

Mcm7 Cas9-KO Strategy

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Overview

Target Gene Name

- Mcm7

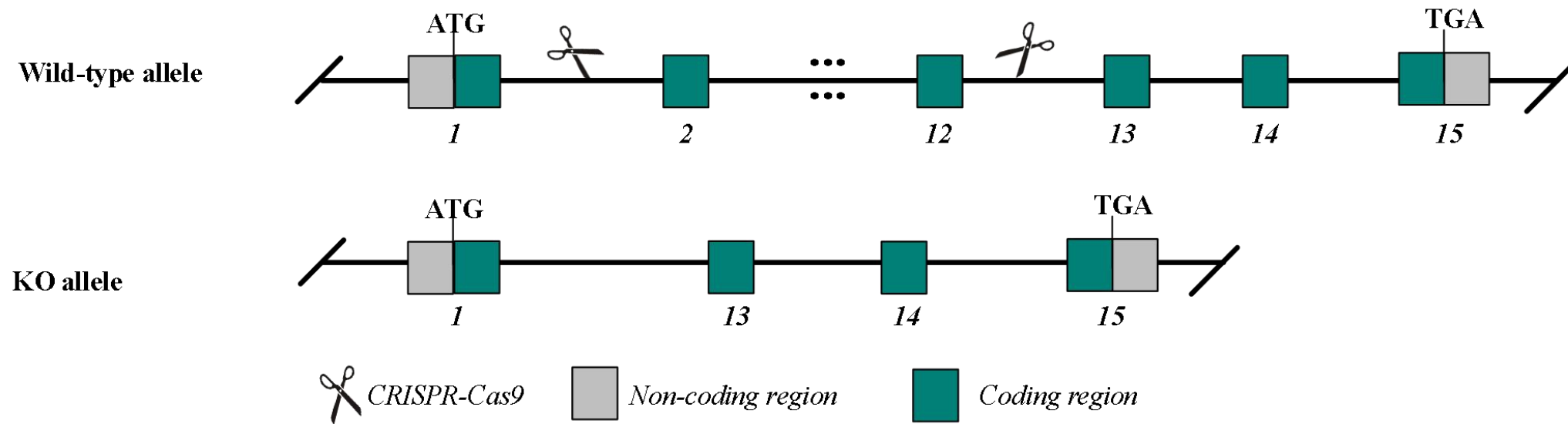
Project Type

- Cas9-KO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Technical Information

- The *Mcm7* gene has 10 transcripts. According to the structure of *Mcm7* gene, exon 2-exon 12 of *Mcm7*-201 (ENSMUST00000000505.16) transcript is recommended as the knockout region. The region contains 1648 bp coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Mcm7* gene. The brief process is as follows: gRNAs were transcribed in vitro. Cas9 and gRNAs 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 on-target amplicon sequencing. A stable F1-generation mouse strain was obtained by mating positive F0-generation mice with C57BL/6JGpt mice and confirmation of the desired mutant allele was carried out by PCR and on-target amplicon sequencing.

Gene Information

Mcm7 minichromosome maintenance complex component 7 [Mus musculus (house mouse)]

Gene ID: 17220, updated on 12-Apr-2023

Summary

Official Symbol	Mcm7 provided by MGI
Official Full Name	minichromosome maintenance complex component 7 provided by MGI
Primary source	MGI:MGI:1298398
See related	Ensembl:ENSMUSG00000029730
Gene type	protein coding
RefSeq status	VALIDATED
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	Mcmd7, mCDC47
Summary	Enables single-stranded DNA binding activity. Contributes to DNA helicase activity. Acts upstream of or within DNA unwinding involved in DNA replication; cell population proliferation; and cellular response to xenobiotic stimulus. Located in nucleus. Is expressed in several structures, including alimentary system; brain; genitourinary system; respiratory system; and sensory organ. Human ortholog(s) of this gene implicated in hepatocellular carcinoma. Orthologous to human MCM7 (minichromosome maintenance complex component 7). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Broad expression in liver E14 (RPKM 73.1), liver E14.5 (RPKM 66.9) and 24 other tissues See more
Orthologs	human all

