

# *Dhcr7* Cas9-KO Strategy

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# Project Overview



**Project Name**

***Dhcr7***

**Project type**

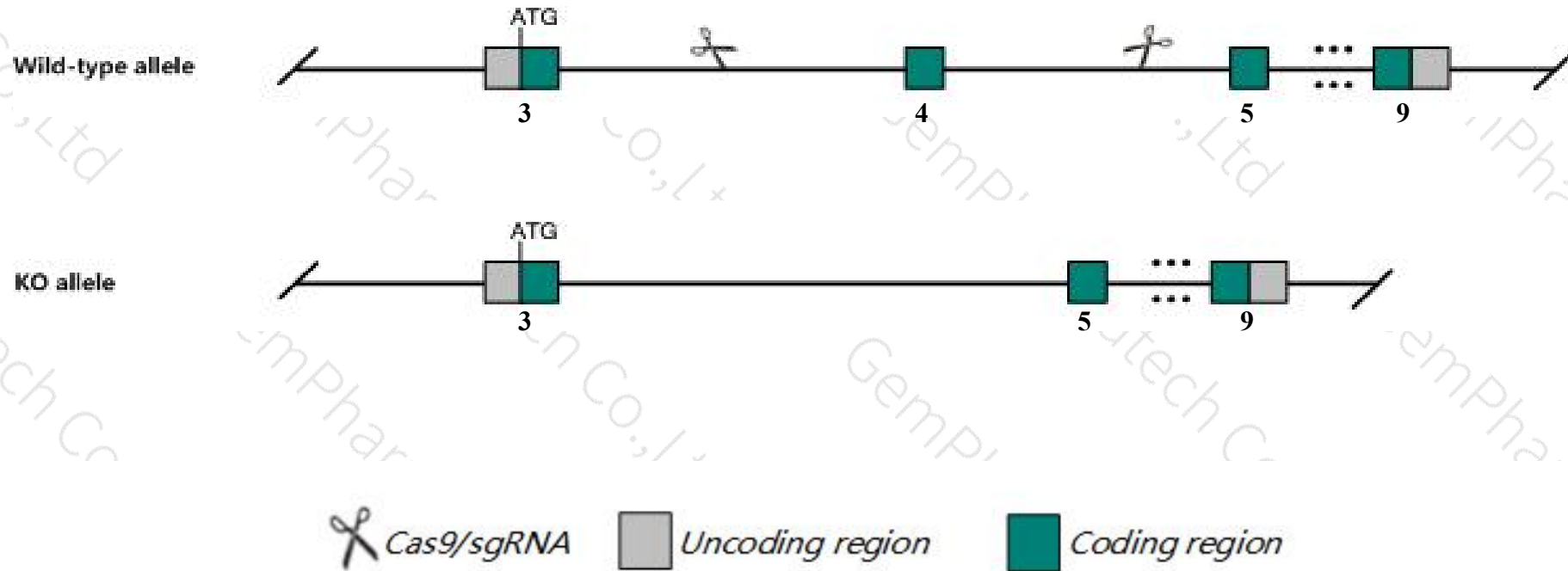
**Cas9-KO**

**Strain background**

**C57BL/6J**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Dhcr7* gene. The schematic diagram is as follows:



- The *Dhcr7* gene has 13 transcripts. According to the structure of *Dhcr7* gene, exon4 of *Dhcr7-201* (ENSMUST00000073878.11) transcript is recommended as the knockout region. The region contains 223bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Dhcr7* gene. The brief process is as follows: sgRNA was transcribed in vitro. Cas9 and sgRNA were microinjected into the fertilized eggs of C57BL/6J 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/6J mice.

- According to the existing MGI data, Mice homozygous for disruptions in this gene die within one day of birth due to respiratory and suckling problems. They exhibit abnormal cholesterol homeostasis with reduced tissue cholesterol levels and total sterol levels, enlarged bladders and sometimes cleft palate.
- The *Dhcr7* 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)

