

# *Hand2* Cas9-CKO Strategy

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**Reviewer:**

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**Design Date:**

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# Project Overview

**Project Name**

*Hand2*

**Project type**

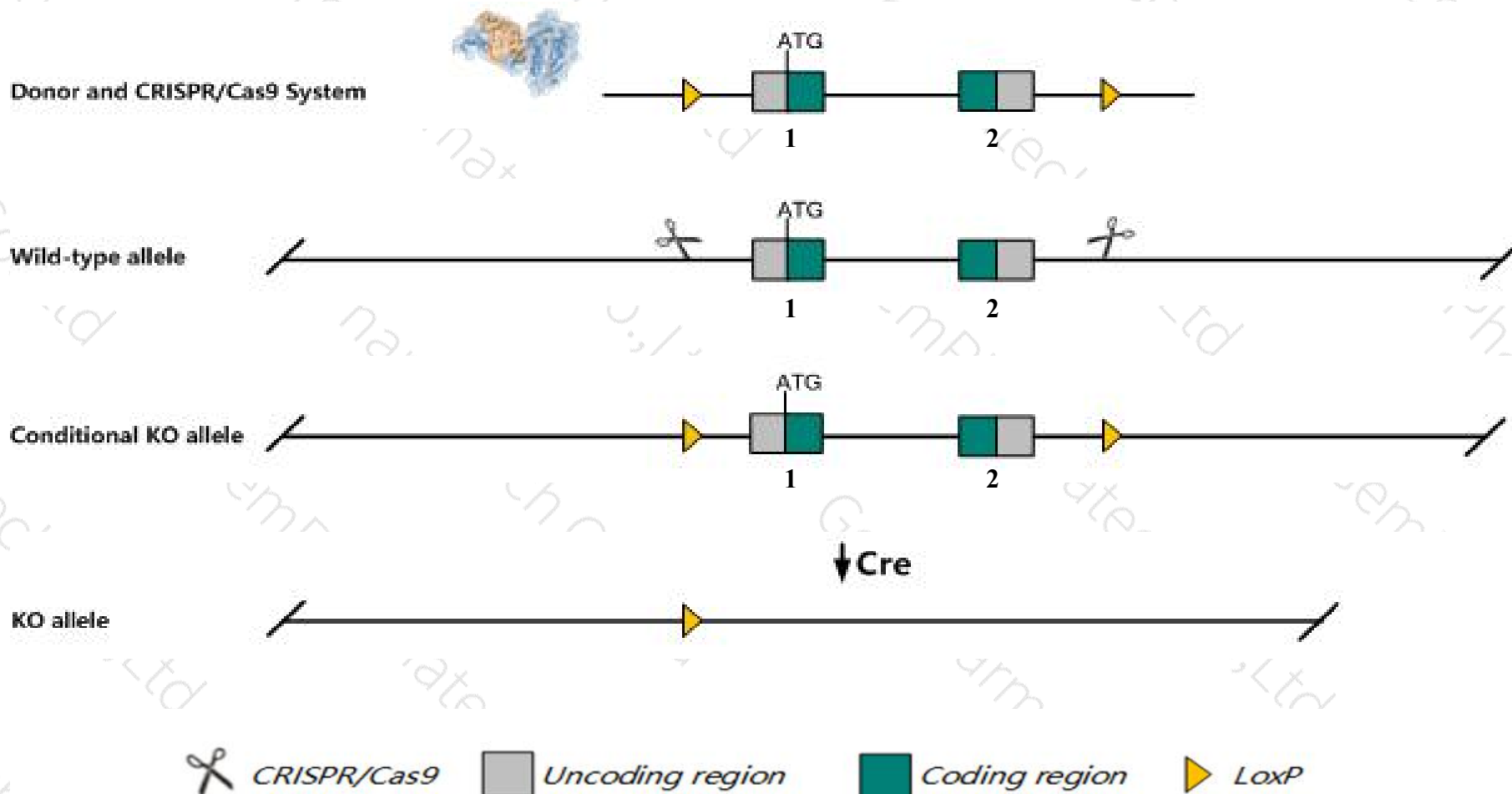
**Cas9-CKO**

**Strain background**

**C57BL/6JGpt**

# Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Hand2* gene. The schematic diagram is as follows:



# Technical routes

- The *Hand2* gene has 1 transcript. According to the structure of *Hand2* gene, exon1-exon2 of *Hand2*-201 (ENSMUST00000040104.4) 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 *Hand2* 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.

