

# ***Arhgef5 Cas9-CKO Strategy***

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**Reviewer:**

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**Design Date:**

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# Project Overview

**Project Name**

*Arhgef5*

**Project type**

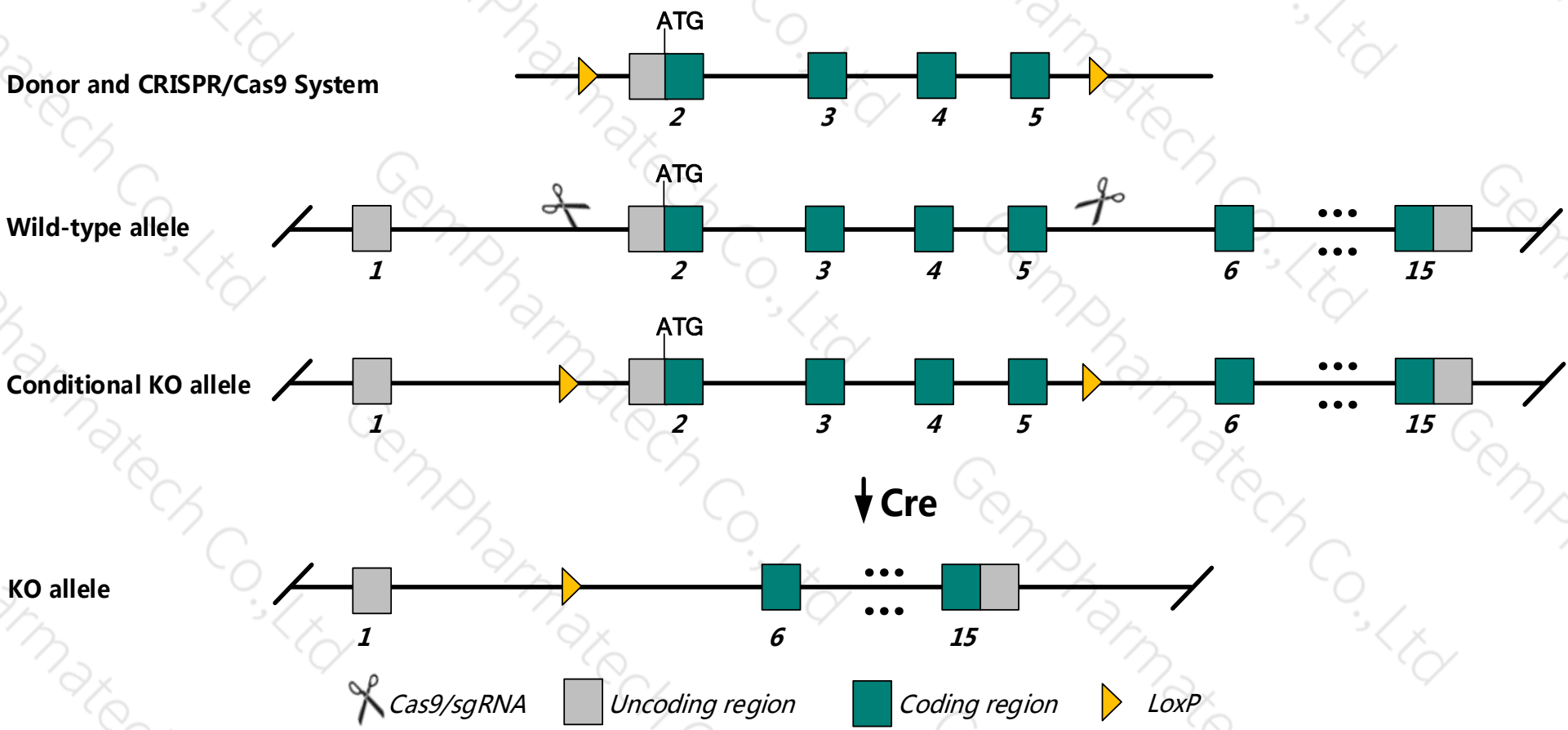
**Cas9-CKO**

**Strain background**

**C57BL/6JGpt**

# Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Arhgef5* gene. The schematic diagram is as follows:



- The *Arhgef5* gene has 8 transcripts. According to the structure of *Arhgef5* gene, exon2~exon5 of *Arhgef5*-201 (ENSMUST00000031750.13) transcript is recommended as the knockout region. The region contains start codon ATG. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Arhgef5* gene. The brief process is as follows: sgRNA was transcribed in vitro, donor vector was constructed. Cas9, sgRNA 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 was knocked out after mating with mice expressing Cre recombinase, resulting in the loss of function of the target gene in specific tissues or cell types.

