

# *Hnf4a* Cas9-KO Strategy

**Designer:**

**Daohua Xu**

**Reviewer:**

**Huimin Su**

**Design Date:**

**2019-9-16**

# Project Overview

**Project Name**

*Hnf4a*

**Project type**

**Cas9-KO**

**Strain background**

**C57BL/6JGpt**

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Hnf4a* gene. The schematic diagram is as follows:



- The *Hnf4a* gene has 5 transcripts. According to the structure of *Hnf4a* gene, exon2-exon5 of *Hnf4a-201* (ENSMUST00000018094.12) transcript is recommended as the knockout region. The region contains 533bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Hnf4a* gene. The brief process is as follows: CRISPR/Cas9 system

- According to the existing MGI data, Nullizygous embryos show delayed growth and lethality, impaired gastrulation, abnormal primitive streak and mesoderm formation, ectoderm apoptosis, and extraembryonic tissue dysplasia. Mice expressing only the alpha1 isoform show glucose intolerance whereas mice expressing alpha7 show dyslipidemia.
- The *Hnf4a* gene is located on the Chr2. 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)

## Hnf4a hepatic nuclear factor 4, alpha [Mus musculus (house mouse)]

Gene ID: 15378, updated on 23-Mar-2019

### Summary



**Official Symbol** Hnf4a provided by [MGI](#)

**Official Full Name** hepatic nuclear factor 4, alpha provided by [MGI](#)

**Primary source** [MGI:MGI:109128](#)

**See related** [Ensembl:ENSMUSG00000017950](#)

**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** HNF-4, Hnf4, Hnf4alpha, MODY1, Nr2a1, TCF-14, Tcf14

**Summary** The protein encoded by this gene is a transcription factor involved in the development of the pancreas, liver, kidney, and intestines. The encoded protein also functions to maintain glucose homeostasis. Several transcript variants encoding different isoforms have been found for this gene. [provided by RefSeq, Aug 2015]

**Expression** Biased expression in large intestine adult (RPKM 148.8), kidney adult (RPKM 141.3) and 9 other tissues [See more](#)

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

# Transcript information (Ensembl)

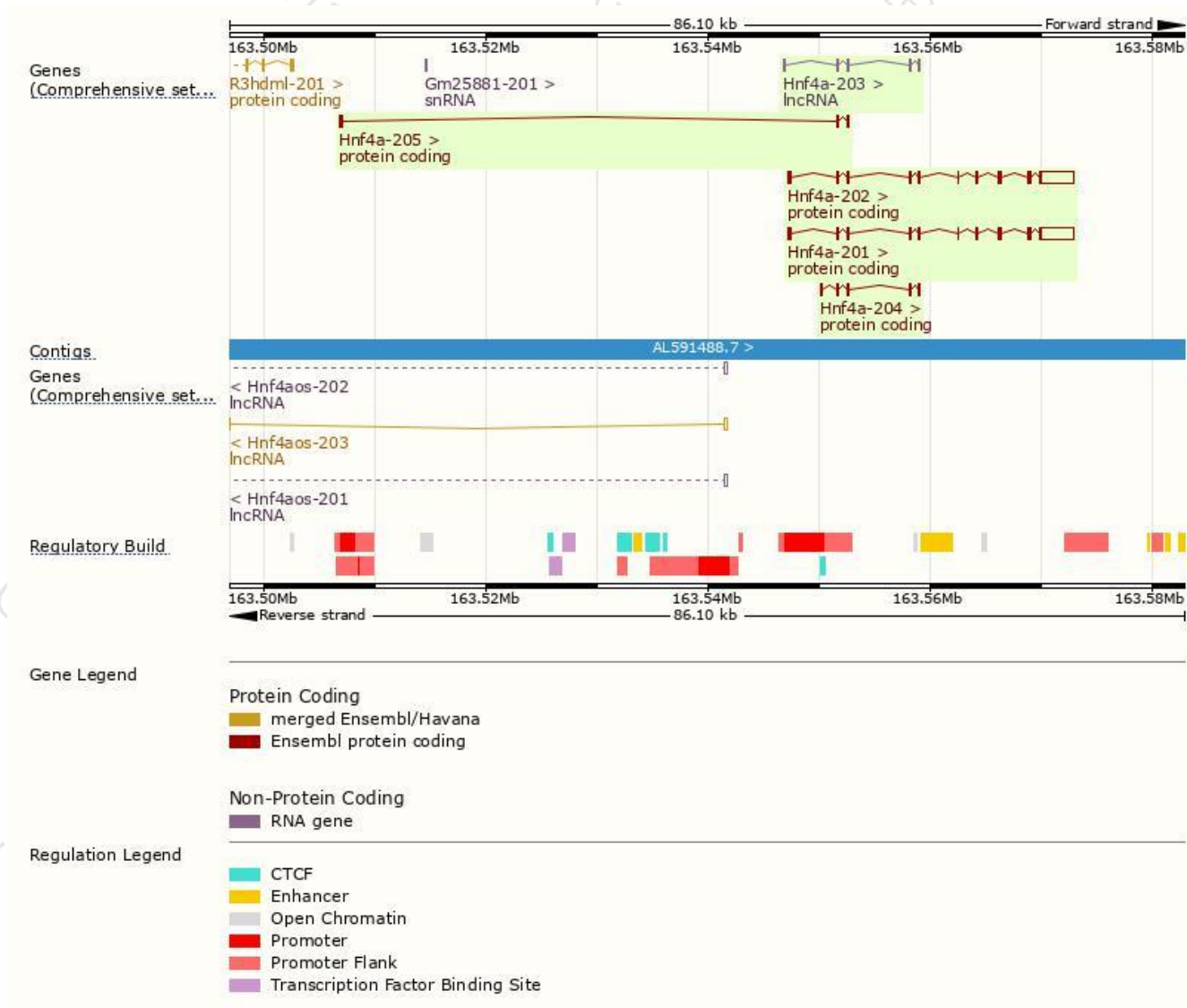
The gene has 5 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Hnf4a-201	<a href="#">ENSMUST00000018094.12</a>	4356	<a href="#">474aa</a>	Protein coding	<a href="#">CCDS17012</a>	<a href="#">P49698</a>	TSL:1 GENCODE basic APPRIS P1
Hnf4a-202	<a href="#">ENSMUST00000109411.7</a>	4362	<a href="#">465aa</a>	Protein coding	-	<a href="#">Z4YKX0</a>	TSL:1 GENCODE basic
Hnf4a-204	<a href="#">ENSMUST00000137449.1</a>	692	<a href="#">191aa</a>	Protein coding	-	<a href="#">A2A5I6</a>	CDS 3' incomplete TSL:3
Hnf4a-205	<a href="#">ENSMUST00000143911.7</a>	431	<a href="#">100aa</a>	Protein coding	-	<a href="#">A2A5I4</a>	CDS 3' incomplete TSL:1
Hnf4a-203	<a href="#">ENSMUST00000131658.1</a>	659	No protein	lncRNA	-	-	TSL:3