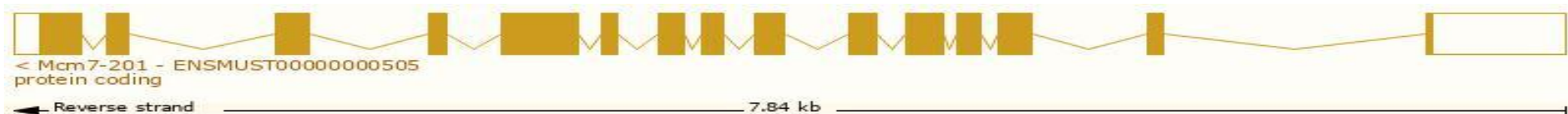
Source: <https://www.ncbi.nlm.nih.gov/>

Transcript Information

The gene has 10 transcripts, all transcripts are shown below:

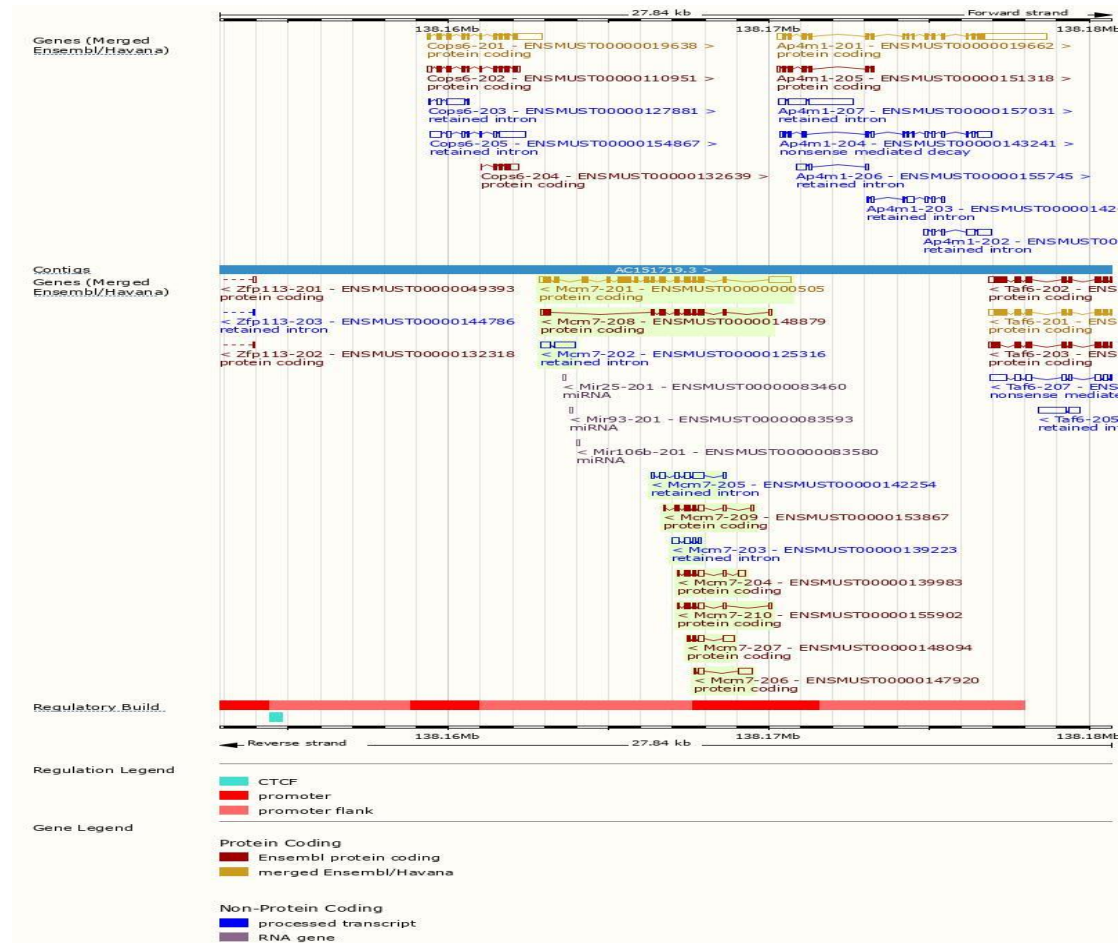
Show/hide columns (1 hidden)							Filter			
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags			
ENSMUST00000000505.16	Mcm7-201	2962	719aa	Protein coding	CCDS19793	Q3U4T8 Q61881	Ensembl Canonical	GENCODE basic	APPRIS P1	TSL:1
ENSMUST00000148879.8	Mcm7-208	1351	389aa	Protein coding		D3Z6N3		GENCODE basic	TSL:5	
ENSMUST00000139983.8	Mcm7-204	829	110aa	Protein coding		D3Z0J6		TSL:3	CDS 3' incomplete	
ENSMUST00000153867.8	Mcm7-209	795	142aa	Protein coding		D3Z2K9		TSL:5	CDS 3' incomplete	
ENSMUST00000155902.8	Mcm7-210	736	110aa	Protein coding		D3Z0J6		TSL:5	CDS 3' incomplete	
ENSMUST00000148094.8	Mcm7-207	705	50aa	Protein coding		D3Z335		TSL:2	CDS 3' incomplete	
ENSMUST00000147920.2	Mcm7-206	660	6aa	Protein coding		-		TSL:3	CDS 3' incomplete	
ENSMUST00000142254.8	Mcm7-205	1023	No protein	Retained intron		-		TSL:5		
ENSMUST00000125316.2	Mcm7-202	986	No protein	Retained intron		-		TSL:2		
ENSMUST00000139223.2	Mcm7-203	629	No protein	Retained intron		-		TSL:2		

