

***Rasgrf1* Cas9-KO Strategy**

Designer: Xueting Zhang

Reviewer: Yanhua Shen

Date: 2019-10-27

Project Overview

Project Name

Rasgrf1

Project type

Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

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



- The *Rasgrf1* gene has 4 transcripts. According to the structure of *Rasgrf1* gene, exon2 of *Rasgrf1*-202 (ENSMUST00000034912.5) transcript is recommended as the knockout region. The region contains 110bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Rasgrf1* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Homozygotes for null mutations (and heterozygotes with a paternally inherited mutant allele) exhibit reduced postnatal growth, low insulin and IGF I levels, glucose intolerance, beta-cell hypoplasia, impaired long-term synaptic plasticity, and impaired hippocampal-dependent learning.
- Transcript *Rasgrf1*-201&203 may not be affected.
- The *Rasgrf1* gene is located on the Chr9. 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)

Rasgrf1 RAS protein-specific guanine nucleotide-releasing factor 1 [*Mus musculus* (house mouse)]

Gene ID: 19417, updated on 13-Aug-2019

Summary

- Official Symbol

Rasgrf1 provided by MGI
- Official Full Name

RAS protein-specific guanine nucleotide-releasing factor 1 provided by MGI
- Primary source

[MGI:MGI:99694](#)
- See related

[Ensembl:ENSMUSG00000032356](#)
- 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

Gnrp; Grf1; p190; CDC25; P190-A; CDC25Mm; Grfbeta; AI844718; Ras-GRF1; p190RhoGEF
- Expression

Biased expression in cerebellum adult (RPKM 26.4), frontal lobe adult (RPKM 25.1) and 6 other tissues [See more](#)
- Orthologs

[human](#) [all](#)

Genomic context

Location: 9 E3.1; 9 47.31 cM

See Rasgrf1 in [Genome Data Viewer](#)

Exon count: 29

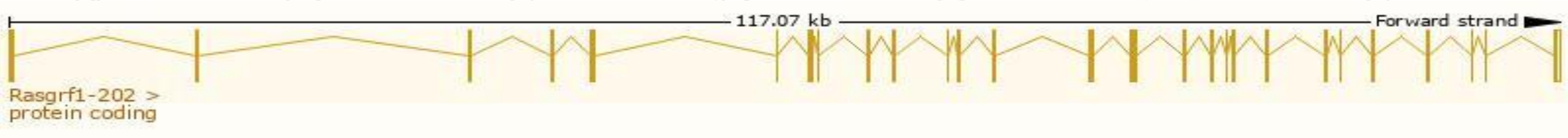
Annotation release	Status	Assembly	Chr	Location
108	current	GRCm38.p6 (GCF_000001635.26)	9	NC_000075.6 (89909508..90026979)
Build 37.2	previous assembly	MGSCv37 (GCF_000001635.18)	9	NC_000075.5 (89804613..89921817)

Transcript information (Ensembl)

