

Gnaq Cas9-KO Strategy

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Overview

Target Gene Name

- Gnaq

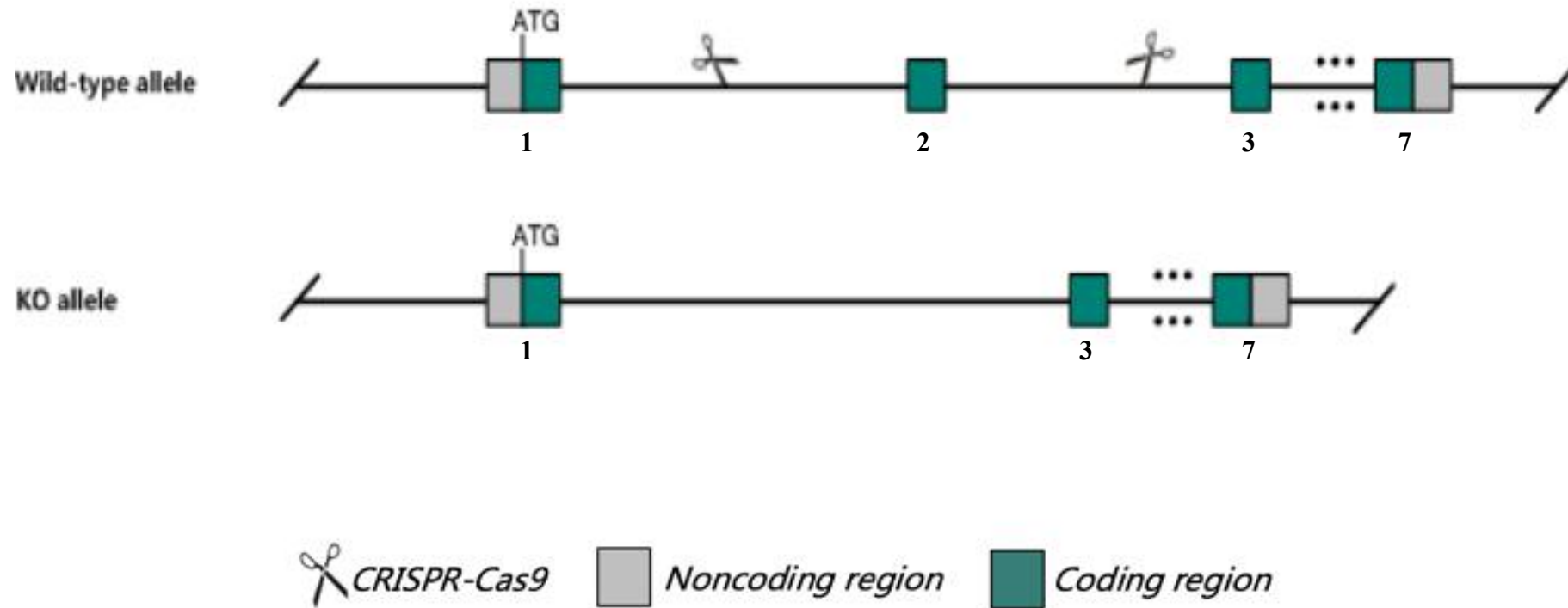
Project Type

- Cas9-KO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Gnaq* gene.

Technical Information

- The *Gnaq* gene has 3 transcripts. According to the structure of *Gnaq* gene, exon2 of *Gnaq-201* (ENSMUST00000025541.6) transcript is recommended as the knockout region. The region contains 185bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Gnaq* gene. The brief process is as follows: gRNAs were transcribed in vitro. Cas9 and gRNAs 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 on-target amplicon sequencing. A stable F1-generation mouse strain was obtained by mating positive F0-generation mice with C57BL/6JGpt mice and confirmation of the desired mutant allele was carried out by PCR and on-target amplicon sequencing.

