

# ***Msh5*** Cas9-KO Strategy

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Reviewer: Jia Yu

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# Project Overview

**Project Name**

*Msh5*

**Project type**

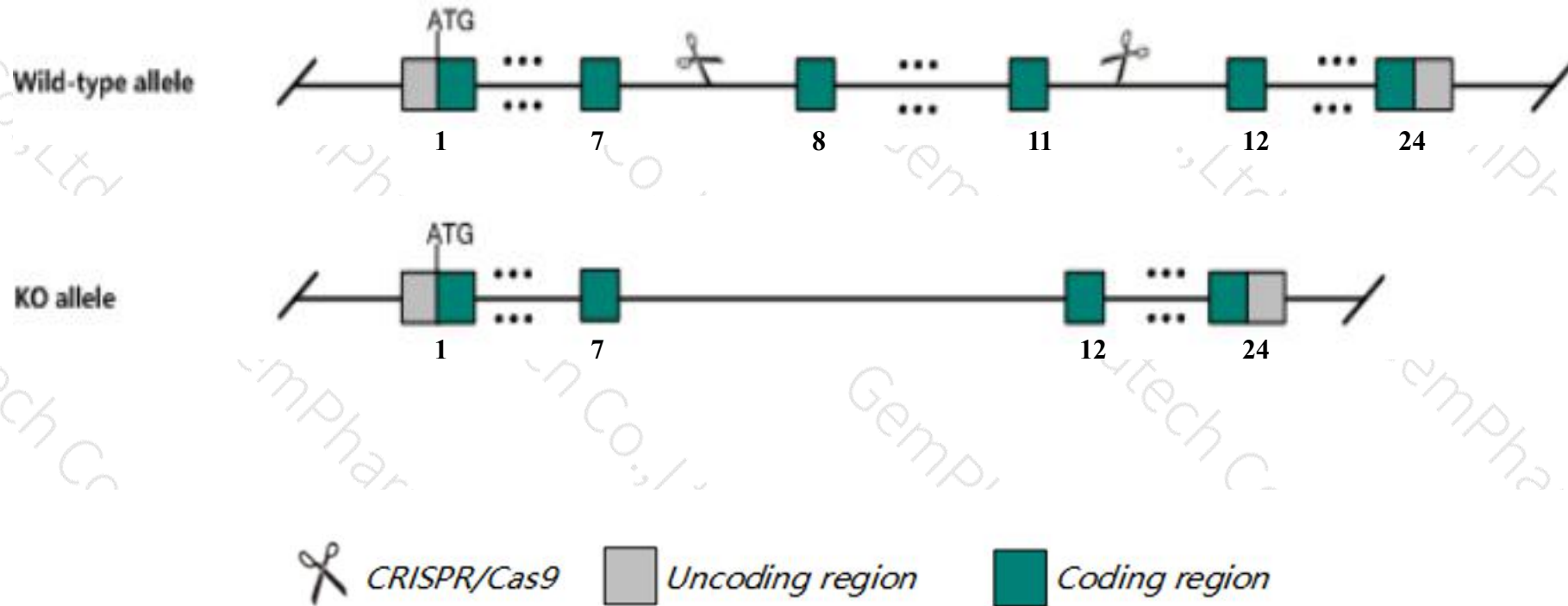
**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Msh5* gene. The schematic diagram is as follows:



- The *Msh5* gene has 12 transcripts. According to the structure of *Msh5* gene, exon8-exon11 of *Msh5-201* (ENSMUST00000007250.13) transcript is recommended as the knockout region. The region contains 331bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Msh5* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, homozygotes for targeted null mutations exhibit disrupted chromosome pairing in meiosis i resulting in cell death and sterility. in males, testes size is reduced, and in females, there is a total loss of ovarian structure.
- The *Msh5* gene is located on the Chr17. 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)

## Msh5 mutS homolog 5 [Mus musculus (house mouse)]

Gene ID: 17687, updated on 13-Mar-2020

### Summary

**Official Symbol** Msh5 provided by MGI

**Official Full Name** mutS homolog 5 provided by MGI

**Primary source** MGI:MGI:1329021

**See related** Ensembl:ENSMUSG00000007035

**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** Mut5

**Summary** This gene encodes a member of the MutS family of proteins that play critical roles in DNA mismatch repair and meiotic homologous recombination processes. Mice lacking the encoded protein are viable but sterile, with severe defects in spermatogenesis in males and complete loss of ovarian structures in females. Mutations in a similar gene in humans have been shown to cause common variable immune deficiency (CVID) and immunoglobulin A deficiency. Alternative splicing of this gene results in multiple transcript variants. [provided by RefSeq, Jan 2015]

