

***Muc4* Cas9-KO Strategy**

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Project Overview

Project Name

Muc4

Project type

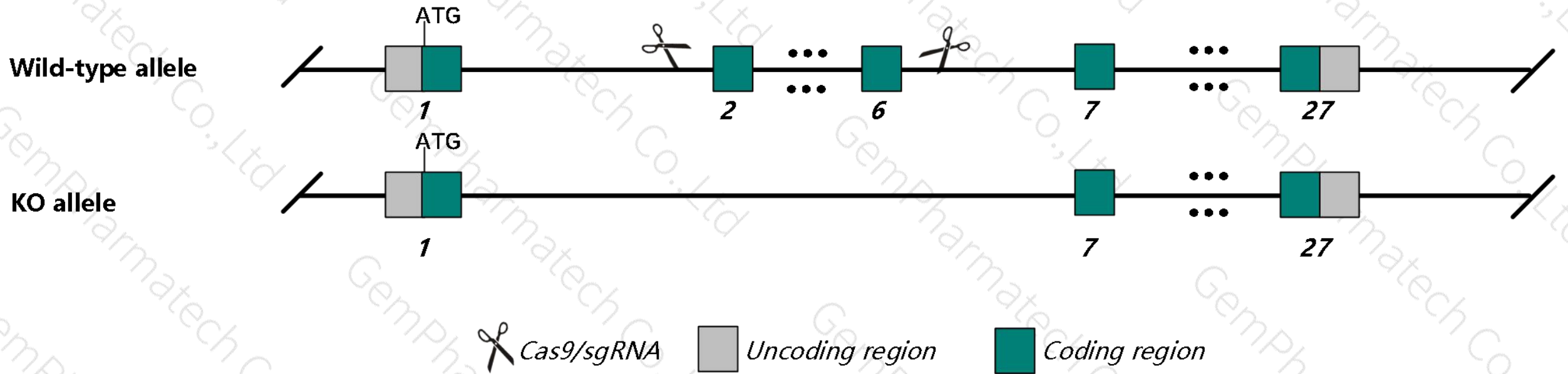
Cas9-KO

Strain background

C57BL/6JGpt

Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Muc4* gene. The schematic diagram is as follows:



- The *Muc4* gene has 8 transcripts. According to the structure of *Muc4* gene, exon2-exon6 of *Muc4-201*(ENSMUST00000096106.9) transcript is recommended as the knockout region. The region contains 7187bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Muc4* gene. The brief process is as follows: gRNA was transcribed in vitro. Cas9 and gRNA 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, mice homozygous for a knock-out allele exhibit resistance to DSS-treated colitis and colitis-associated colorectal cancer.
- The *Muc4* gene is located on the Chr16. 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)

Muc4 mucin 4 [*Mus musculus* (house mouse)]

Gene ID: 140474, updated on 22-Jul-2020

Summary



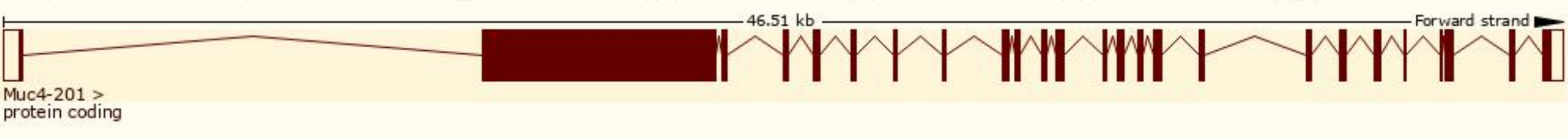
Official Symbol	Muc4 provided by MGI
Official Full Name	mucin 4 provided by MGI
Primary source	MGI:MGI:2153525
See related	Ensembl:ENSMUSG00000079620
Gene type	protein coding
RefSeq status	REVIEWED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Asgp; 4933405I11Rik
Summary	The major constituents of mucus, the viscous secretion that covers epithelial surfaces such as those in the trachea, colon, and cervix, are highly glycosylated proteins called mucins. These glycoproteins play important roles in the protection of the epithelial cells and have been implicated in epithelial renewal and differentiation. This gene encodes an integral membrane glycoprotein found on the cell surface. A large 5' exon encodes at least 15 tandem repeats of 124-126 amino acids. [provided by RefSeq, Jul 2008]
Expression	Biased expression in colon adult (RPKM 15.2), large intestine adult (RPKM 5.6) and 6 other tissues See more
Orthologs	human all