The strategy is based on the design of *Hnf4a-201* transcript,The transcription is shown below



# Genomic location distribution

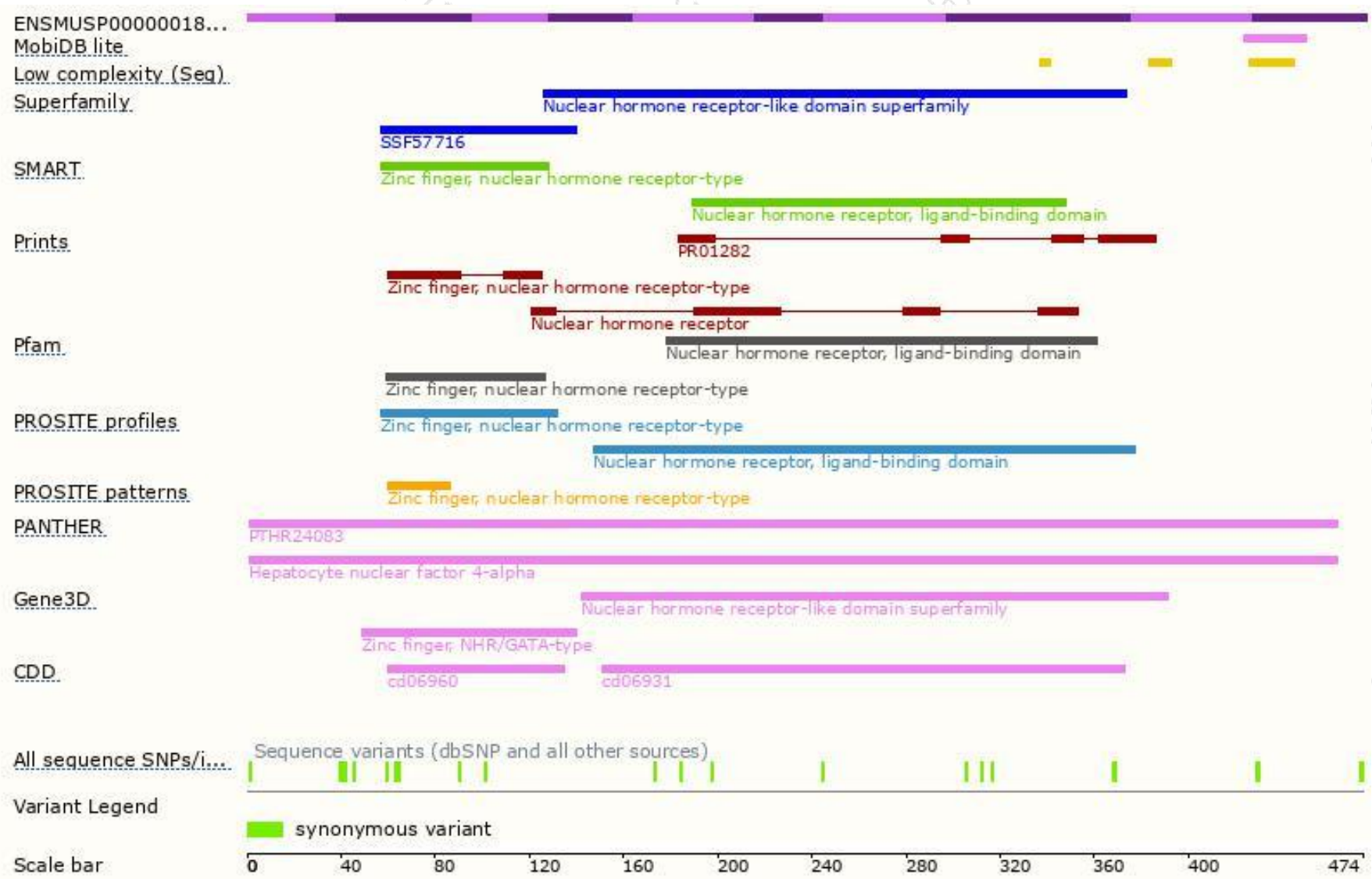




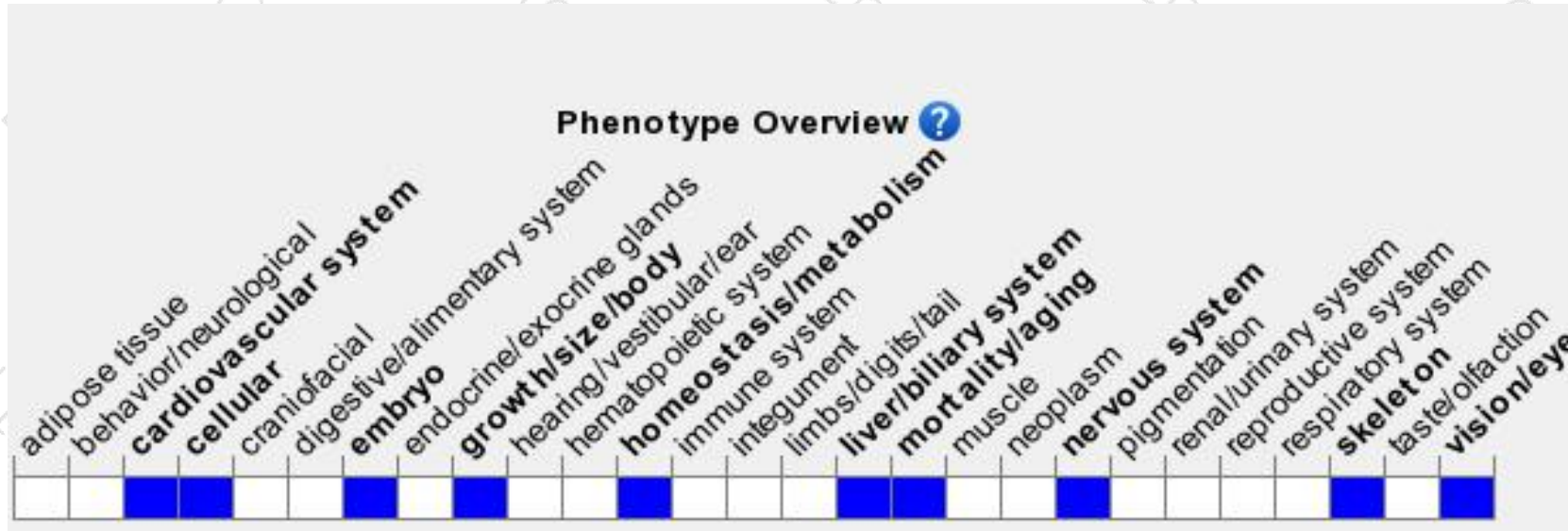
# Protein domain



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, Nullizygous embryos show delayed growth and lethality, impaired gastrulation, abnormal primitive streak and mesoderm formation, ectoderm apoptosis, and extraembryonic tissue dysplasia. Mice expressing only the alpha1 isoform show glucose intolerance whereas mice expressing alpha7 show dyslipidemia.

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

Tel: 400-9660890