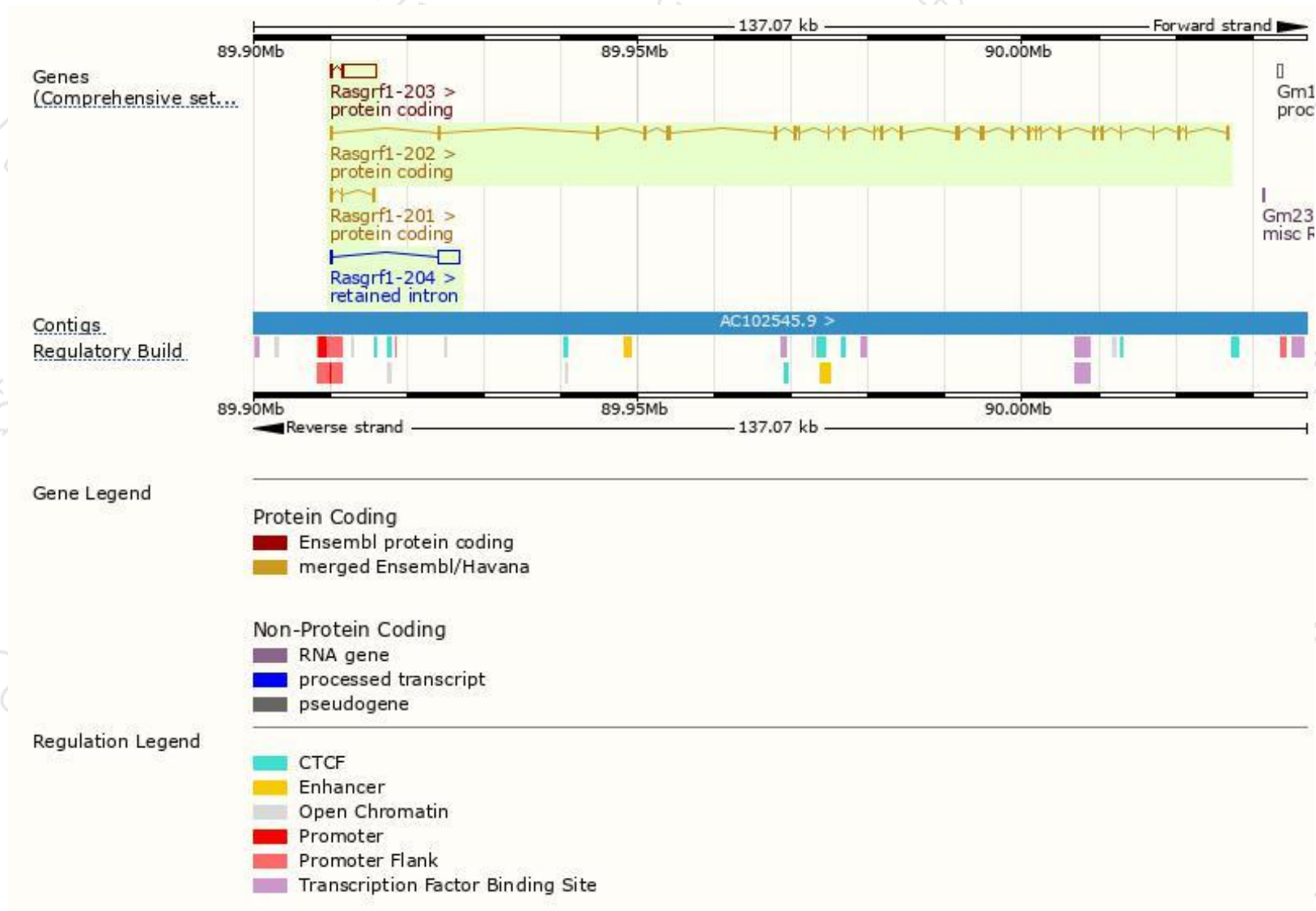
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Rasgrf1-202	ENSMUST00000034912.5	4092	1262aa	Protein coding	CCDS40722	B2RS27 P27671	TSL:1 GENCODE basic APPRIS P1
Rasgrf1-201	ENSMUST00000034909.10	853	178aa	Protein coding	CCDS40723	Q9QZR7	TSL:1 GENCODE basic
Rasgrf1-203	ENSMUST00000189545.1	4766	153aa	Protein coding	-	A0A087WS68	TSL:1 GENCODE basic
Rasgrf1-204	ENSMUST00000190073.1	3042	No protein	Retained intron	-	-	TSL:1

The strategy is based on the design of *Rasgrf1-202* transcript,The transcription is shown below



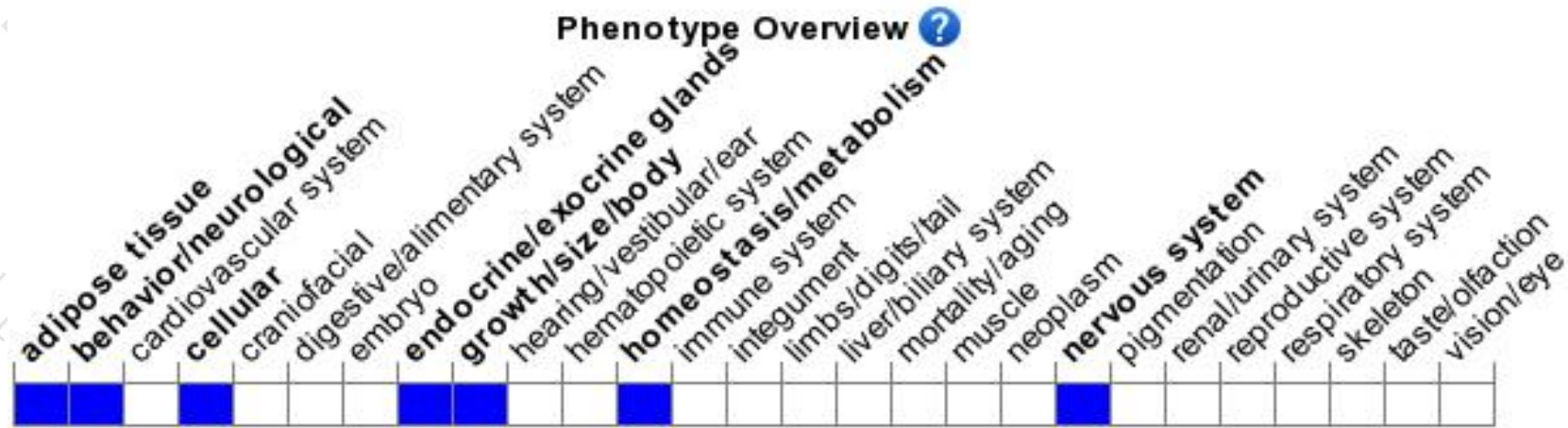
Genomic location distribution



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 null mutations (and heterozygotes with a paternally inherited mutant allele) exhibit reduced postnatal growth, low insulin and IGF I levels, glucose intolerance, beta-cell hypoplasia, impaired long-term synaptic plasticity, and impaired hippocampal-dependent learning.

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

Tel: 400-9660890

