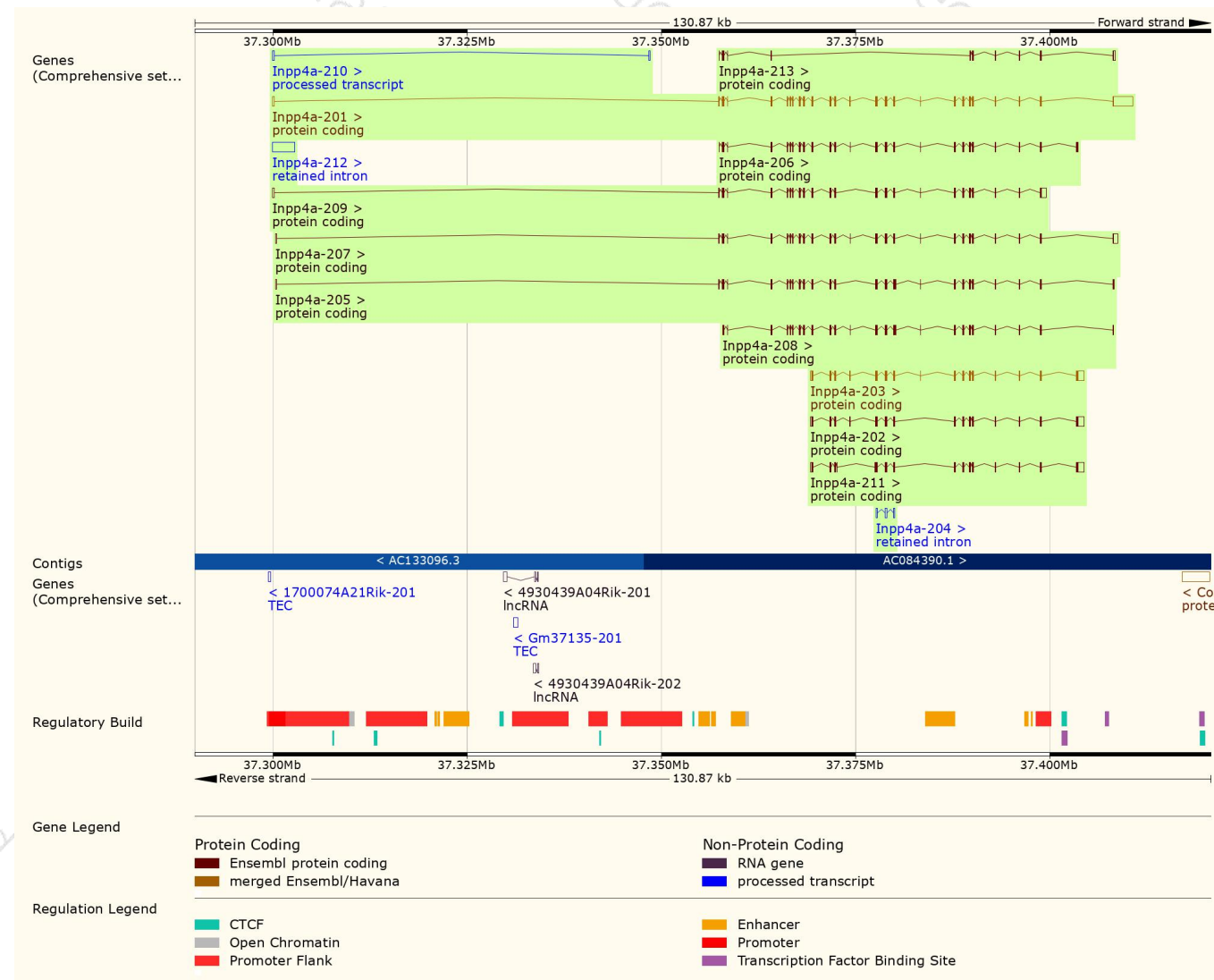
The gene has 13 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Inpp4a-201	ENSMUST00000027287.10	5691	939aa	Protein coding	CCDS35539	F6V2U0	TSL:5 GENCODE basic APPRIS P3
Inpp4a-203	ENSMUST00000114933.8	3004	690aa	Protein coding	CCDS35540	E9QAD0	TSL:1 GENCODE basic
Inpp4a-202	ENSMUST00000058307.14	2963	679aa	Protein coding	CCDS78570	A0A0R4J0Q2	TSL:1 GENCODE basic
Inpp4a-208	ENSMUST00000137266.7	2934	977aa	Protein coding	CCDS69879	D3Z230	TSL:5 GENCODE basic APPRIS ALT2
Inpp4a-209	ENSMUST00000140264.7	3676	890aa	Protein coding	-	Q3UEQ1	TSL:1 GENCODE basic
Inpp4a-207	ENSMUST00000136846.7	3576	938aa	Protein coding	-	E9Q9A0	TSL:5 GENCODE basic APPRIS ALT1
Inpp4a-205	ENSMUST00000132401.7	3234	972aa	Protein coding	-	D3YUL8	TSL:5 GENCODE basic APPRIS ALT2
Inpp4a-206	ENSMUST00000132615.7	3038	954aa	Protein coding	-	D3YUD3	TSL:5 GENCODE basic APPRIS ALT1
Inpp4a-211	ENSMUST00000168546.2	2964	679aa	Protein coding	-	F6R4N2	TSL:5 GENCODE basic
Inpp4a-213	ENSMUST00000193774.5	1243	306aa	Protein coding	-	A0A0A6YXS5	TSL:5 GENCODE basic
Inpp4a-210	ENSMUST00000146676.1	369	No protein	Processed transcript	-	-	TSL:3
Inpp4a-212	ENSMUST00000193024.1	2874	No protein	Retained intron	-	-	TSL:NA
Inpp4a-204	ENSMUST00000123124.1	463	No protein	Retained intron	-	-	TSL:5