The strategy is based on the design of *Mcm7-201* transcript, the transcription is shown below:

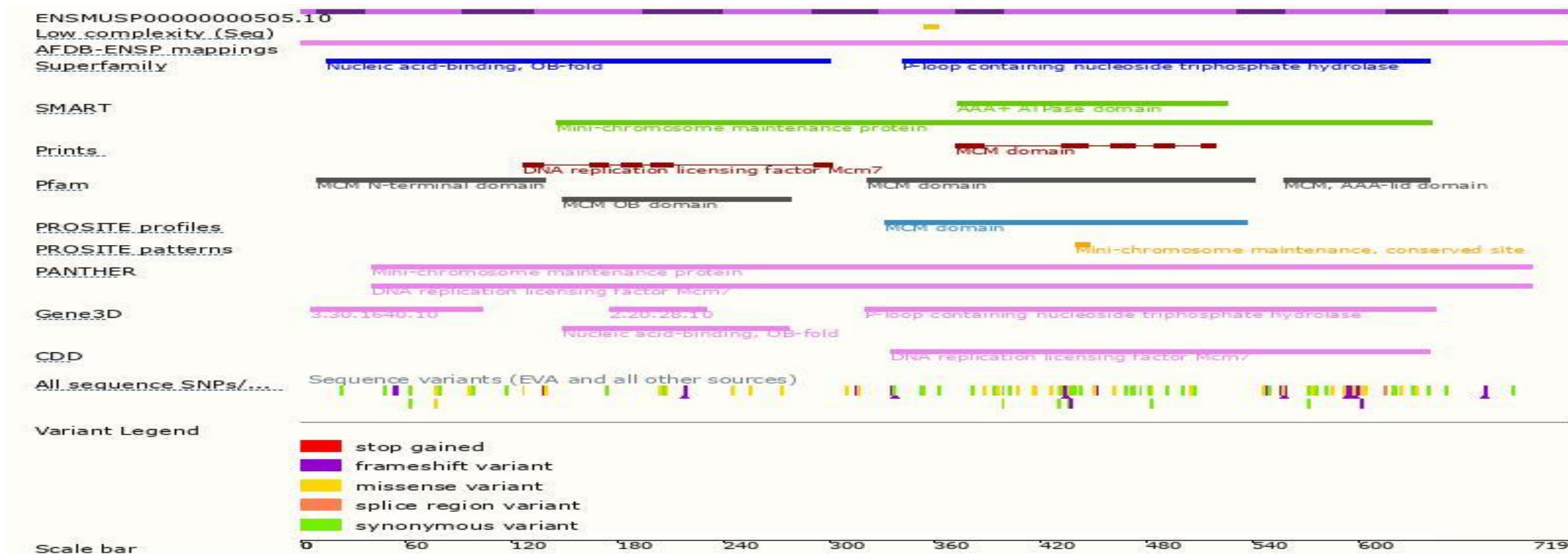


Source: <https://www.ensembl.org>

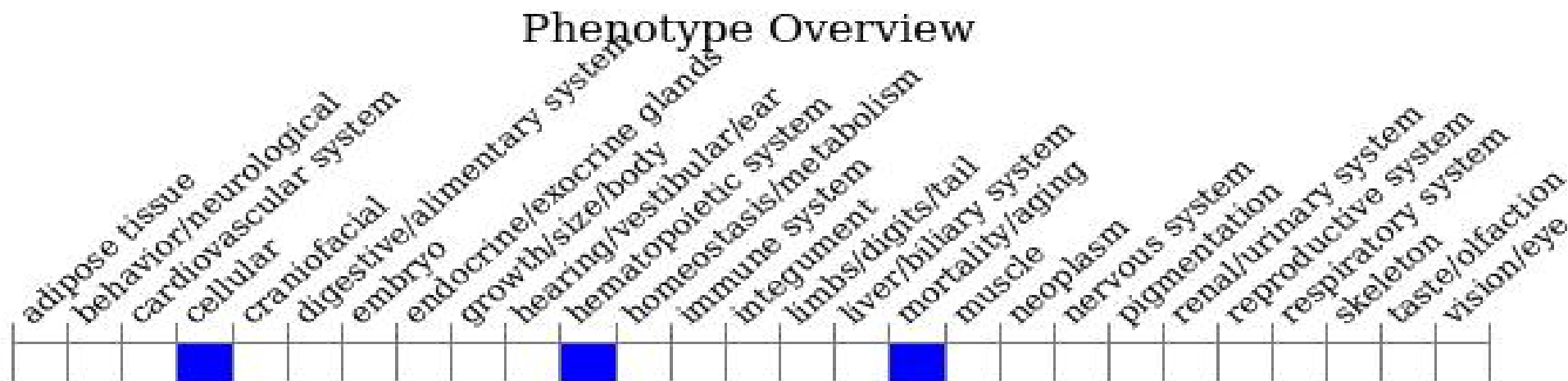
Genomic Information



Protein Information



Mouse Phenotype Information (MGI)



- Mice homozygous for a gene trapped allele exhibit prenatal lethality. Mice heterozygous for this allele exhibit increased micronuclei-containing red blood cells.

Important Information

- According to the existing MGI data, Mice homozygous for a gene trapped allele exhibit prenatal lethality. Mice heterozygous for this allele exhibit increased micronuclei-containing red blood cells.
- The influence of the transcript *Mcm7-204&Mcm7-206&Mcm7-207&Mcm7-209&Mcm7-210* is unknown.
- The KO region may affect the function of *Ap4m1&Cops6 &Mir25* gene.
- *Mcm7* is located on Chr5. If the knockout mice are crossed with other mouse strains to obtain double homozygous mutant offspring, please avoid the situation that the second gene is on the same chromosome.
- This Strategy is designed based on genetic information in existing databases. Due to the complexity of biological processes, all risks of the mutation on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.