**Expression** Ubiquitous expression in testis adult (RPKM 3.5), liver E18 (RPKM 1.6) and 26 other tissues [See more](#)

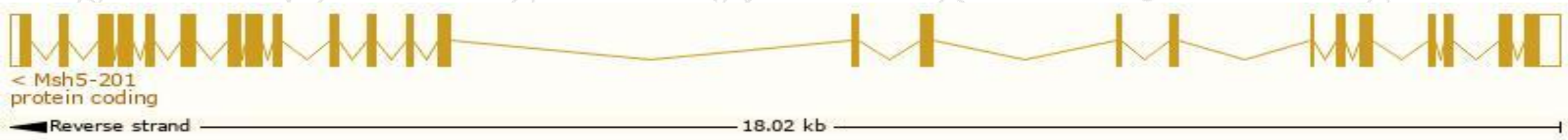
**Orthologs** [human](#) [all](#)

# Transcript information (Ensembl)

The gene has 12 transcripts,all transcripts are shown below:

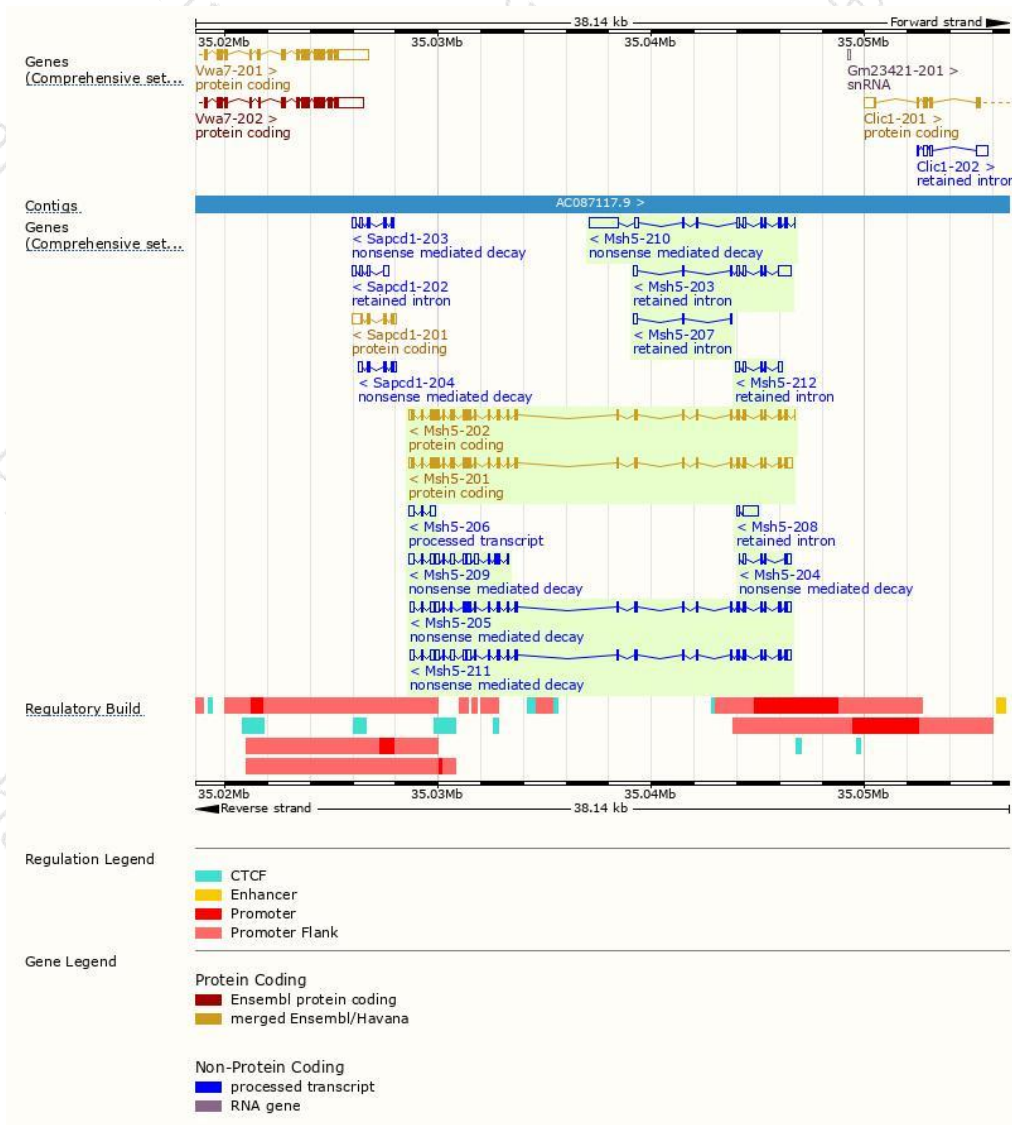
Name ▲	Transcript ID ▲	bp ▲	Protein ▲	Biotype ▲	CCDS ▲	UniProt ▲	Flags ▲
Msh5-201	<a href="#">ENSMUST00000007250.13</a>	2886	<a href="#">833aa</a>	Protein coding	<a href="#">CCDS28674</a>	<a href="#">A0A0R4IZY8</a>	TSL:1 GENCODE basic APPRIS P1
Msh5-202	<a href="#">ENSMUST000000097338.10</a>	2678	<a href="#">833aa</a>	Protein coding	<a href="#">CCDS28674</a>	<a href="#">A0A0R4IZY8</a>	TSL:1 GENCODE basic APPRIS P1
Msh5-203	<a href="#">ENSMUST00000165329.8</a>	1248	No protein	Retained intron	-	-	TSL:2
Msh5-204	<a href="#">ENSMUST00000172491.1</a>	591	<a href="#">67aa</a>	Nonsense mediated decay	-	<a href="#">G3UWT5</a>	TSL:3