## Dhcr7 7-dehydrocholesterol reductase [Mus musculus (house mouse)]

Gene ID: 13360, updated on 19-Mar-2019

### Summary

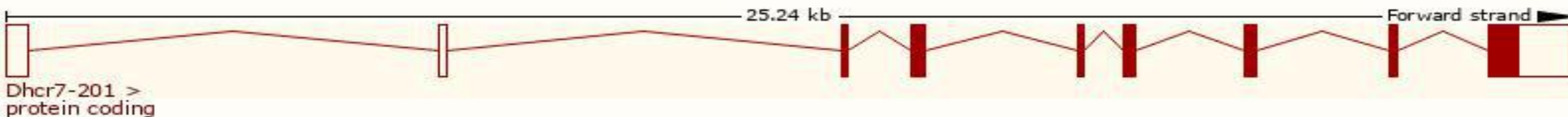
<b>Official Symbol</b>	Dhcr7 provided by <a href="#">MGI</a>
<b>Official Full Name</b>	7-dehydrocholesterol reductase provided by <a href="#">MGI</a>
<b>Primary source</b>	<a href="#">MGI:MGI:1298378</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG00000058454</a>
<b>Gene type</b>	protein coding
<b>RefSeq status</b>	VALIDATED
<b>Organism</b>	<a href="#">Mus musculus</a>
<b>Lineage</b>	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
<b>Also known as</b>	AA409147
<b>Expression</b>	Broad expression in adrenal adult (RPKM 302.7), liver adult (RPKM 72.3) and 18 other tissues <a href="#">See more</a>
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>

# Transcript information (Ensembl)

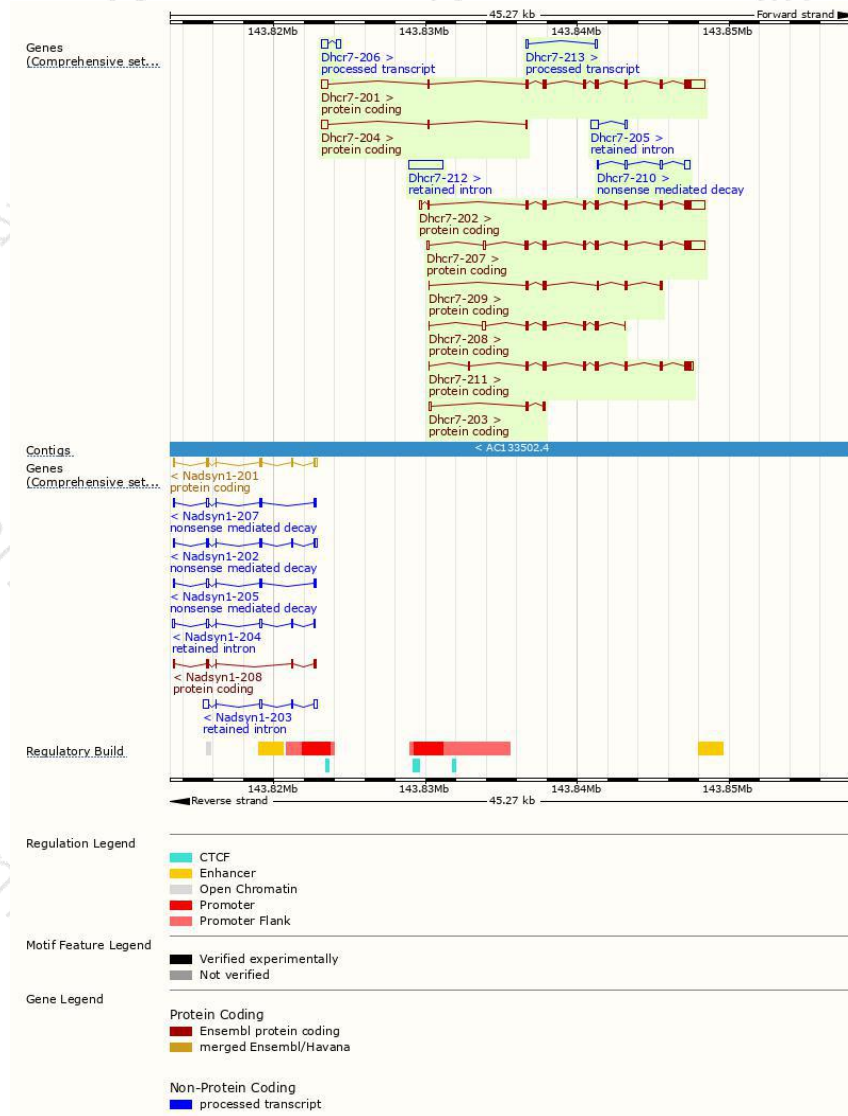
The gene has 13 transcripts, all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Dhcr7-201	<a href="#">ENSMUST00000073878.11</a>	2815	<a href="#">471aa</a>	Protein coding	<a href="#">CCDS22048</a>	<a href="#">O88455</a>	TSL:5 GENCODE basic APPRIS P2
Dhcr7-207	<a href="#">ENSMUST00000141916.7</a>	2752	<a href="#">471aa</a>	Protein coding	<a href="#">CCDS22048</a>	<a href="#">O88455</a>	TSL:5 GENCODE basic APPRIS P2
