

# *Hspa1a* Cas9-KO Strategy

**Designer: JiaYu**

**Reviewer: Xiaojing Li**

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# Project Overview

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**Project Name**

*Hspa1a*

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**Project type**

**Cas9-KO**

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**Strain background**

**C57BL/6JGpt**

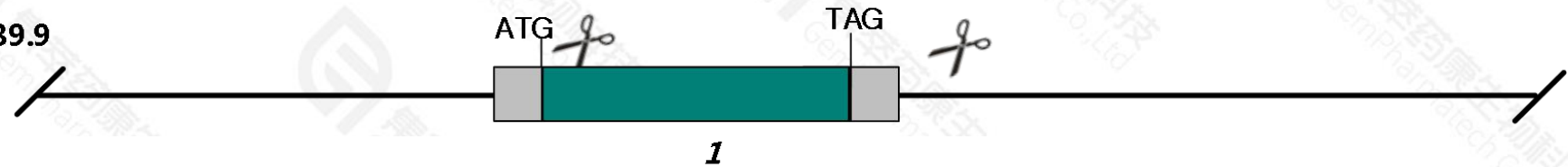
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# Knockout strategy

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

ENSMUST00000043089.9

Wild-type allele



KO allele



CRISPR/Cas9



Uncoding region



Coding region

- The *Hspala* gene has 1 transcript. According to the structure of *Hspala* gene, exon1 of *Hspala-201*(ENSMUST00000087328.4) transcript is recommended as the knockout region. The region contains all of the coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Hspala* gene. The brief process is as follows: CRISPR/Cas9 system 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, at the cellular level, mice homozygous for a knock-out allele exhibit impaired thermotolerance and increased sensitivity to heat stress-induced apoptosis.
- The KO region overlap with part of the *Gm20481* gene, which may delete this gene.
- The KO region is about 800bp away from the 5th end of the *Hspal1* gene, which may affect the regulation of this gene
- The *Hspala* 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)

## Hspa1a heat shock protein 1A [Mus musculus (house mouse)]

Gene ID: 193740, updated on 12-Jan-2021

### Summary



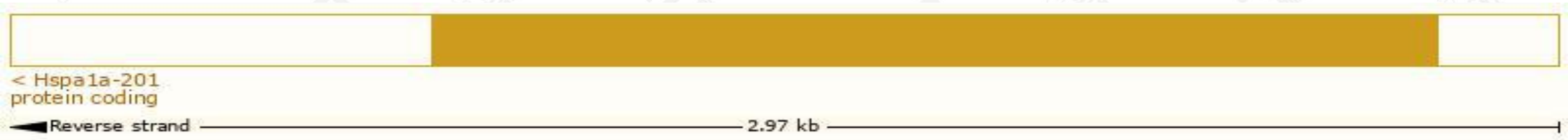
<b>Official Symbol</b>	Hspa1a provided by <a href="#">MGI</a>
<b>Official Full Name</b>	heat shock protein 1A provided by <a href="#">MGI</a>
<b>Primary source</b>	<a href="#">MGI:MGI:96244</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG00000091971</a>
<b>Gene type</b>	protein coding
<b>RefSeq status</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>	Hsp, Hsp7, Hsp70, Hsp70-3, Hsp70.3, Hsp72, hsp68, hsp70A1
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>