- According to the existing MGI data, homozygous targeted null mutants have defects of the neural crest component of branchial and aortic arches and die from heart failure at embryonic day 10.5. targeted branchial arch specific enhancer mutants show craniofacial defects and die perinatally.
- The KO region contains functional region of the *Hand2os1* gene. Knockout the region may affect the function of *Hand2os1* gene.
- The *Hand2* gene is located on the Chr8. 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)

## Hand2 heart and neural crest derivatives expressed 2 [Mus musculus (house mouse)]

Gene ID: 15111, updated on 13-Mar-2020

### Summary

**Official Symbol** Hand2 provided by [MGI](#)

**Official Full Name** heart and neural crest derivatives expressed 2 provided by [MGI](#)

**Primary source** [MGI:MGI:103580](#)

**See related** [Ensembl:ENSMUSG00000038193](#)

**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** AI225906, AI661148, Ehand2, Hed, Th2, Thing2, bHLHa26, dHAND

**Expression** Biased expression in adrenal adult (RPKM 31.8), stomach adult (RPKM 17.4) and 12 other tissues [See more](#)

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

# Transcript information (Ensembl)

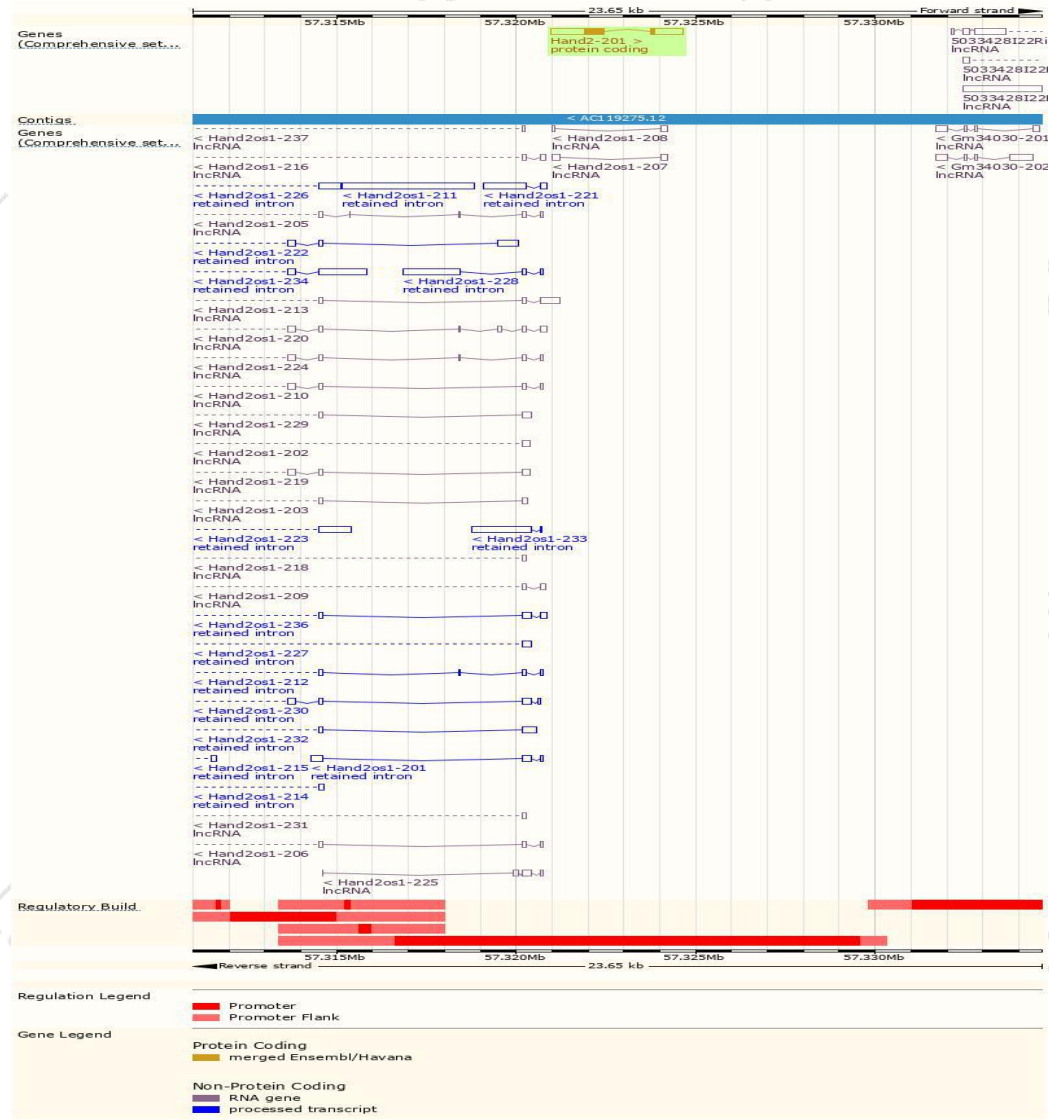
The gene has 1 transcript, and the transcript is shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Hand2-201	<a href="#">ENSMUST00000040104.4</a>	2351	<a href="#">217aa</a>	Protein coding	<a href="#">CCDS22315</a>	<a href="#">Q61039</a>	TSL:1 GENCODE basic APPRIS is a system to annotate alternatively spliced transcripts based on a range of computational methods to identify the most functionally important transcript(s) of a gene. APPRIS P1