Gene Information

Gnaq guanine nucleotide binding protein, alpha q polypeptide [Mus musculus (house mouse)]

Gene ID: 14682, updated on 12-Jul-2022

Summary	
Official Symbol	Gnaq provided by MGI
Official Full Name	guanine nucleotide binding protein, alpha q polypeptide provided by MGI
Primary source	MGI:MGI:95776
See related	Ensembl:ENSMUSG00000024639
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	1110005L02Rik, 6230401I02Rik, AA408290, AW060788, Dsk1, Dsk10, Galphaq, Gq, Gql
Expression	Ubiquitous expression in CNS E18 (RPKM 21.9), CNS E14 (RPKM 19.1) and 28 other tissues See more
Orthologs	human all

Source: <https://www.ncbi.nlm.nih.gov/>

Transcript Information

The gene has 3 transcripts, all transcripts are shown below:

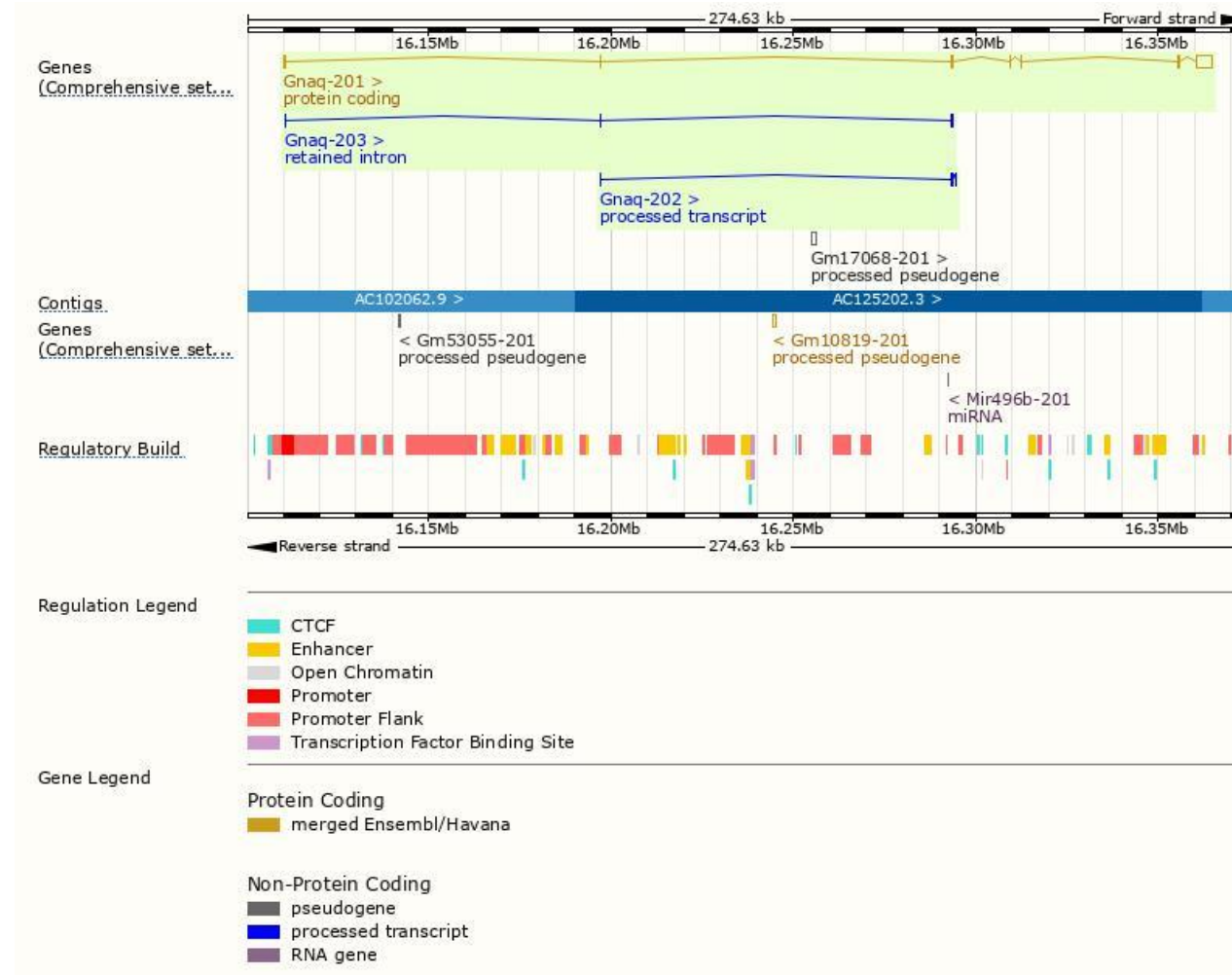
Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Gnaq-201	ENSMUST00000025541.6	5644	359aa	Protein coding	CCDS29684		TSL:1 , GENCODE basic , APPRIS P1 ,
Gnaq-202	ENSMUST00000167656.2	481	No protein	Processed transcript	-		TSL:3 ,
Gnaq-203	ENSMUST00000170229.2	862	No protein	Retained intron	-		TSL:2 ,