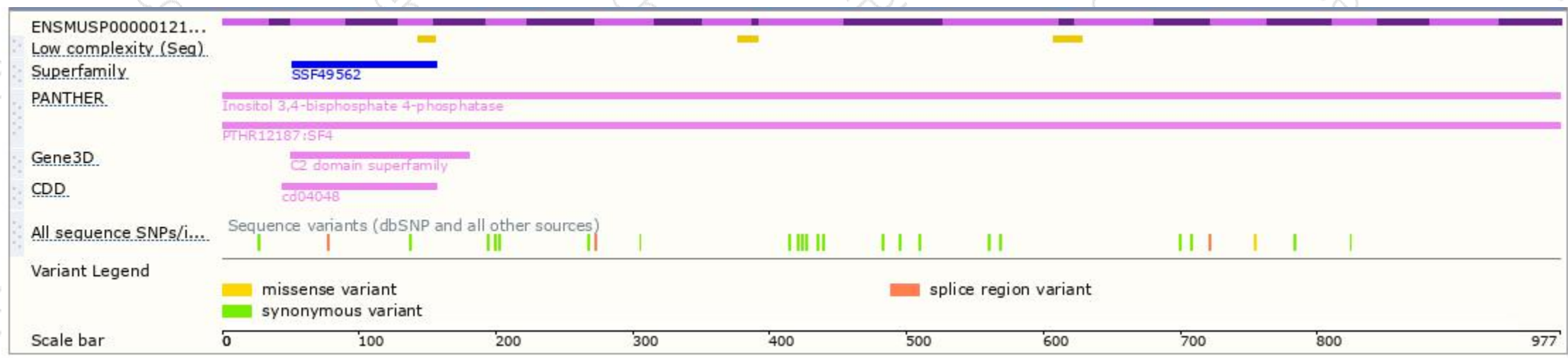
The strategy is based on the design of *Inpp4a-208* transcript,the transcription is shown below:



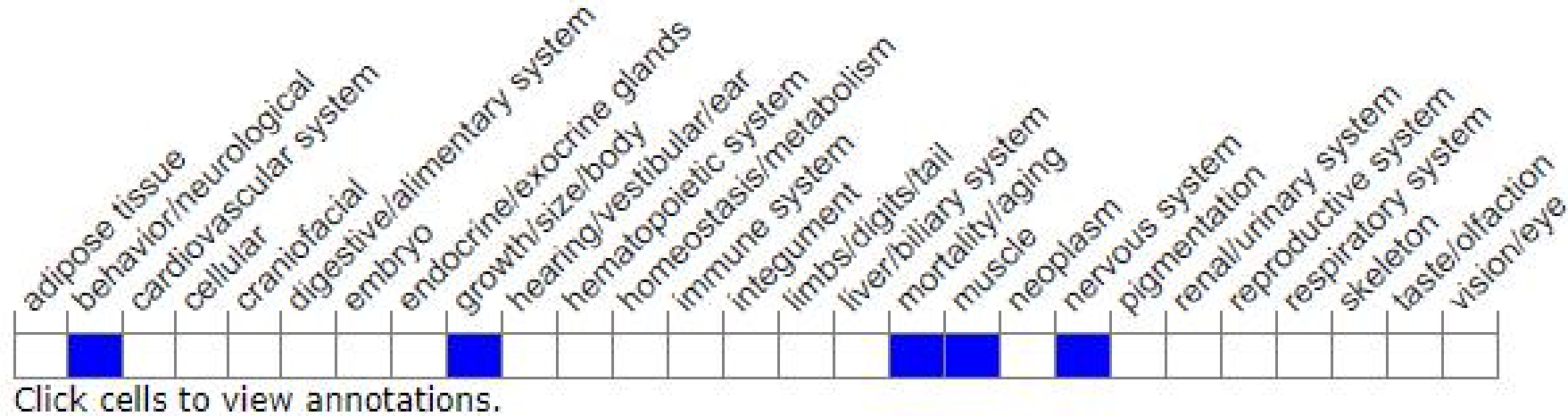
Genomic location distribution



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, homozygotes for a spontaneous mutation exhibit small size, ataxia, loss of cerebellar and hippocampal CA1 neurons, and death by 24 days of age from seizures and/or malnutrition.

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

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