- According to the existing MGI data , mice homozygous for a knock-out allele exhibit decreased Th2 response in an ovalbumin-induced asthma model.
- The KO region contains functional region of the *Gm44253* gene. Knockout the region may affect the function of *Gm44253* gene.
- The *Arhgef5* gene is located on the Chr6. 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

# Gene information ( NCBI )

## Arhgef5 Rho guanine nucleotide exchange factor (GEF) 5 [ *Mus musculus* (house mouse) ]

Gene ID: 54324, updated on 13-Mar-2020

### Summary

**Official Symbol** Arhgef5 provided by [MGI](#)

**Official Full Name** Rho guanine nucleotide exchange factor (GEF) 5 provided by [MGI](#)

**Primary source** [MGI:MGI:1858952](#)

**See related** [Ensembl:ENSMUSG000000033542](#)

**Gene type** protein coding

**RefSeq status** PROVISIONAL

**Organism** [Mus musculus](#)

**Lineage** Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus

**Also known as** Tim1; AA717842; AW495314; 2210412D05Rik

**Expression** Broad expression in large intestine adult (RPKM 16.0), placenta adult (RPKM 11.8) and 23 other tissues [See more](#)

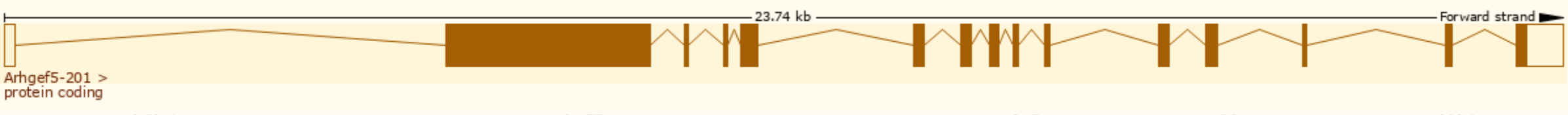
**Orthologs** [human](#) [all](#)

# Transcript information ( Ensembl )

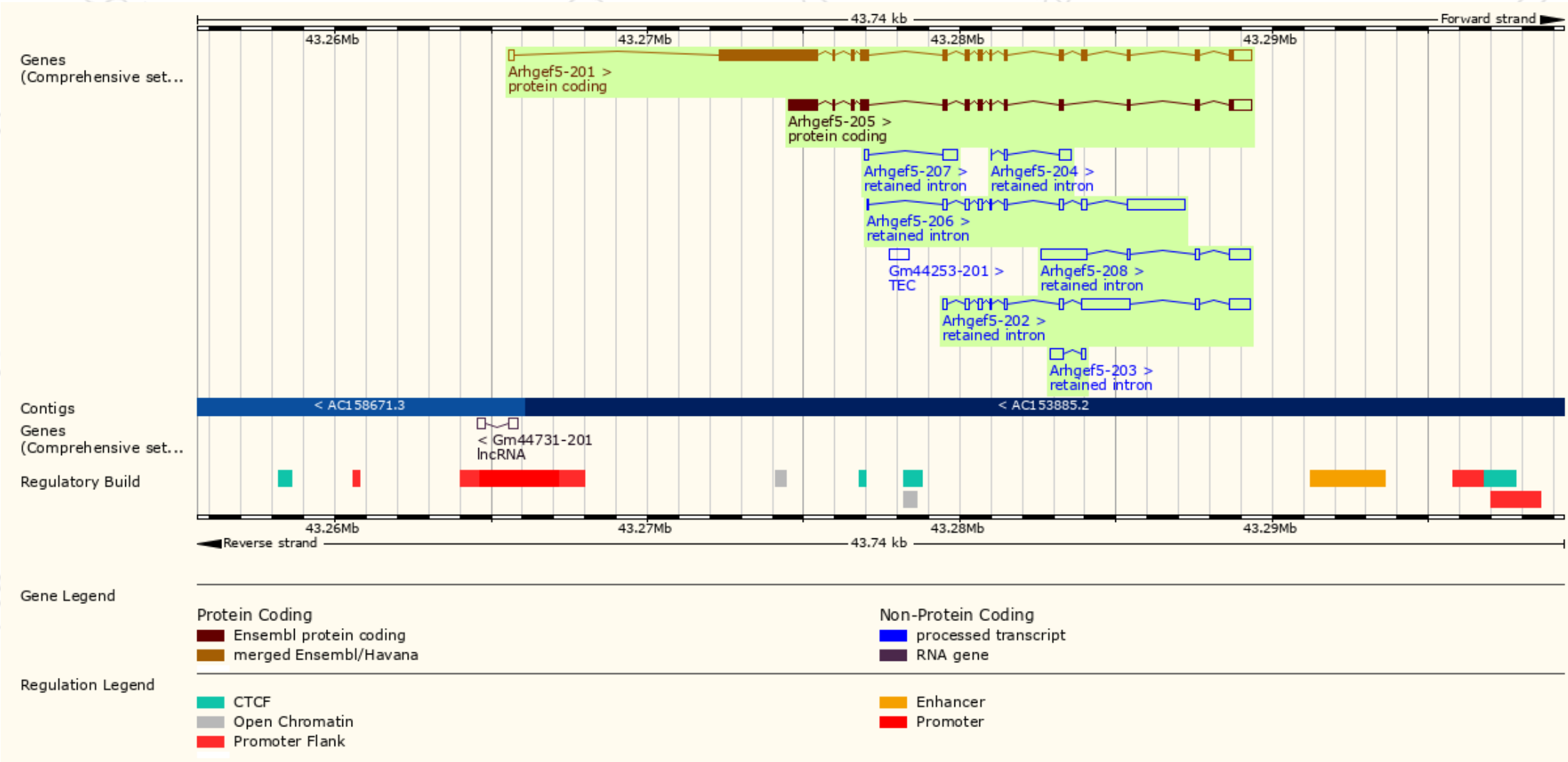
The gene has 8 transcripts, and all transcripts are shown below:

| Name        | Transcript ID                         | bp   | Protein                | Biotype         | CCDS                      | UniProt                | Flags                         |
|-------------|---------------------------------------|------|------------------------|-----------------|---------------------------|------------------------|-------------------------------|
| Arhgef5-201 | <a href="#">ENSMUST00000031750.13</a> | 5469 | <a href="#">1581aa</a> | Protein coding  | <a href="#">CCDS51759</a> | <a href="#">E9Q7D5</a> | TSL:5 Gencode basic APPRIS P1 |
| Arhgef5-205 | <a href="#">ENSMUST00000182924.1</a>  | 2938 | <a href="#">796aa</a>  | Protein coding  | -                         | <a href="#">S4R1F1</a> | CDS 5' incomplete TSL:5       |
| Arhgef5-202 | <a href="#">ENSMUST00000182190.7</a>  | 3098 | No protein             | Retained intron | -                         | -                      | TSL:1                         |
| Arhgef5-206 | <a href="#">ENSMUST00000183094.7</a>  | 2777 | No protein             | Retained intron | -                         | -                      | TSL:5                         |
| Arhgef5-208 | <a href="#">ENSMUST00000183313.1</a>  | 2319 | No protein             | Retained intron | -                         | -                      | TSL:1                         |
| Arhgef5-207 | <a href="#">ENSMUST00000183227.1</a>  | 598  | No protein             | Retained intron | -                         | -                      | TSL:1                         |
| Arhgef5-203 | <a href="#">ENSMUST00000182647.1</a>  | 573  | No protein             | Retained intron | -                         | -                      | TSL:2                         |
| Arhgef5-204 | <a href="#">ENSMUST00000182752.1</a>  | 519  | No protein             | Retained intron | -                         | -                      | TSL:3                         |

