Rac1 Cas9-KO Strategy

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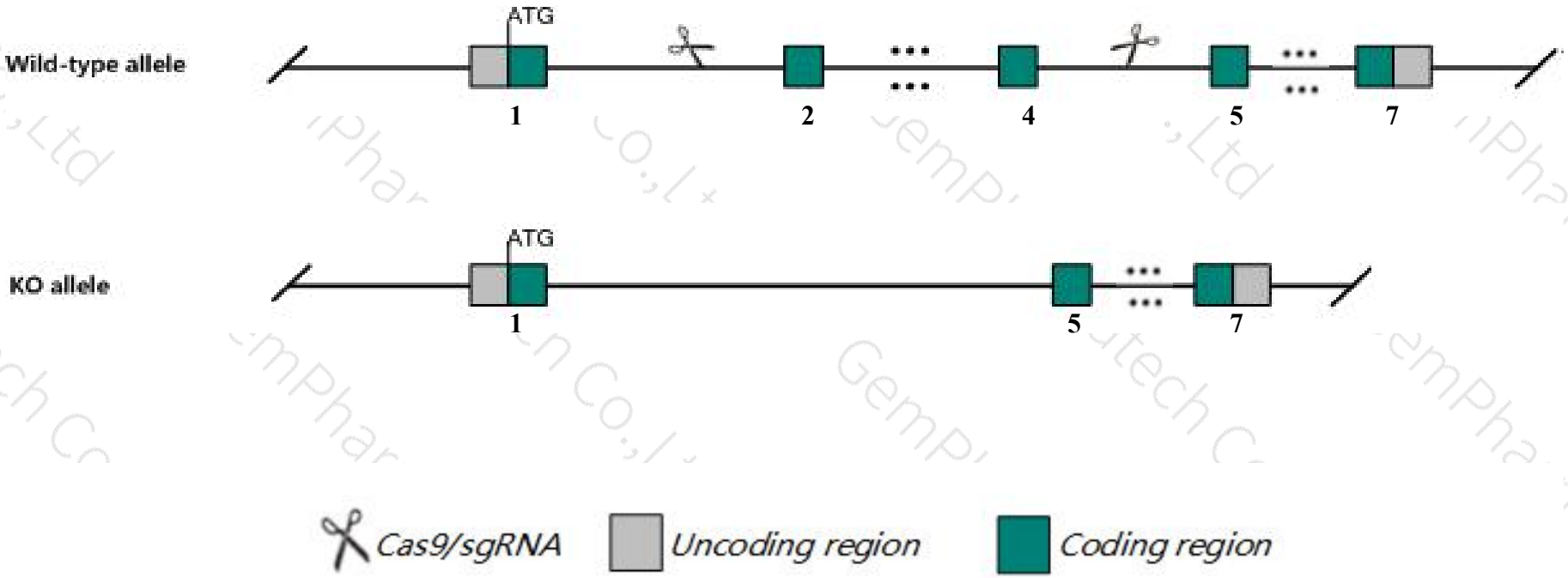
Project Overview

Project Name	***Rac1***
Project type	**Cas9-KO**
Strain background	**C57BL/6J**

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Rac1* gene. The schematic diagram is as follows:



Technical routes

➢ The *Rac1* gene has 4 transcripts. According to the structure of *Rac1* gene, exon2-exon4 of *Rac1-202* (ENSMUST00000100489.3) transcript is recommended as the knockout region.The region contains 247bp coding sequence. Knock out the region will result in disruption of protein function.

➢ In this project we use CRISPR/Cas9 technology to modify *Rac1* gene. The brief process is as follows: sgRNA was transcribed in vitro.Cas9 and sgRNA were microinjected into the fertilized eggs of C57BL/6J 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/6J mice.

Notice

- According to the existing MGI data,Homozygotes for targeted null mutations exhibit embryonic lethality prior to embryonic day 9.5 with defects in gastrulation. Neutrophil specific knockout mice show defects in inflammatory recruitment and chemotactic responses.

- The *Rac1* gene is located on the Chr5. 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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Rac1 Rac family small GTPase 1 [Mus musculus (house mouse)]

Gene ID: 19353, updated on 7-Apr-2019

Summary

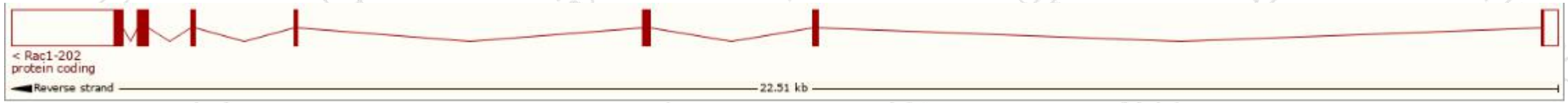
Official Symbol	Rac1 provided by MGI
Official Full Name	Rac family small GTPase 1 provided by MGI
Primary source	MGI:MGI:97845
See related	Ensembl:ENSMUSG00000001847
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	AL023026, D5Ertd559e
Expression	Ubiquitous expression in colon adult (RPKM 163.9), small intestine adult (RPKM 137.6) and 28 other tissues See more
Orthologs	human all