Msh5-205	<a href="#">ENSMUST00000172536.1</a>	2630	<a href="#">616aa</a>	Nonsense mediated decay	-	<a href="#">G3UZB5</a>	TSL:1
Msh5-206	<a href="#">ENSMUST00000173124.7</a>	538	No protein	Processed transcript	-	-	TSL:2
Msh5-207	<a href="#">ENSMUST00000173685.7</a>	279	No protein	Retained intron	-	-	TSL:3
Msh5-208	<a href="#">ENSMUST00000173928.1</a>	855	No protein	Retained intron	-	-	TSL:2
Msh5-209	<a href="#">ENSMUST00000174026.7</a>	1743	<a href="#">75aa</a>	Nonsense mediated decay	-	<a href="#">G3UZ06</a>	CDS 5' incomplete TSL:1
Msh5-210	<a href="#">ENSMUST00000174556.7</a>	2391	<a href="#">53aa</a>	Nonsense mediated decay	-	<a href="#">G3UYF3</a>	TSL:2
Msh5-211	<a href="#">ENSMUST00000174603.7</a>	2718	<a href="#">499aa</a>	Nonsense mediated decay	-	<a href="#">G3UYF6</a>	TSL:1
Msh5-212	<a href="#">ENSMUST00000174741.7</a>	622	No protein	Retained intron	-	-	TSL:3

