# *Usp3* Cas9-CKO Strategy

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# Project Overview

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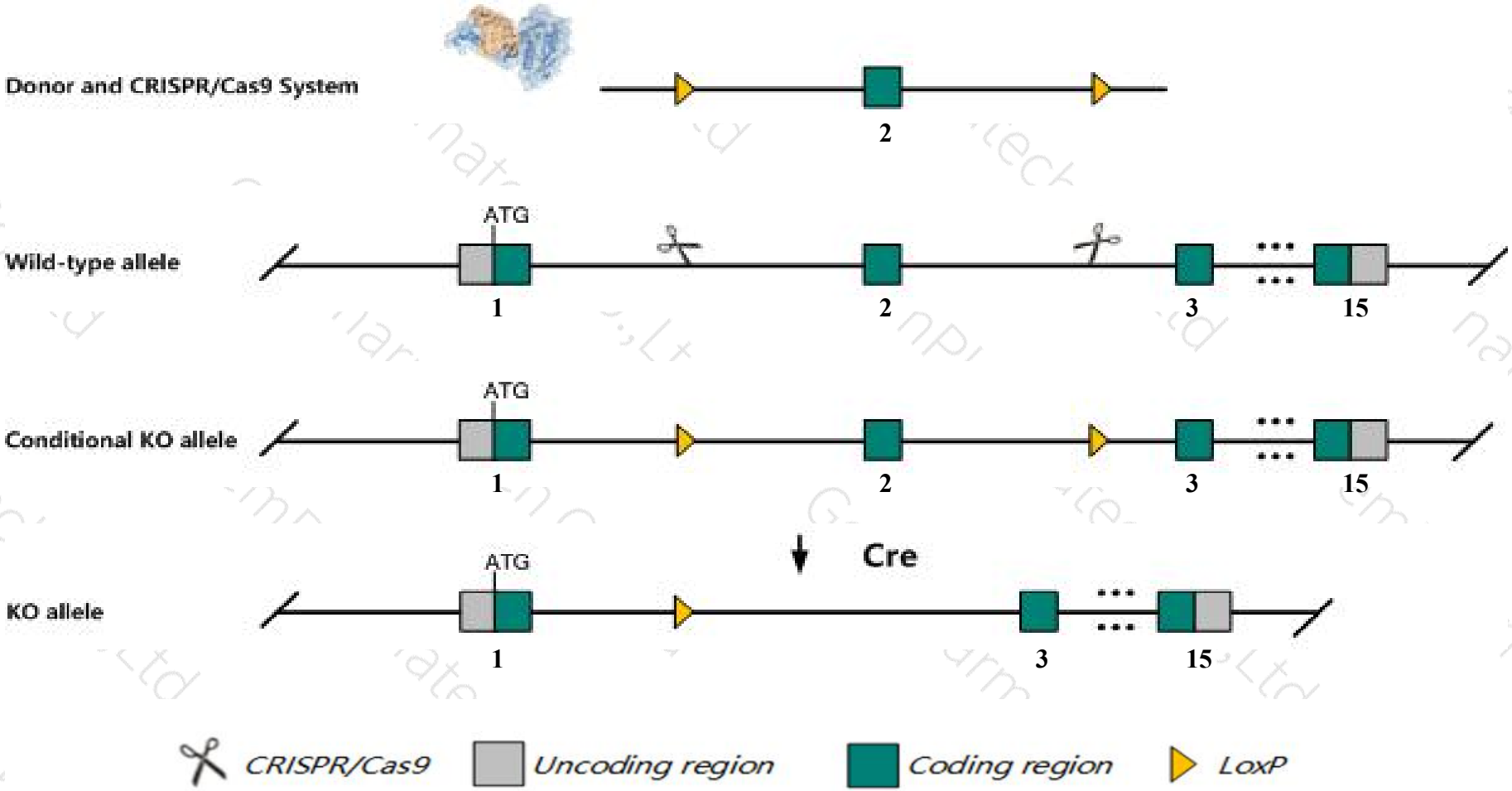
| **Project Name** | ***Usp3*** |
| **Project type** | **Cas9-CKO** |
| **Strain background** | **C57BL/6JGpt** |

# Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Usp3* gene. The schematic diagram is as follows:



# Technical routes

- The *Usp3* gene has 11 transcripts. According to the structure of *Usp3* gene, exon2 of *Usp3-205* (ENSMUST00000127569.7) transcript is recommended as the knockout region.The region contains 61bp coding sequence. Knock out the region will result in disruption of protein function.

- In this project we use CRISPR/Cas9 technology to modify *Usp3* gene. The brief process is as follows:CRISPR/Cas9 system 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 will be knocked out after mating with mice expressing Cre recombinase, resulting in the loss of function of the target gene in specific tissues and cell types.