Transcript information（Ensembl）

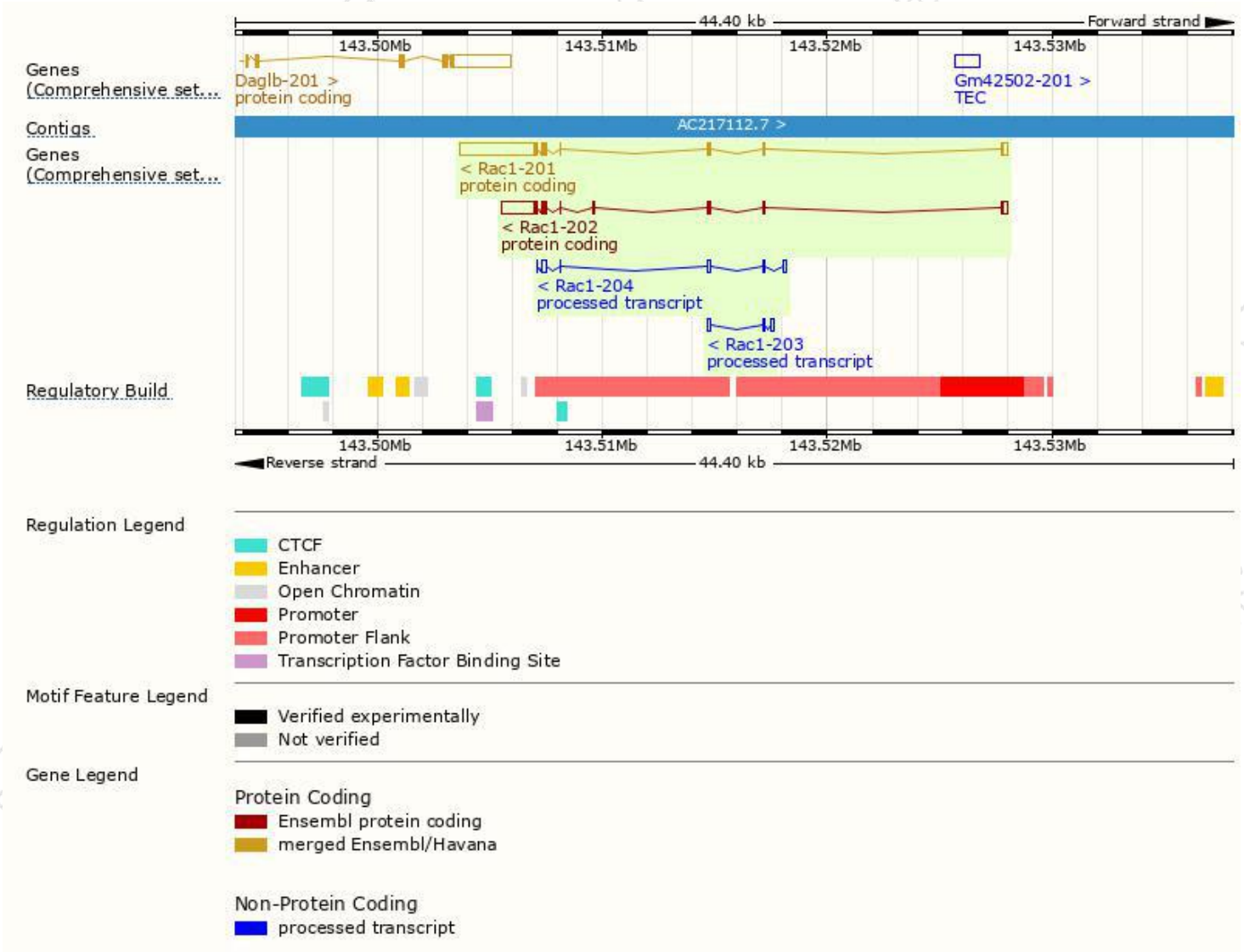
The gene has 4 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Rac1-201	ENSMUST00000080537.13	4159	192aa	Protein coding	CCDS19843	K7Q7T7 P63001	TSL:1 GENCODE basic APPRIS P3
Rac1-202	ENSMUST00000100489.3	2325	211aa	Protein coding	CCDS84993	Q3TLP8	TSL:1 GENCODE basic APPRIS ALT1
Rac1-204	ENSMUST00000145709.7	585	No protein	Processed transcript	-	-	TSL:3
Rac1-203	ENSMUST00000131513.1	344	No protein	Processed transcript	-	-	TSL:5