Dhcr7-202	<a href="#">ENSMUST00000124340.7</a>	2556	<a href="#">471aa</a>	Protein coding	<a href="#">CCDS22048</a>	<a href="#">O88455</a>	TSL:5 GENCODE basic APPRIS P2
Dhcr7-211	<a href="#">ENSMUST00000207143.1</a>	1652	<a href="#">474aa</a>	Protein coding	-	<a href="#">A0A140LIT2</a>	TSL:5 GENCODE basic APPRIS ALT2
Dhcr7-208	<a href="#">ENSMUST00000143338.1</a>	850	<a href="#">215aa</a>	Protein coding	-	<a href="#">D3Z7G1</a>	CDS 3' incomplete TSL:5
Dhcr7-209	<a href="#">ENSMUST00000144034.7</a>	713	<a href="#">225aa</a>	Protein coding	-	<a href="#">D3YXR4</a>	CDS 3' incomplete TSL:3
Dhcr7-204	<a href="#">ENSMUST00000128454.7</a>	543	<a href="#">12aa</a>	Protein coding	-	<a href="#">Q711T1</a>	CDS 3' incomplete TSL:1
Dhcr7-203	<a href="#">ENSMUST00000125564.1</a>	361	<a href="#">71aa</a>	Protein coding	-	<a href="#">A0A140LI18</a>	CDS 3' incomplete TSL:3
Dhcr7-210	<a href="#">ENSMUST00000145471.1</a>	721	<a href="#">23aa</a>	Nonsense mediated decay	-	<a href="#">A0A140LIS4</a>	CDS 5' incomplete TSL:3
Dhcr7-206	<a href="#">ENSMUST00000139748.2</a>	682	No protein	Processed transcript	-	-	TSL:3
Dhcr7-213	<a href="#">ENSMUST00000208631.1</a>	230	No protein	Processed transcript	-	-	TSL:3
Dhcr7-212	<a href="#">ENSMUST00000208535.1</a>	2231	No protein	Retained intron	-	-	TSL:NA
Dhcr7-205	<a href="#">ENSMUST00000128610.1</a>	629	No protein	Retained intron	-	-	TSL:2

