

Muc2 Cas9-KO Strategy

Designer: Daohua Xu

Reviewer: Xueting Zhang

Design Date: 2020-11-3

Project Overview

Project Name

Muc2

Project type

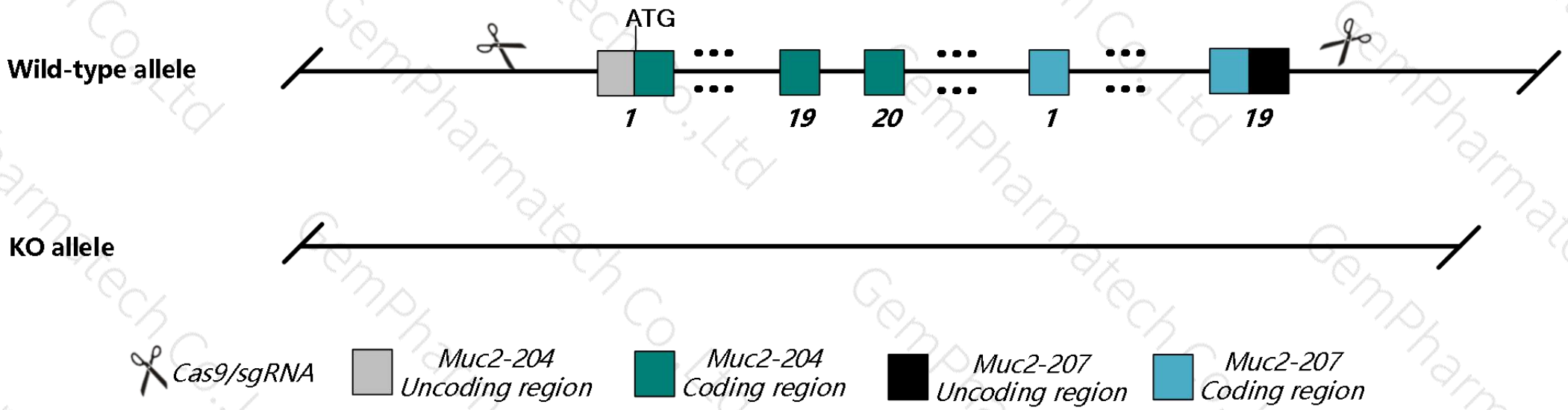
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Muc2* gene. The schematic diagram is as follows:



- The *Muc2* gene has 8 transcripts. According to the structure of *Muc2* gene, exon1 of *Muc2*-204 (ENSMUST00000185406.6) -exon19 of *Muc2*-207 (ENSMUST00000187945.6) transcript is recommended as the knockout region. The region contains all of the coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Muc2* gene. The brief process is as follows: sgRNA was transcribed in vitro. Cas9, sgRNA 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.

- According to the existing MGI data, homozygotes for a point mutation have soft feces at weaning and develop diarrhea associated with malabsorption syndrome. Homozygous null mutants pass blood in their feces at 6 months, and 65% of null mutants have intestinal tumors at 1 year.
- The *Muc2* gene is located on the Chr7. 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)



Muc2 mucin 2 [*Mus musculus* (house mouse)]

Gene ID: 17831, updated on 27-Oct-2020

Summary

Official Symbol	Muc2 provided by MGI
Official Full Name	mucin 2 provided by MGI
Primary source	MGI:MGI:1339364
Gene type	protein coding
RefSeq status	VALIDATED
Organism	<i>Mus musculus</i>
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	MCM; wnn; 2010015E03Rik
Annotation information	Annotation category: suggests misassembly
Expression	Biased expression in colon adult (RPKM 1294.7), large intestine adult (RPKM 306.2) and 2 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