# Notice

➢ The *Usp3* gene is located on the Chr9. 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

# Gene information （NCBI）

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## Usp3 ubiquitin specific peptidase 3 [Mus musculus (house mouse)]

Gene ID: 235441, updated on 31-Jan-2019

### Summary

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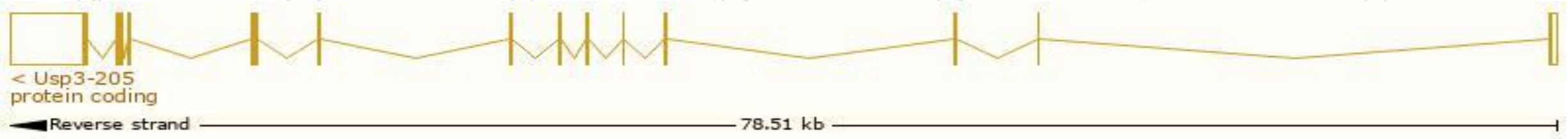
|---|---|
| **Official Symbol** | Usp3 provided by MGI |
| **Official Full Name** | ubiquitin specific peptidase 3 provided by MGI |
| **Primary source** | MGI:MGI:2152450 |
| **See related** | Ensembl:ENSMUSG00000032376 |
| **Gene type** | protein coding |
| **RefSeq status** | REVIEWED |
| **Organism** | Mus musculus |
| **Lineage** | Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus |
| **Also known as** | AA409661, BC017156 |
| **Summary** | The protein encoded by this gene is a chromatin-associated histone 2A and 2B deubiquitinating enzyme that negatively regulates the DNA damage response. Mice deficient for this enzyme have reduced hematopoietic stem cell reserves, demonstrating a requirement in hematopoietic stem cell homeostasis. In addition, knock down of protein levels results in spontaneous tumor development and shortened lifespan, consistent with a function in preserving chromosomal integrity. Alternative splicing results in multiple transcript variants encoding different isoforms. [provided by RefSeq, Oct 2014] |
| **Expression** | Ubiquitous expression in thymus adult (RPKM 7.4), cerebellum adult (RPKM 5.9) and 28 other tissues See more |
| **Orthologs** | human all |

# Transcript information（Ensembl）

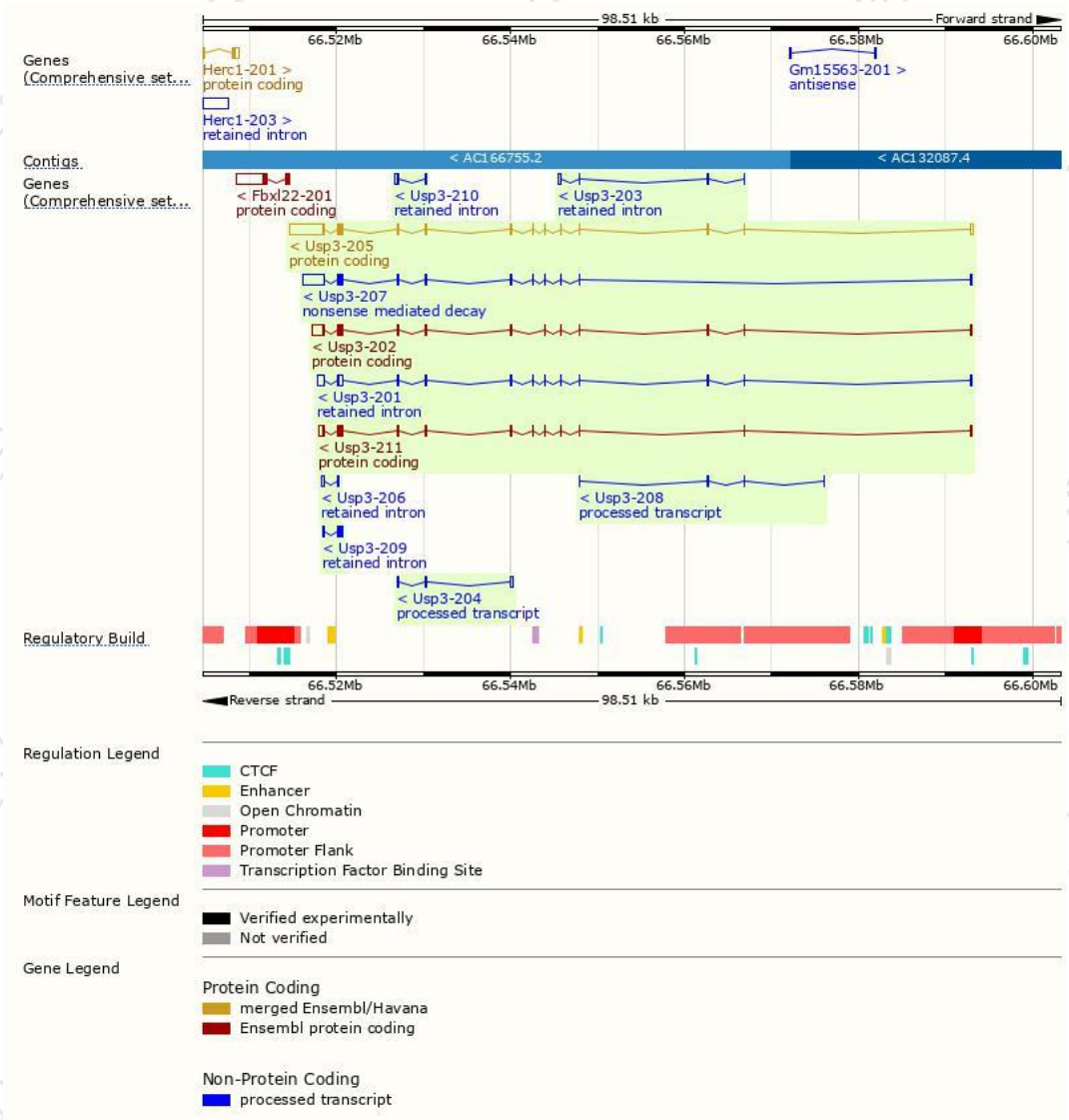
The gene has 11 transcripts,all transcripts are shown below:

| Name | Transcript ID | bp | Protein | Biotype | CCDS | UniProt | Flags |
|---|---|---|---|---|---|---|---|
| Usp3-205 | ENSMUST00000127569.7 | 5607 | 520aa | Protein coding | CCDS23305 | Q91W36 | TSL:1 GENCODE basic APPRIS P1 |
| Usp3-202 | ENSMUST00000098613.8 | 2797 | 482aa | Protein coding | CCDS81025 | E9Q8W9 | TSL:1 GENCODE basic |
| Usp3-211 | ENSMUST00000174387.1 | 1901 | 476aa | Protein coding | - | G3UZF0 | TSL:5 GENCODE basic |
| Usp3-207 | ENSMUST00000139547.7 | 3662 | 49aa | Nonsense mediated decay | - | D6RG67 | TSL:1 |
| Usp3-204 | ENSMUST00000124694.1 | 588 | No protein | Processed transcript | - | - | TSL:2 |
| Usp3-208 | ENSMUST00000139952.1 | 324 | No protein | Processed transcript | - | - | TSL:5 |
| Usp3-201 | ENSMUST00000034940.10 | 2405 | No protein | Retained intron | - | - | TSL:5 |
| Usp3-203 | ENSMUST00000124519.7 | 664 | No protein | Retained intron | - | - | TSL:3 |
| Usp3-210 | ENSMUST00000154476.7 | 625 | No protein | Retained intron | - | - | TSL:2 |
| Usp3-206 | ENSMUST00000132255.1 | 573 | No protein | Retained intron | - | - | TSL:2 |
| Usp3-209 | ENSMUST00000150840.1 | 565 | No protein | Retained intron | - | - | TSL:2 |

The strategy is based on the design of *Usp3-205* transcript,The transcription is shown below

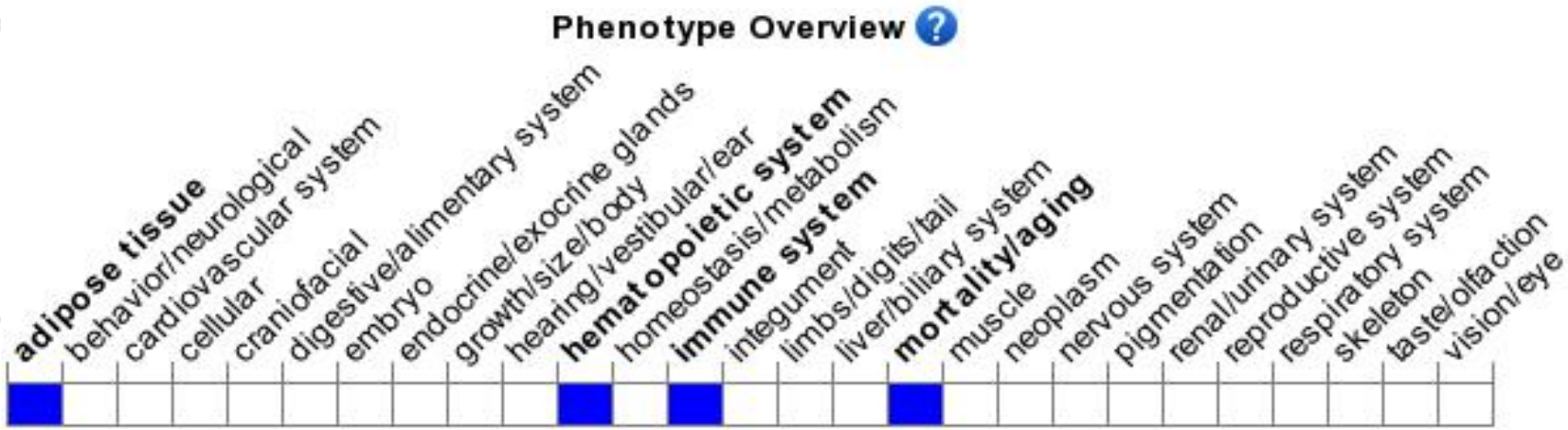


# Genomic location distribution



# 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/).*

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

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