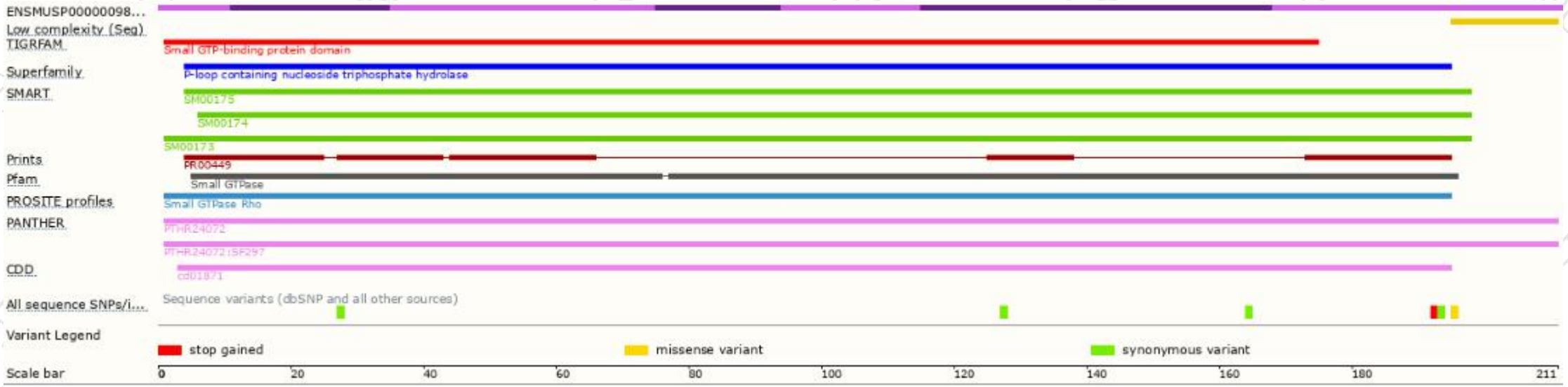
The strategy is based on the design of *Rac1-202* transcript,The transcription is shown below



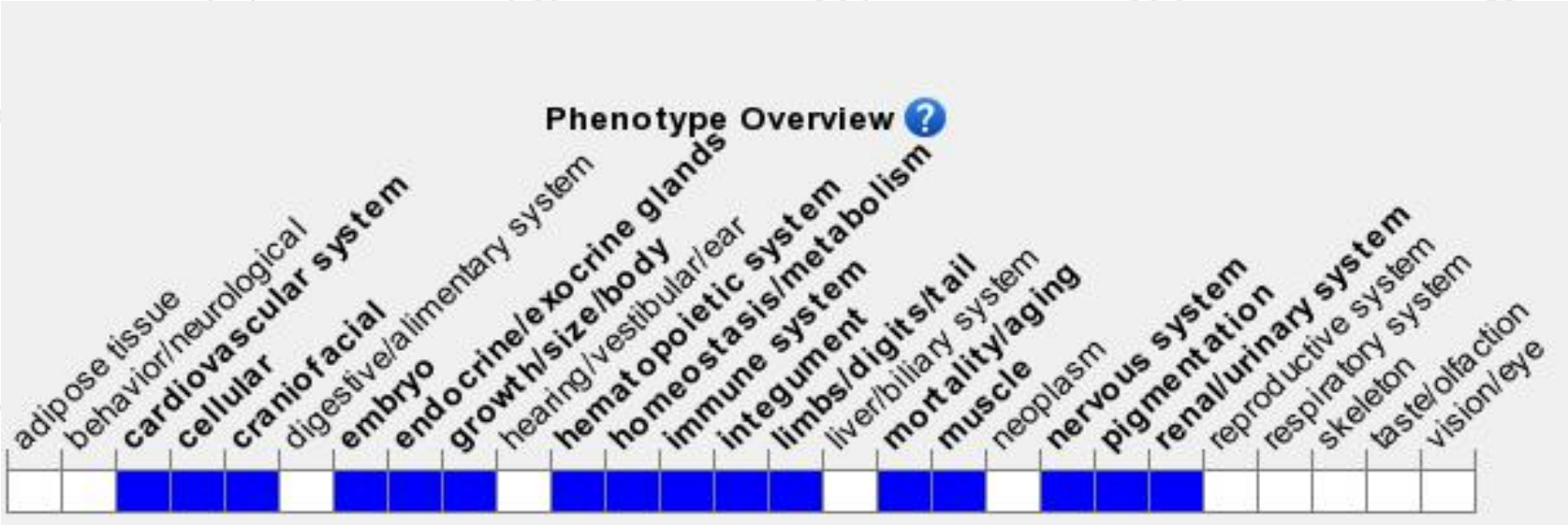
Genomic location distribution



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/).

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

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