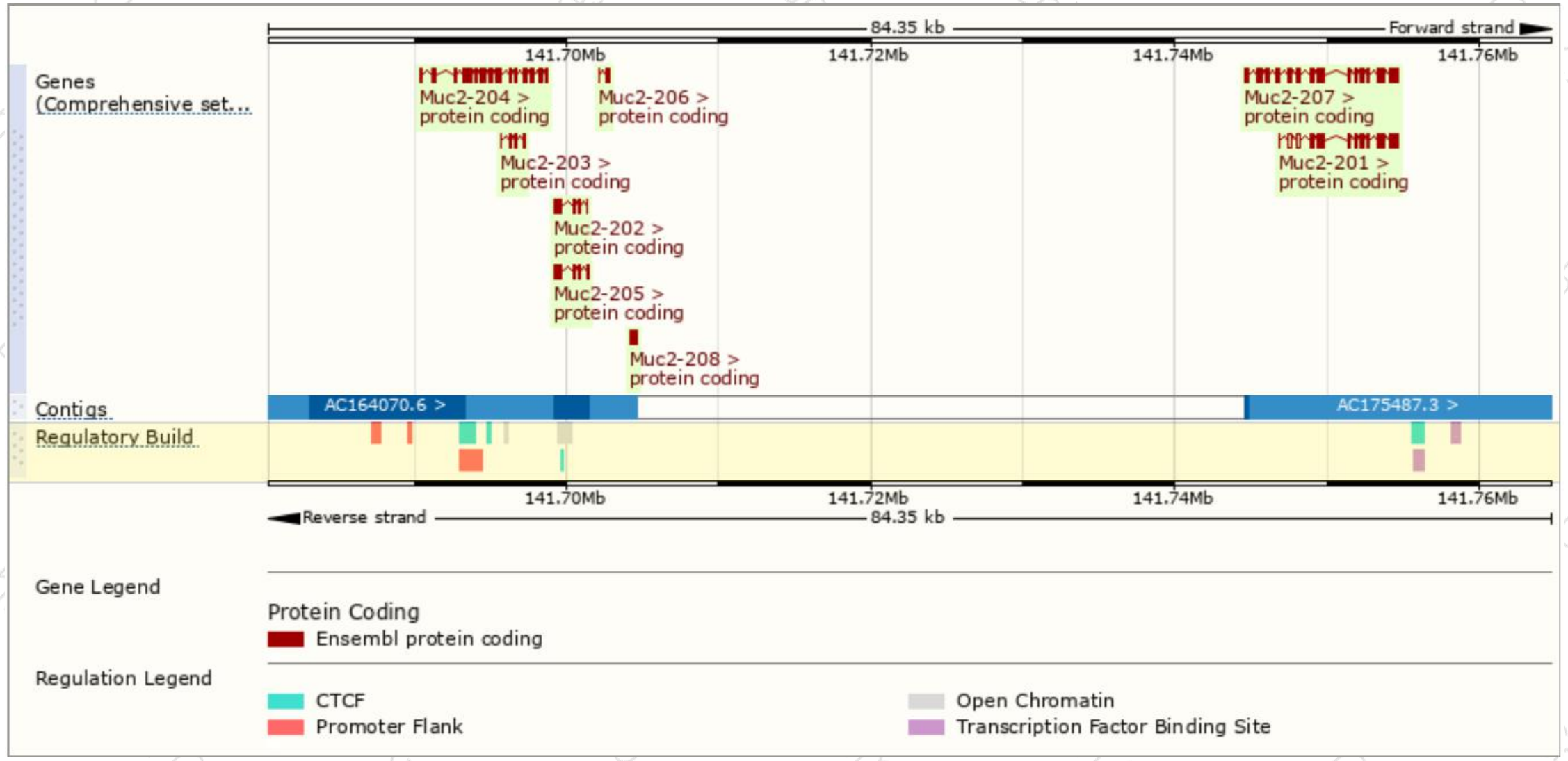
The gene has 8 transcripts, and all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Muc2-207	ENSMUST00000187945.6	2926	923aa	Protein coding	-	A0A087WSP1	CDS 5' incomplete TSL:1
Muc2-204	ENSMUST00000185406.6	2690	887aa	Protein coding	-	A0A087WSG8	CDS 3' incomplete TSL:5
Muc2-201	ENSMUST00000026590.8	2032	483aa	Protein coding	-	A0A140T8I8	TSL:1 GENCODE basic APPRIS P1
Muc2-205	ENSMUST00000185823.6	823	274aa	Protein coding	-	A0A087WS13	CDS 5' and 3' incomplete TSL:3
Muc2-202	ENSMUST00000167366.2	711	237aa	Protein coding	-	F6QGV1	TSL:5 GENCODE basic
Muc2-208	ENSMUST00000191587.1	447	149aa	Protein coding	-	A0A087WP72	CDS 5' and 3' incomplete TSL:NA
Muc2-203	ENSMUST00000179227.1	399	132aa	Protein coding	-	Q9R1L0	TSL:1 GENCODE basic
Muc2-206	ENSMUST00000187789.1	241	80aa	Protein coding	-	A0A087WQU6	CDS 5' and 3' incomplete TSL:5