Transcript information (Ensembl)

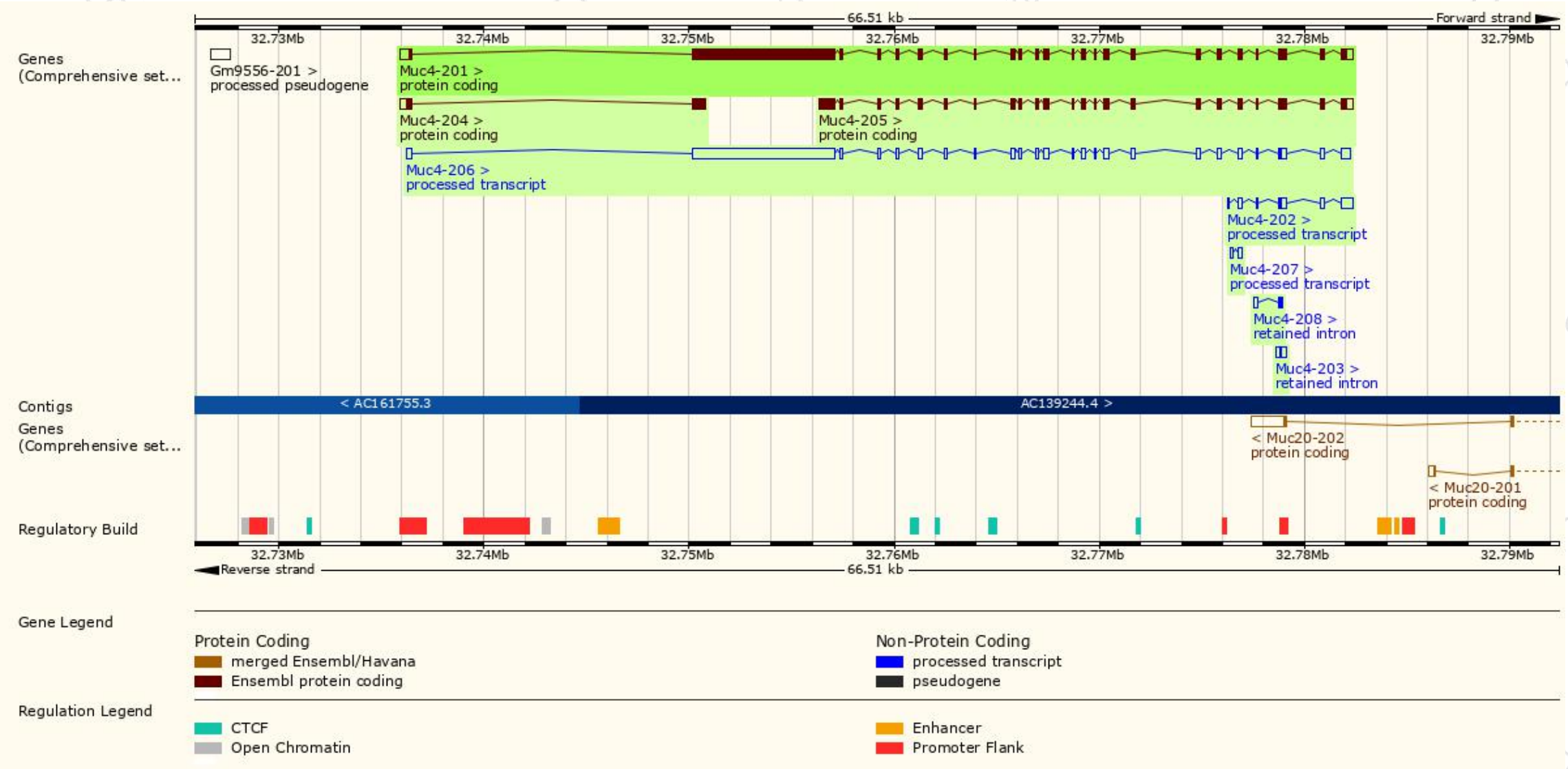
The gene has 8 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Muc4-201	ENSMUST00000096106.9	11277	3470aa	Protein coding	-	E9Q7Q0	TSL:5 GENCODE basic APPRIS P1
Muc4-205	ENSMUST00000135753.1	4575	1401aa	Protein coding	-	F6R2G3	CDS 5' incomplete TSL:1
Muc4-204	ENSMUST00000132475.6	1190	293aa	Protein coding	-	E9Q9U1	CDS 3' incomplete TSL:1
Muc4-206	ENSMUST00000142355.8	10805	No protein	Processed transcript	-	-	TSL:5
Muc4-202	ENSMUST00000115119.7	1348	No protein	Processed transcript	-	-	TSL:1
Muc4-207	ENSMUST00000143297.1	330	No protein	Processed transcript	-	-	TSL:5
Muc4-203	ENSMUST00000131419.1	434	No protein	Retained intron	-	-	TSL:3
Muc4-208	ENSMUST00000149773.1	297	No protein	Retained intron	-	-	TSL:3