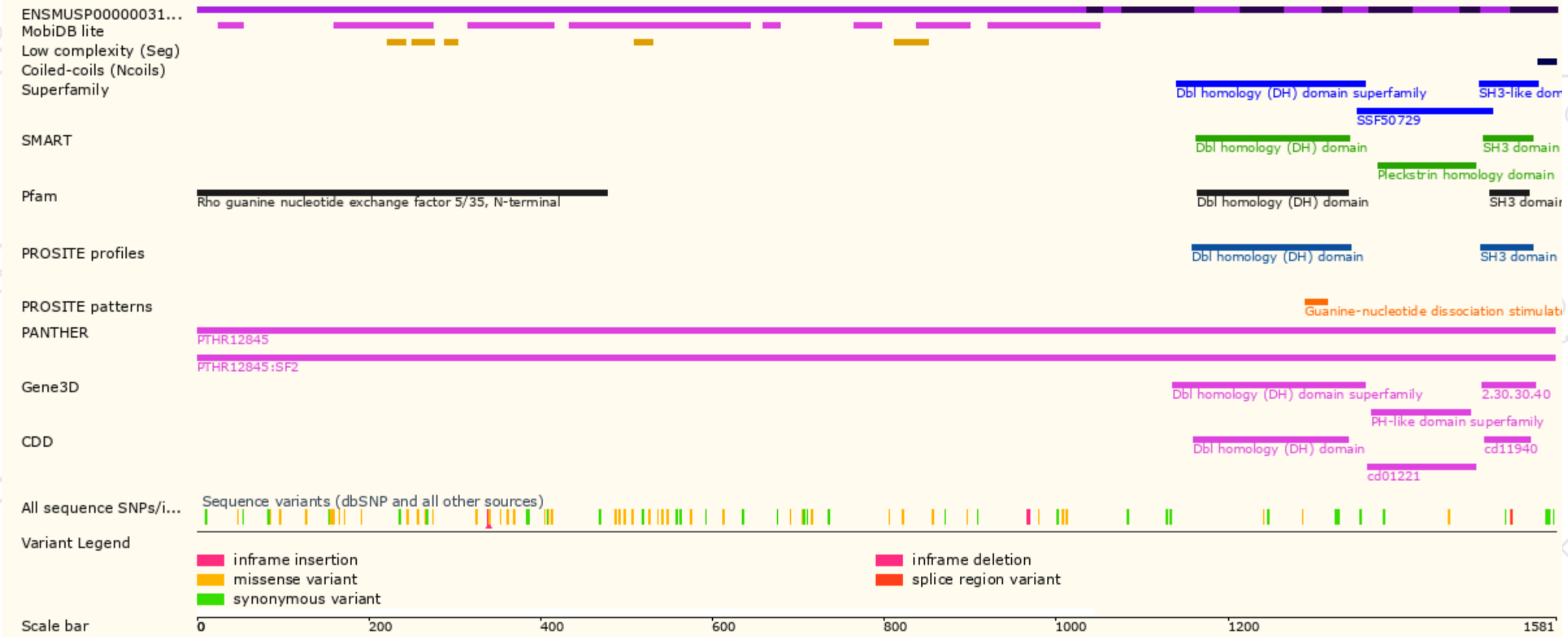
The strategy is based on the design of *Arhgef5*-201 transcript, the transcription is shown below:



# Genomic location distribution

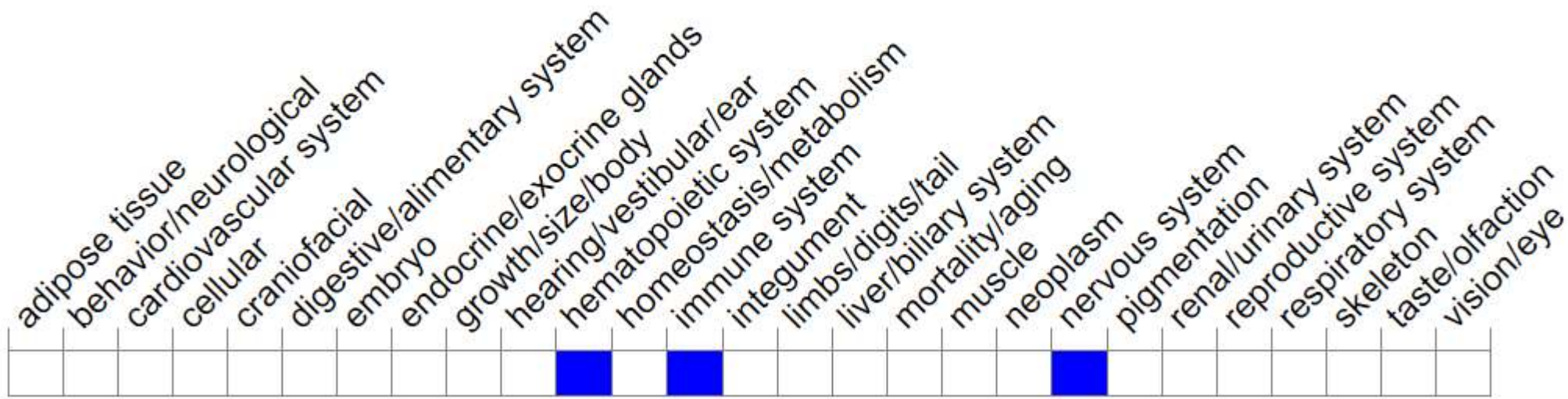


# Protein domain



# Mouse phenotype description(MGI)

## Phenotype Overview ?



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, mice homozygous for a knock-out allele exhibit decreased Th2 response in an ovalbumin-induced asthma model.

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