# Transcript information (Ensembl)

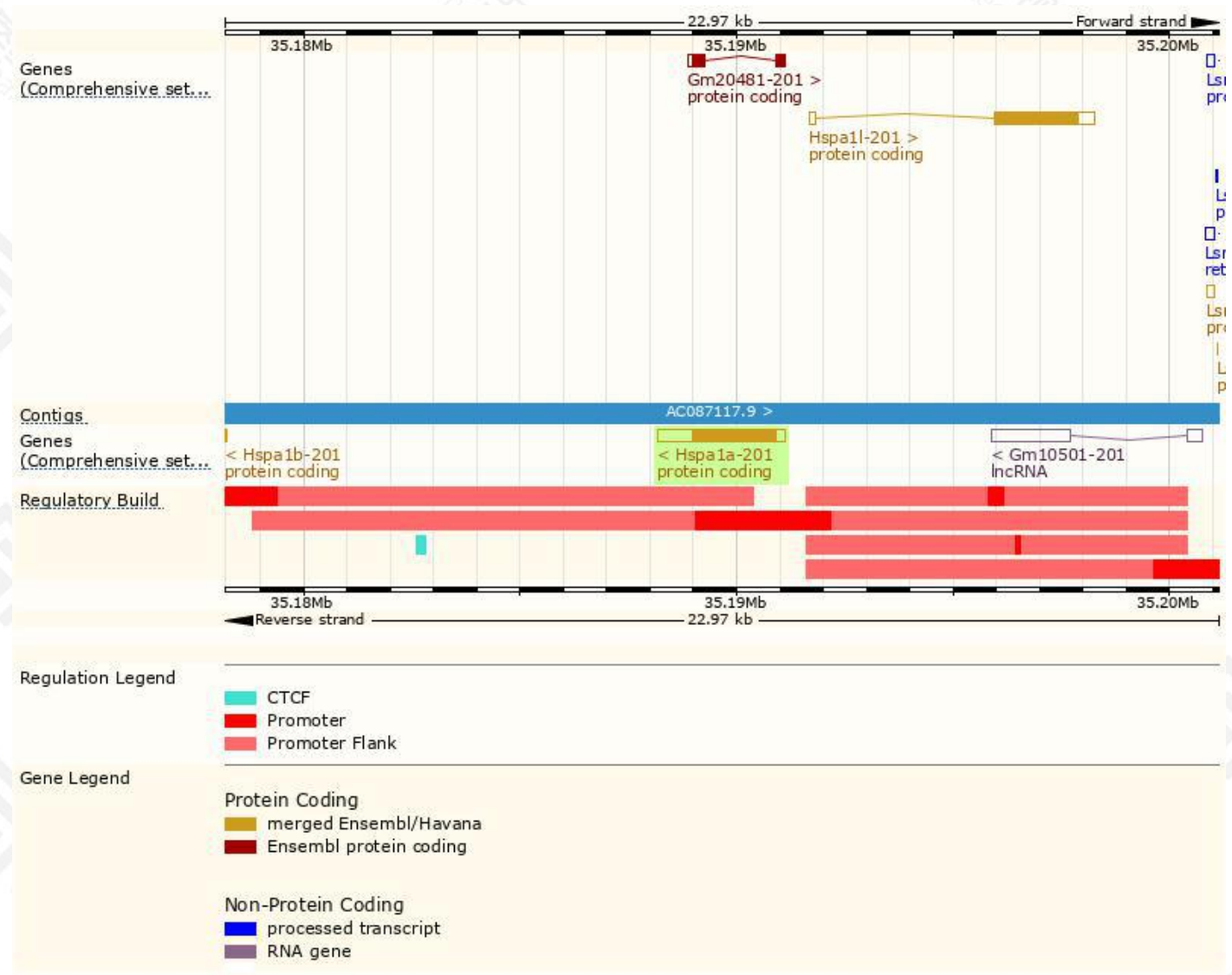
The gene has 1 transcript,and the transcript is shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Hspa1a-201	<a href="#">ENSMUST00000087328.4</a>	2967	<a href="#">641aa</a>	Protein coding	<a href="#">CCDS50080</a>		TSL:NA , GENCODE basic , APPRIS P1 ,

The strategy is based on the design of *Hspa1a-201* transcript,the transcription is shown below:

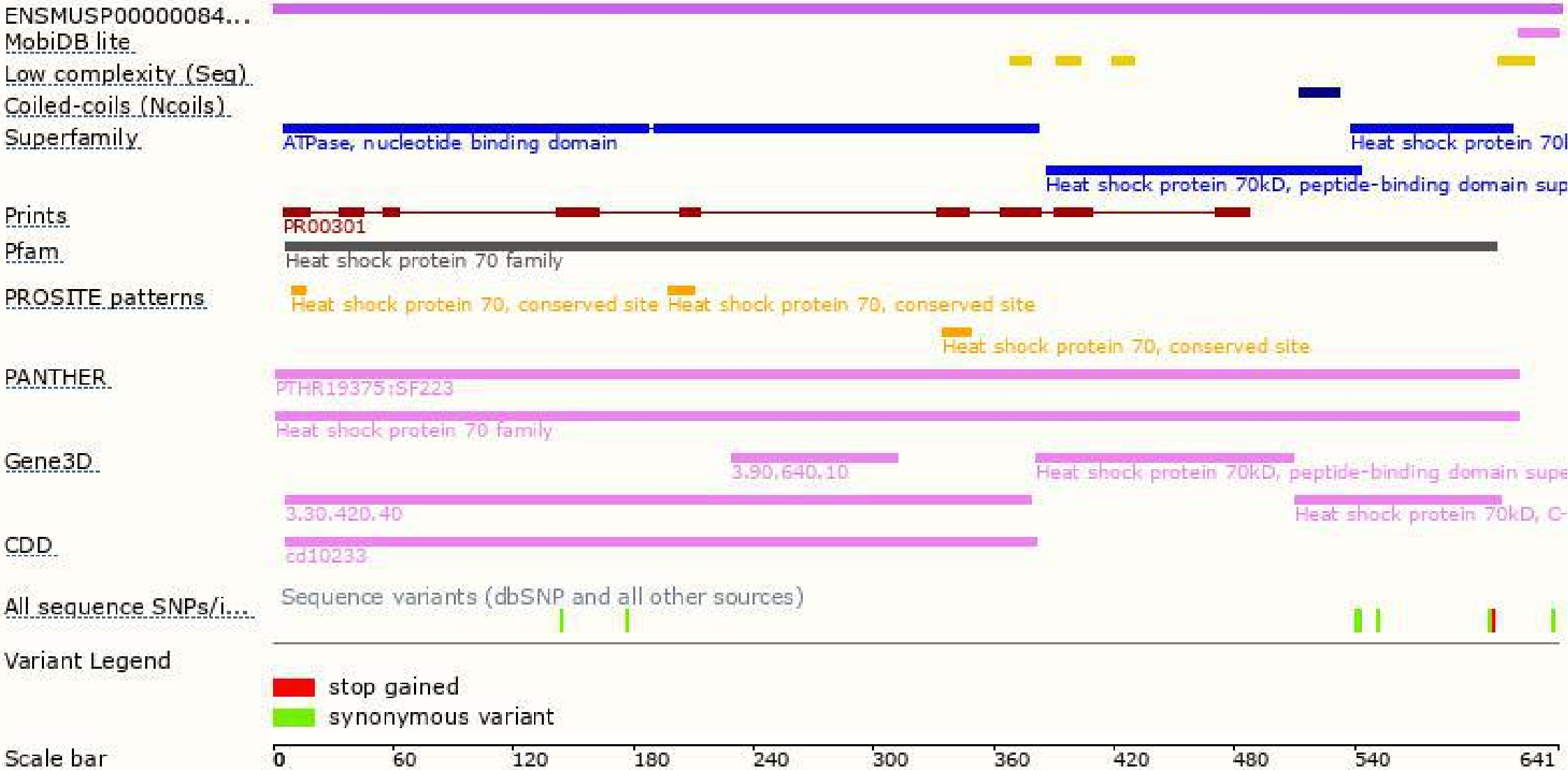


# Genomic location distribution

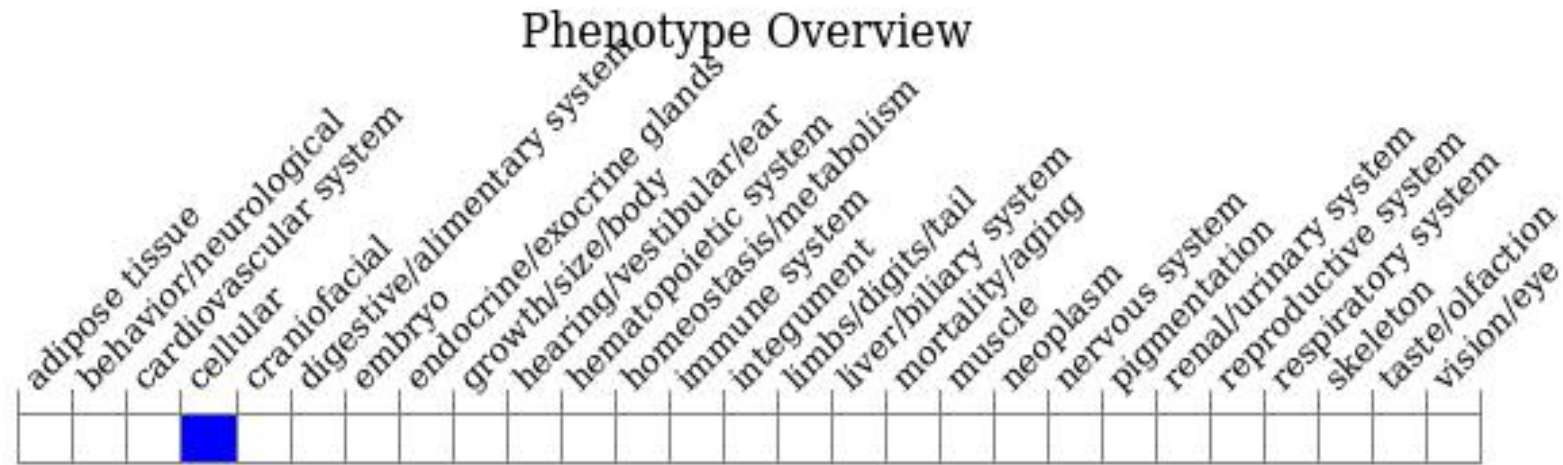




# Protein domain



# 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, at the cellular level, mice homozygous for a knock-out allele exhibit impaired thermotolerance and increased sensitivity to heat stress-induced apoptosis.

If you have any questions, you are welcome to inquire.  
Tel: 400-9660890