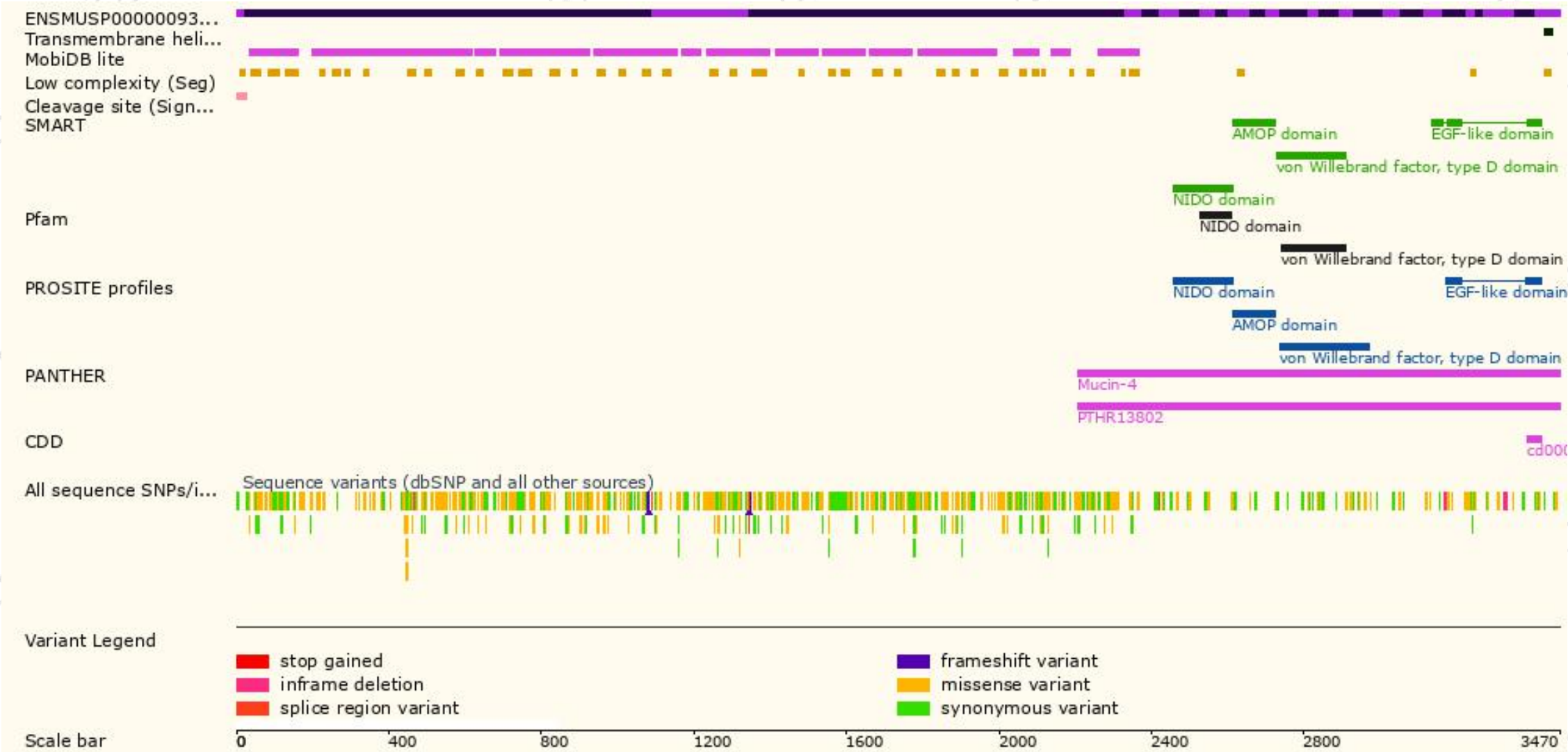
The strategy is based on the design of *Muc4-201* transcript,the transcription is shown below:



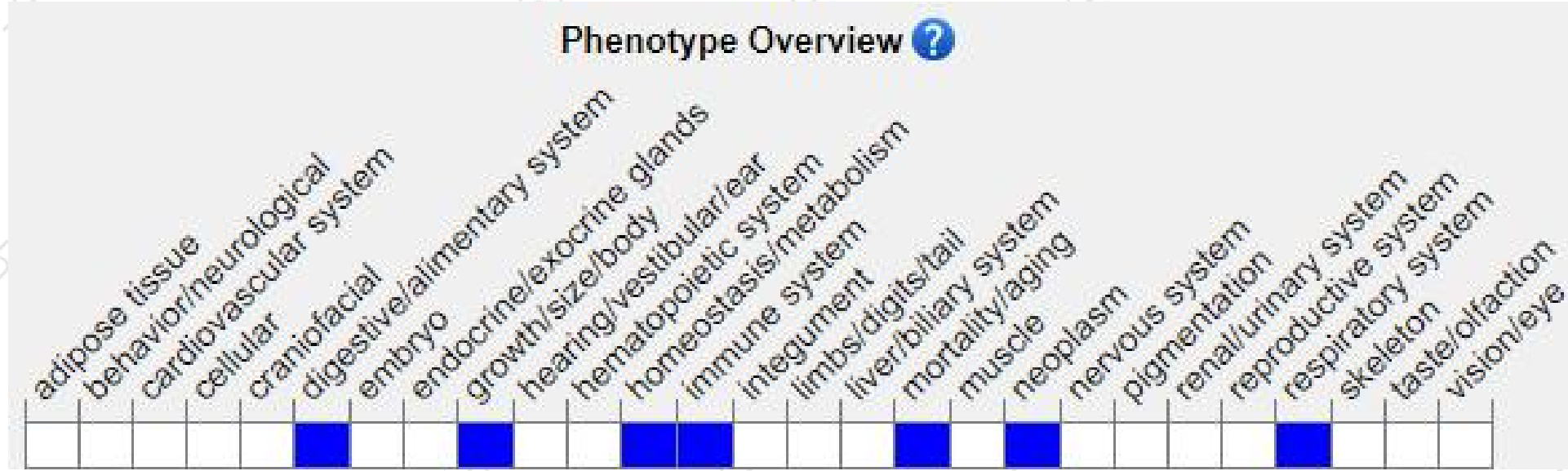
Genomic location distribution



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, mice homozygous for a knock-out allele exhibit resistance to DSS-treated colitis and colitis-associated colorectal cancer.

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

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