The strategy is based on the design of *Hand2-201* transcript, the transcription is shown below

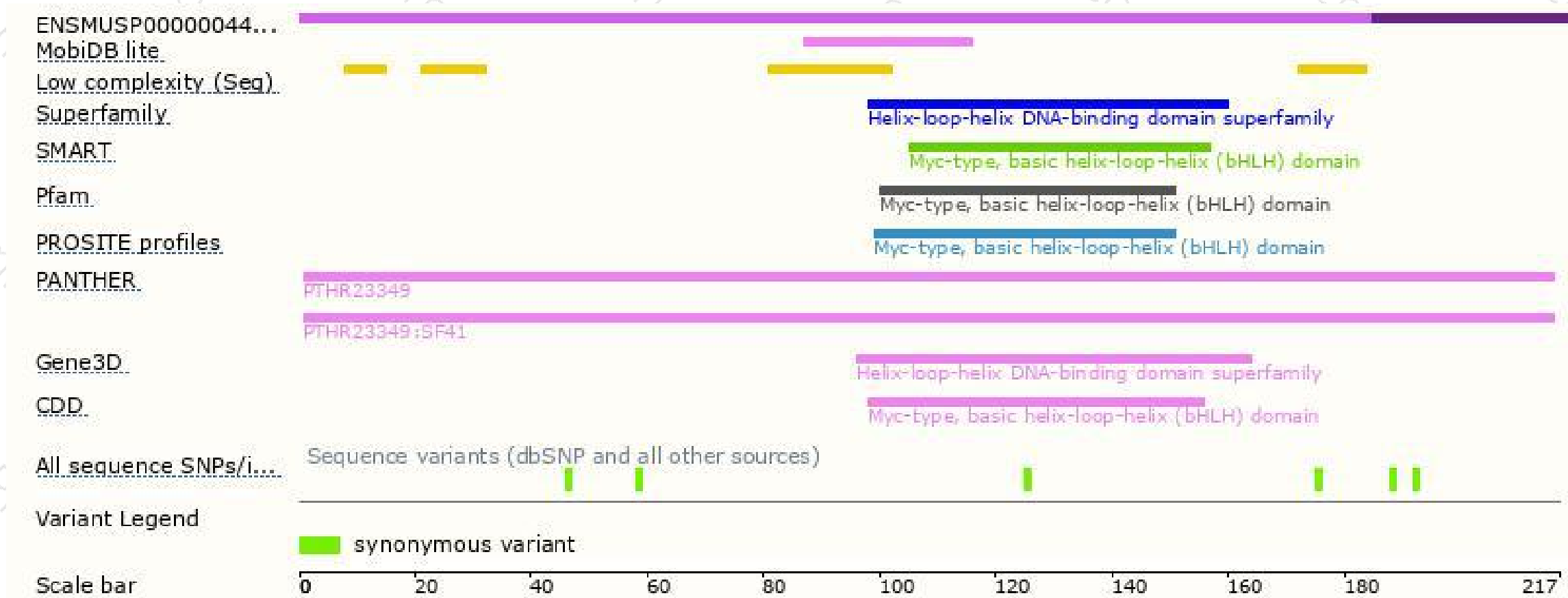


# Genomic location distribution

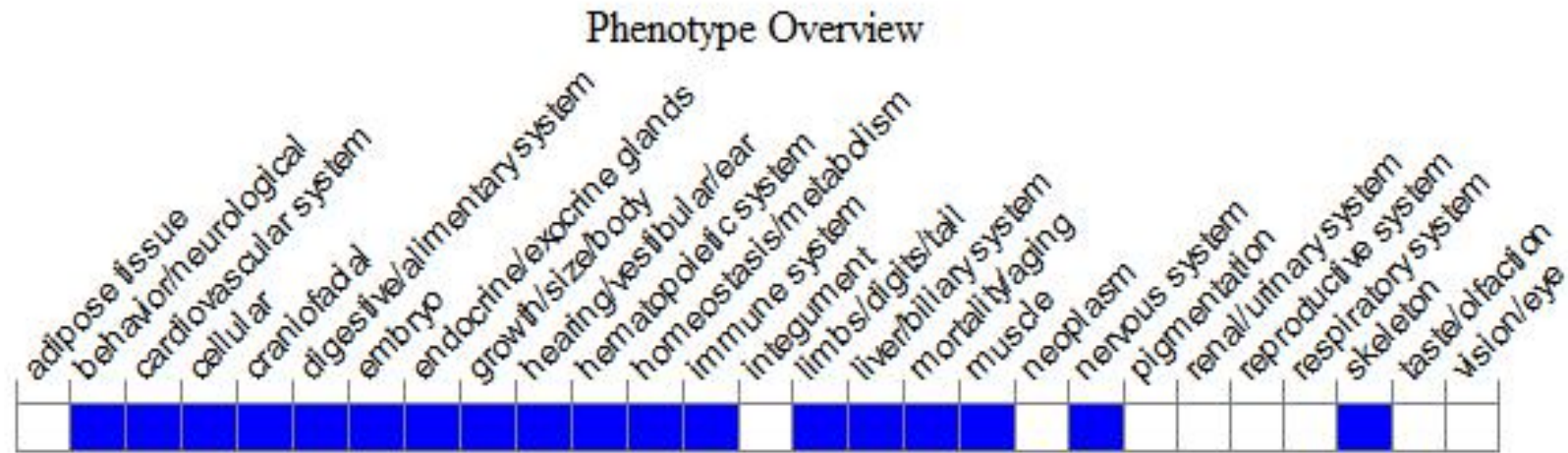




# Protein domain



# 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, homozygous targeted null mutants have defects of the neural crest component of branchial and aortic arches and die from heart failure at embryonic day 10.5. Targeted branchial arch specific enhancer mutants show craniofacial defects and die perinatally.

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

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