The strategy is based on the design of *Msh5-201* transcript,The transcription is shown below





# Genomic location distribution

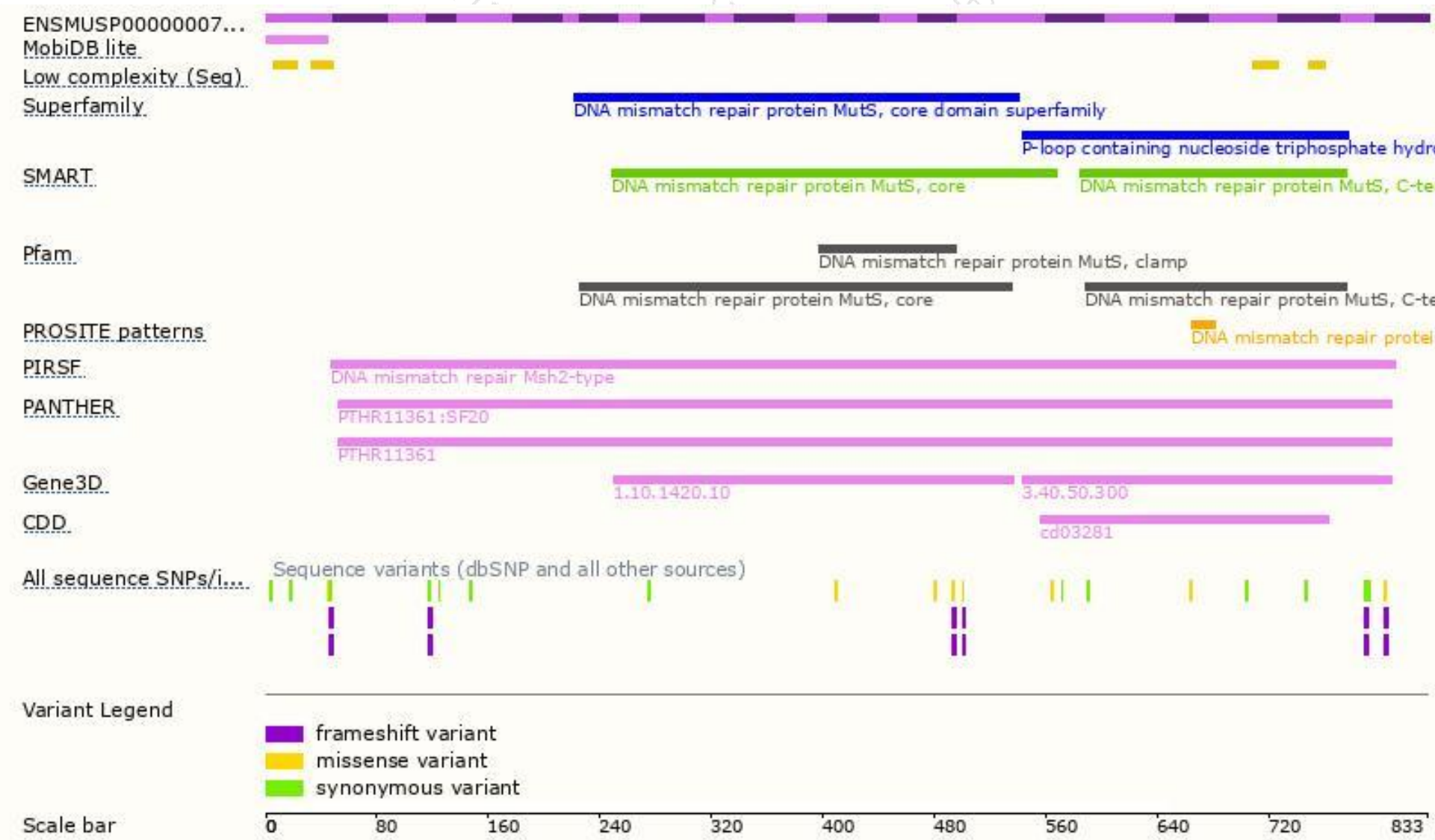




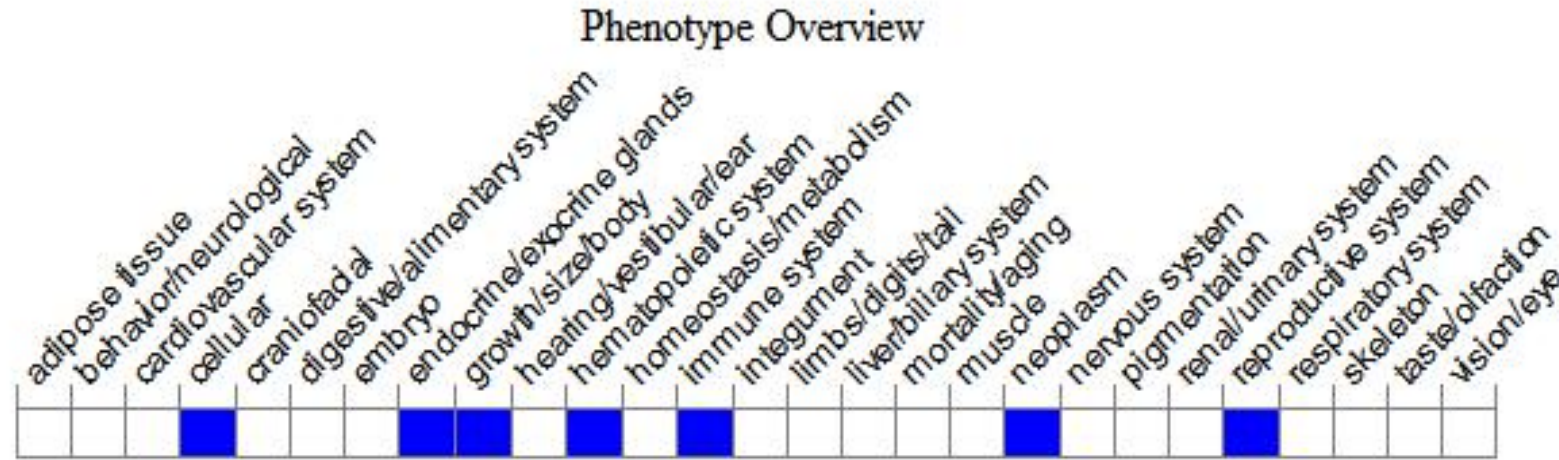
# Protein domain



集萃药康  
GemPharmatech



# 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 targeted null mutations exhibit disrupted chromosome pairing in meiosis I resulting in cell death and sterility. In males, testes size is reduced, and in females, there is a total loss of ovarian structure.

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

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