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

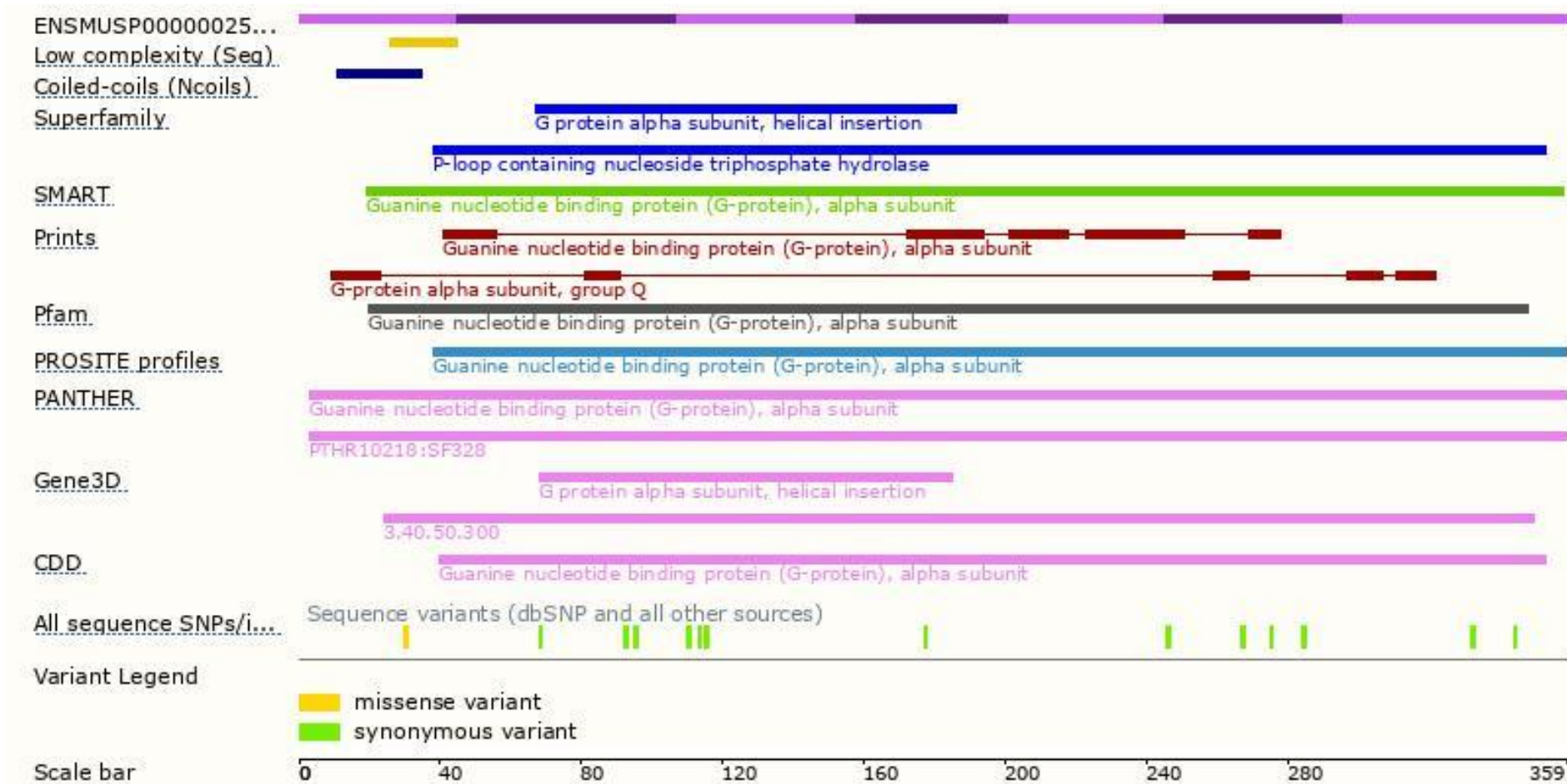


Source: <https://www.ensembl.org>

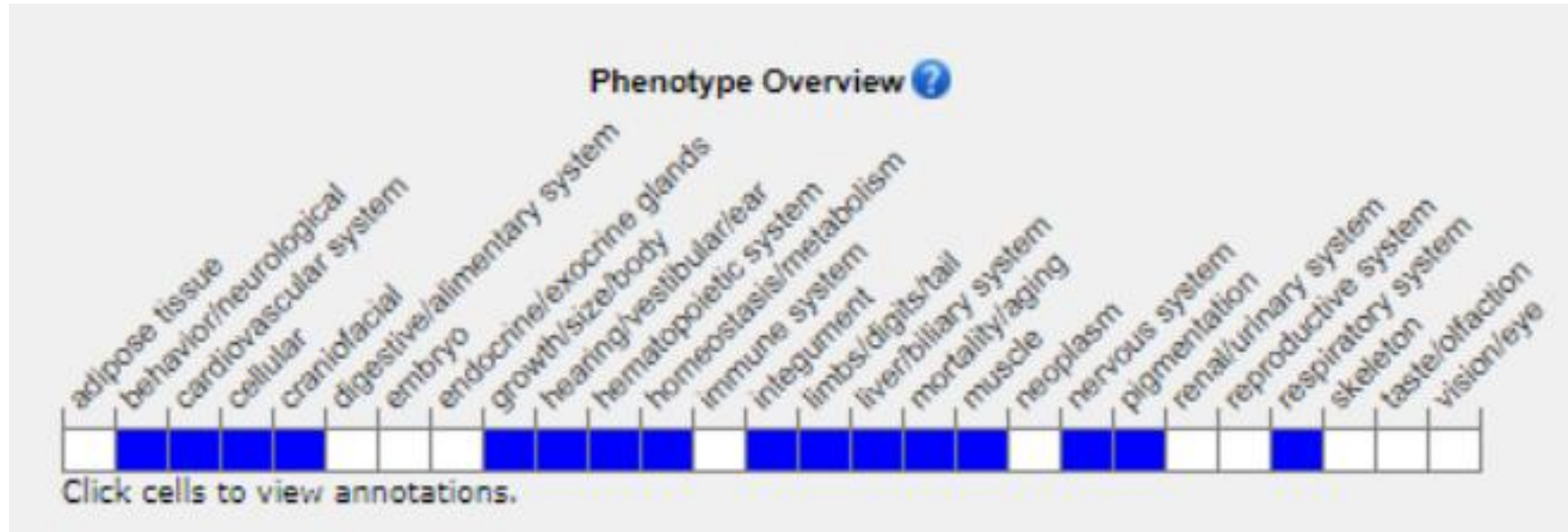
Genomic Information



Protein Information



Mouse Phenotype Information (MGI)



- Mutant mice exhibit pigmentation anomalies affecting the ears, tail and footpads.

Important Information

- According to the existing MGI data, 30% - 40% knockout homozygous mice died after birth.
- *Gnaq* is located on Chr19. If the knockout mice are crossed with other mouse strains to obtain double homozygous mutant offspring, please avoid the situation that the second gene is on the same chromosome.
- This Strategy is designed based on genetic information in existing databases. Due to the complexity of biological processes, all risks of the mutation on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.