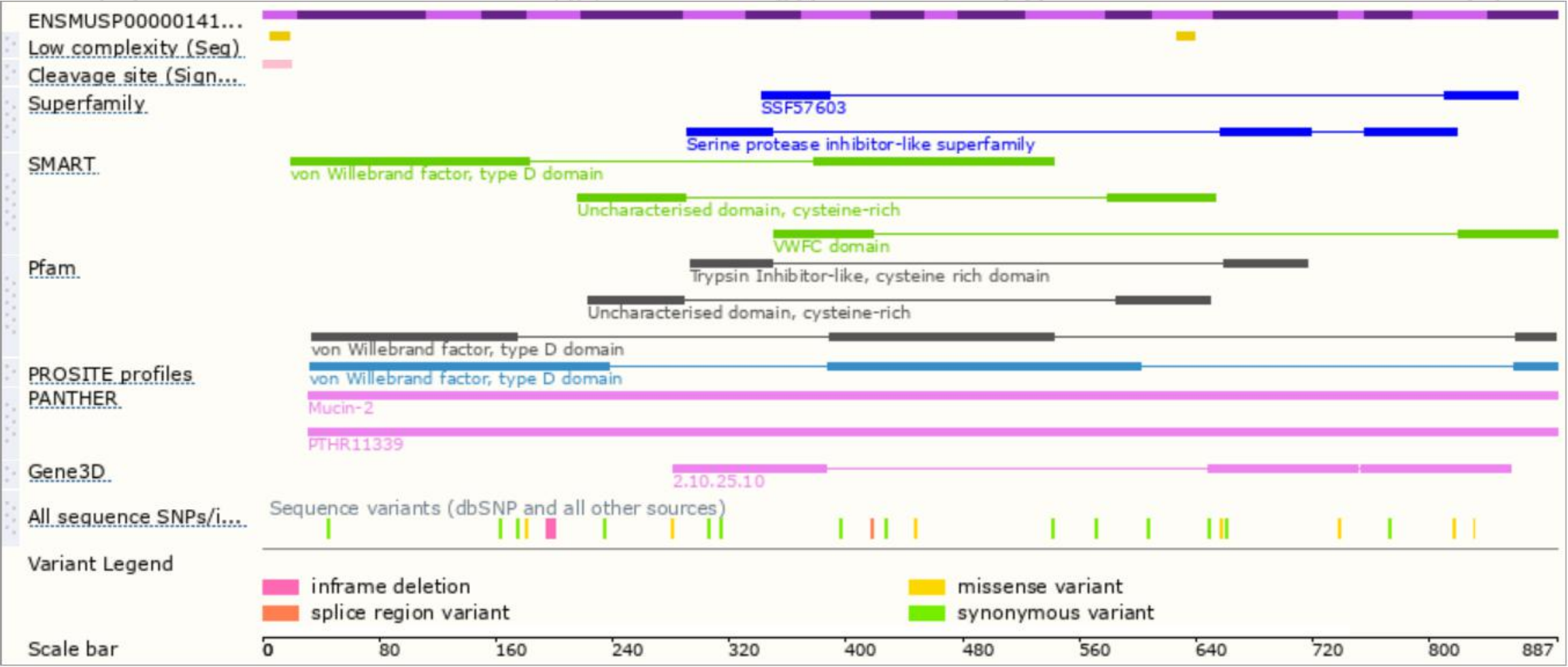
The strategy is based on the design of *Muc2-204*&*Muc2-207* transcript, The transcription is shown below:



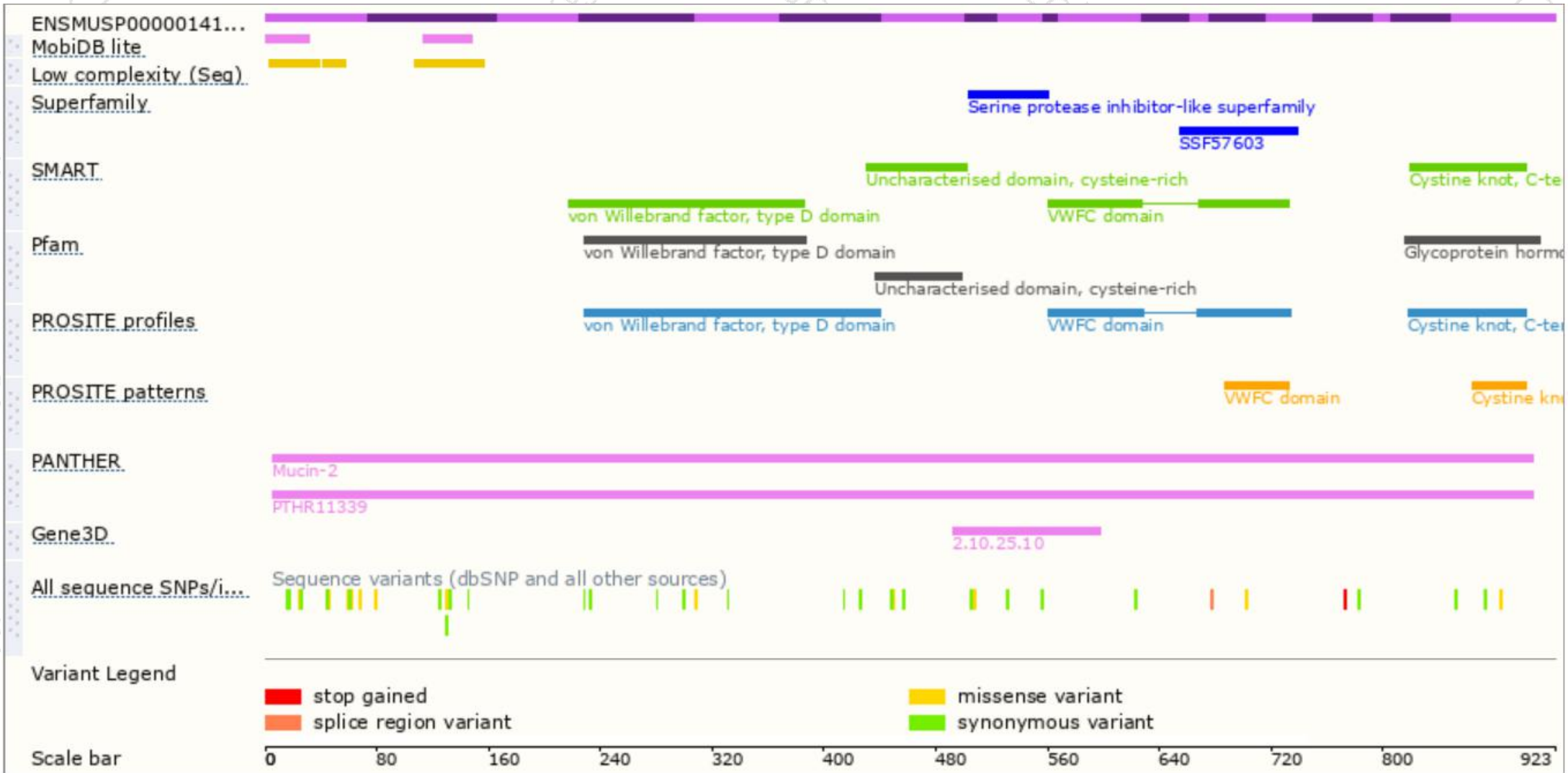
Genomic location distribution



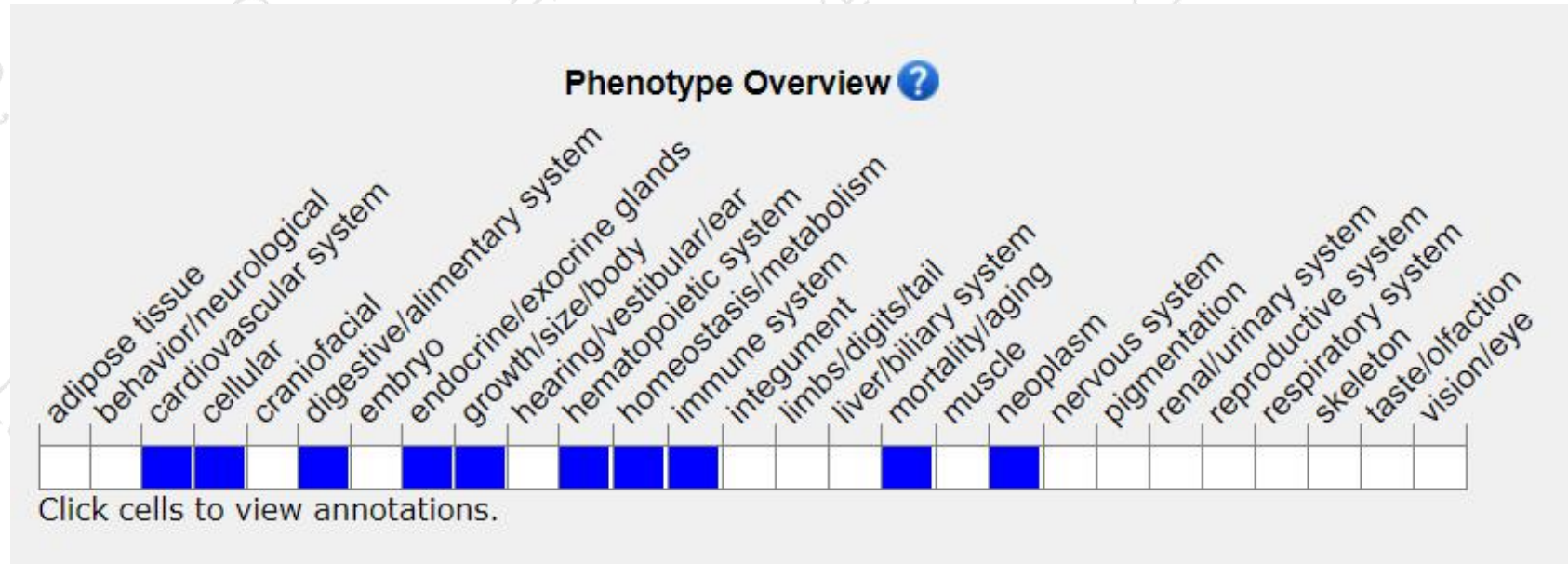
Protein domain



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 point mutation have soft feces at weaning and develop diarrhea associated with malabsorption syndrome. Homozygous null mutants pass blood in their feces at 6 months, and 65% of null mutants have intestinal tumors at 1 year.

If you have any questions, you are welcome to inquire.
Tel: 025-5864 1534



集萃药康生物科技
GemPharmatech Co.,Ltd