The strategy is based on the design of *Dhcr7-201* transcript, The transcription is shown below

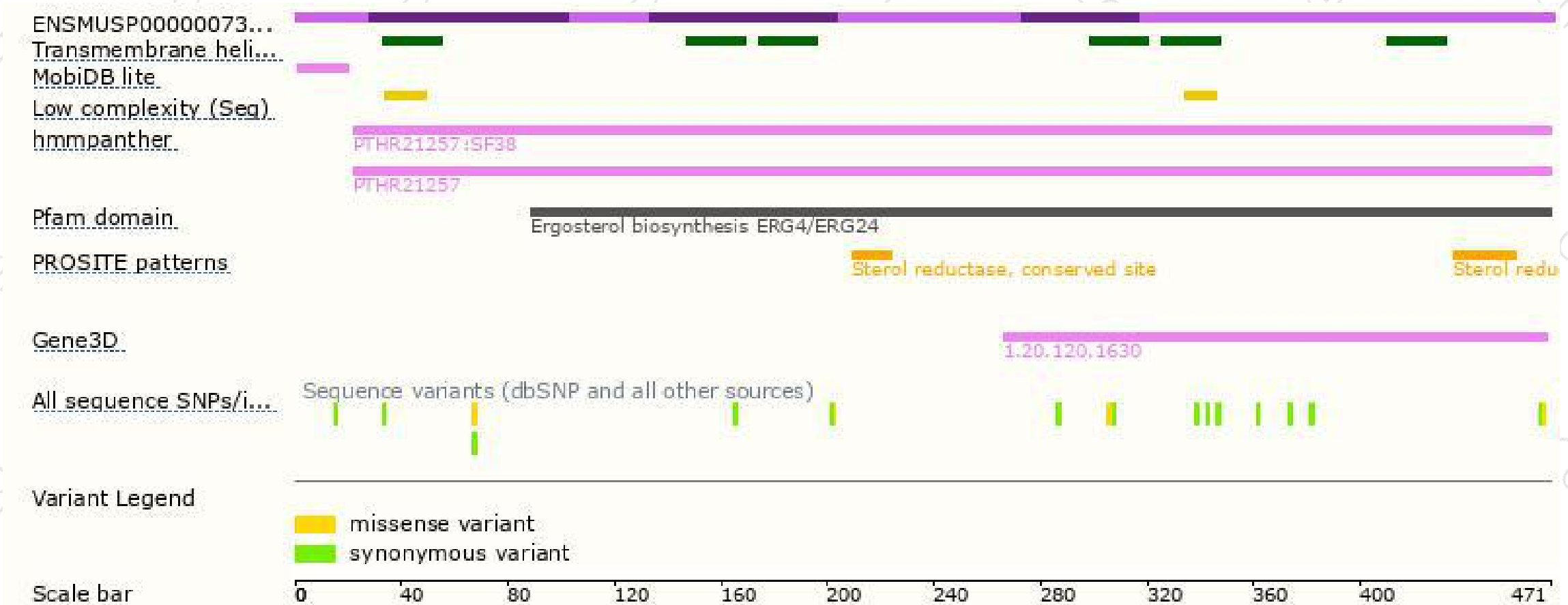


# Genomic location distribution

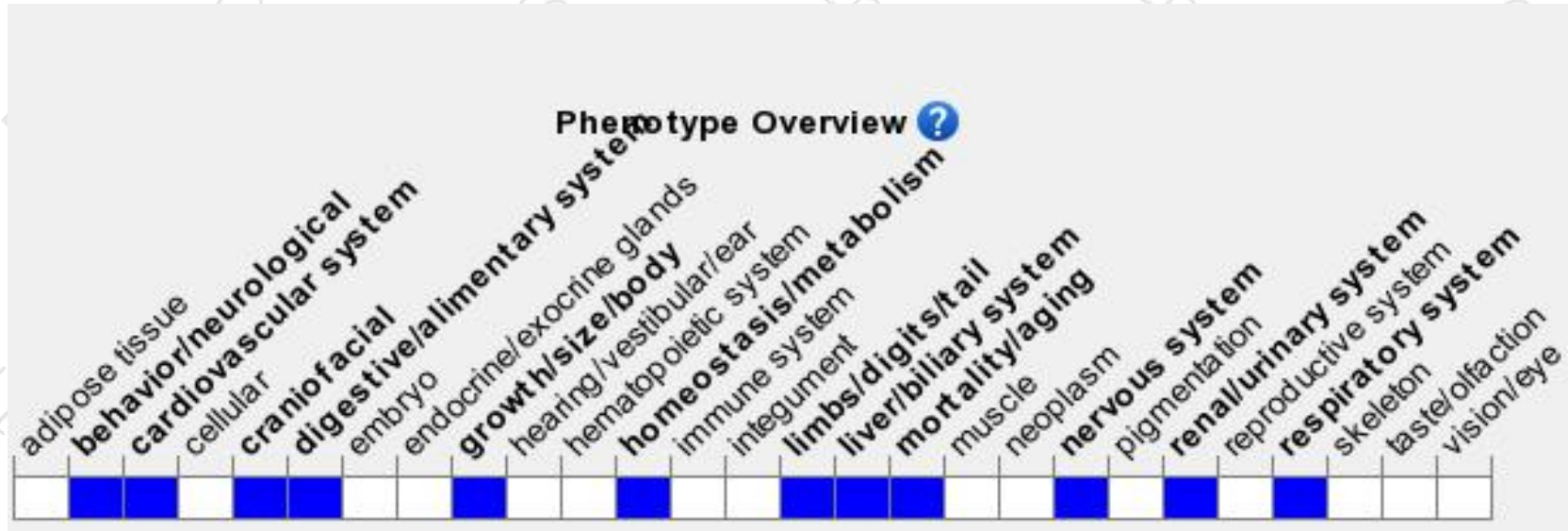




# Protein domain



# 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 disruptions in this gene die within one day of birth due to respiratory and suckling problems. They exhibit abnormal cholesterol homeostasis with reduced tissue cholesterol levels and total sterol levels, enlarged bladders and sometimes cleft palate.

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

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