

# *Six2* Cas9-CKO Strategy

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# Project Overview

**Project Name**

*Six2*

**Project type**

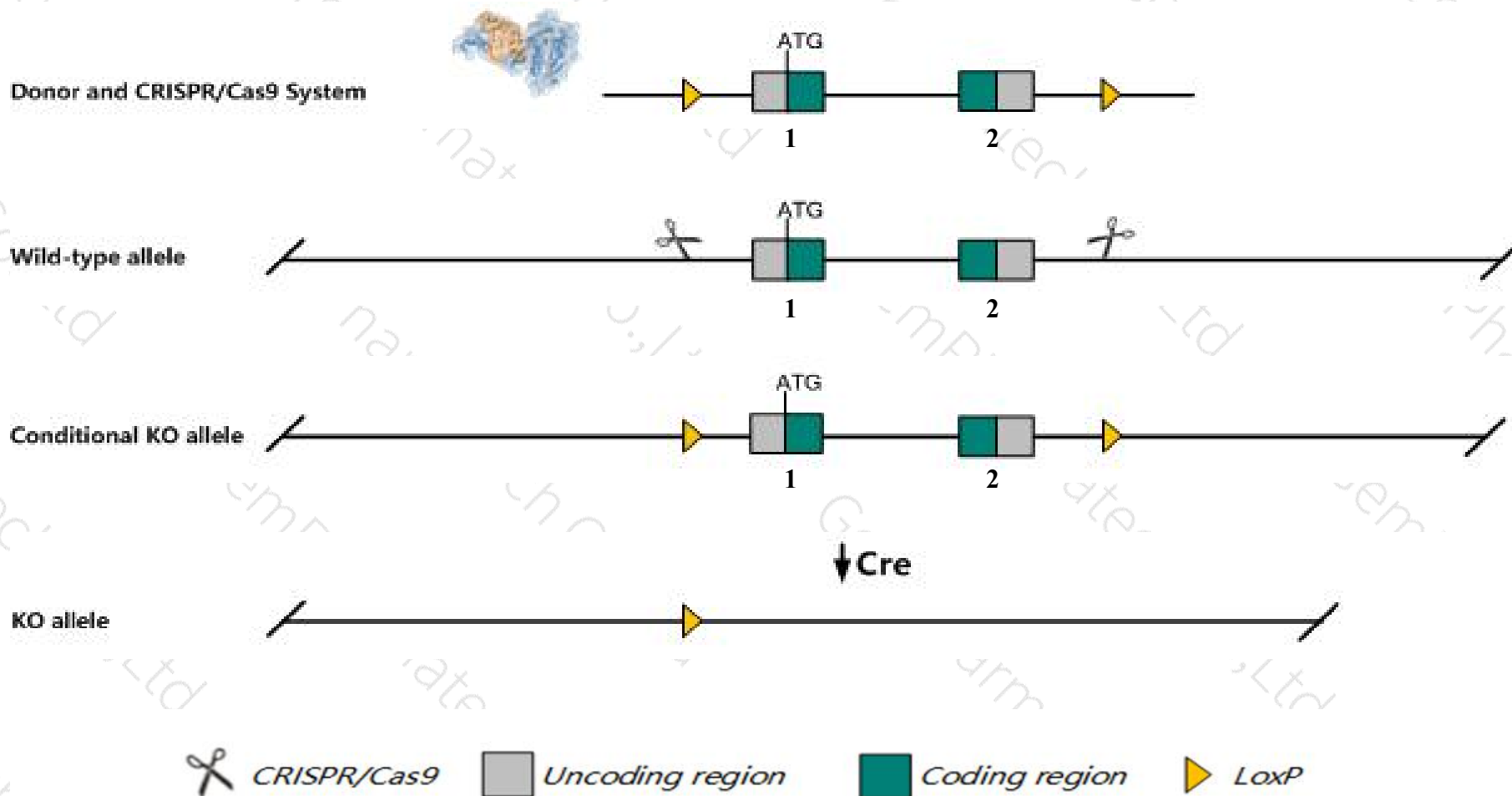
**Cas9-CKO**

**Strain background**

**C57BL/6JGpt**

# Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Six2* gene. The schematic diagram is as follows:



# Technical routes

- The *Six2* gene has 2 transcripts. According to the structure of *Six2* gene, exon1-exon2 of *Six2*-202(ENSMUST00000163568.3) 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 *Six2* 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, mice homozygous for disruptions in this gene die shortly after birth and exhibit abnormal kidney development. Abnormalities include small kidney, lack of ureteric bud branches throughout the kidney, increased apoptosis and premature and arrested nephron development.
- The KO region contains functional region of the *Six2* gene. Knockout the region may affect the function of *CJ186046Rik* gene.
- The *Six2* 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.

# Gene information (NCBI)

## Six2 sine oculis-related homeobox 2 [Mus musculus (house mouse)]

Gene ID: 20472, updated on 13-Mar-2020

### Summary

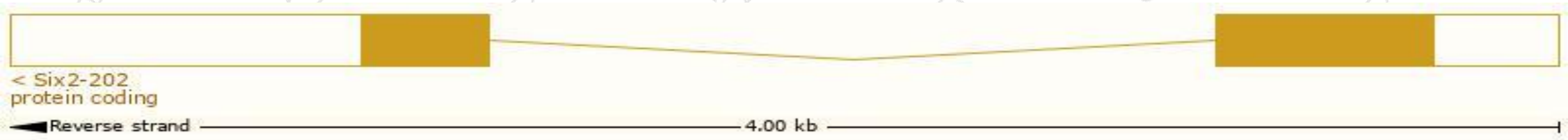
<b>Official Symbol</b>	Six2 provided by <a href="#">MGI</a>
<b>Official Full Name</b>	sine oculis-related homeobox 2 provided by <a href="#">MGI</a>
<b>Primary source</b>	<a href="#">MGI:MGI:102778</a>
<b>See related</b>	<a href="#">Ensembl:ENSMUSG00000024134</a>
<b>Gene type</b>	protein coding
<b>RefSeq 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>Expression</b>	Biased expression in limb E14.5 (RPKM 11.3), CNS E11.5 (RPKM 10.4) and 6 other tissues <a href="#">See more</a>
<b>Orthologs</b>	<a href="#">human</a> <a href="#">all</a>

# Transcript information (Ensembl)

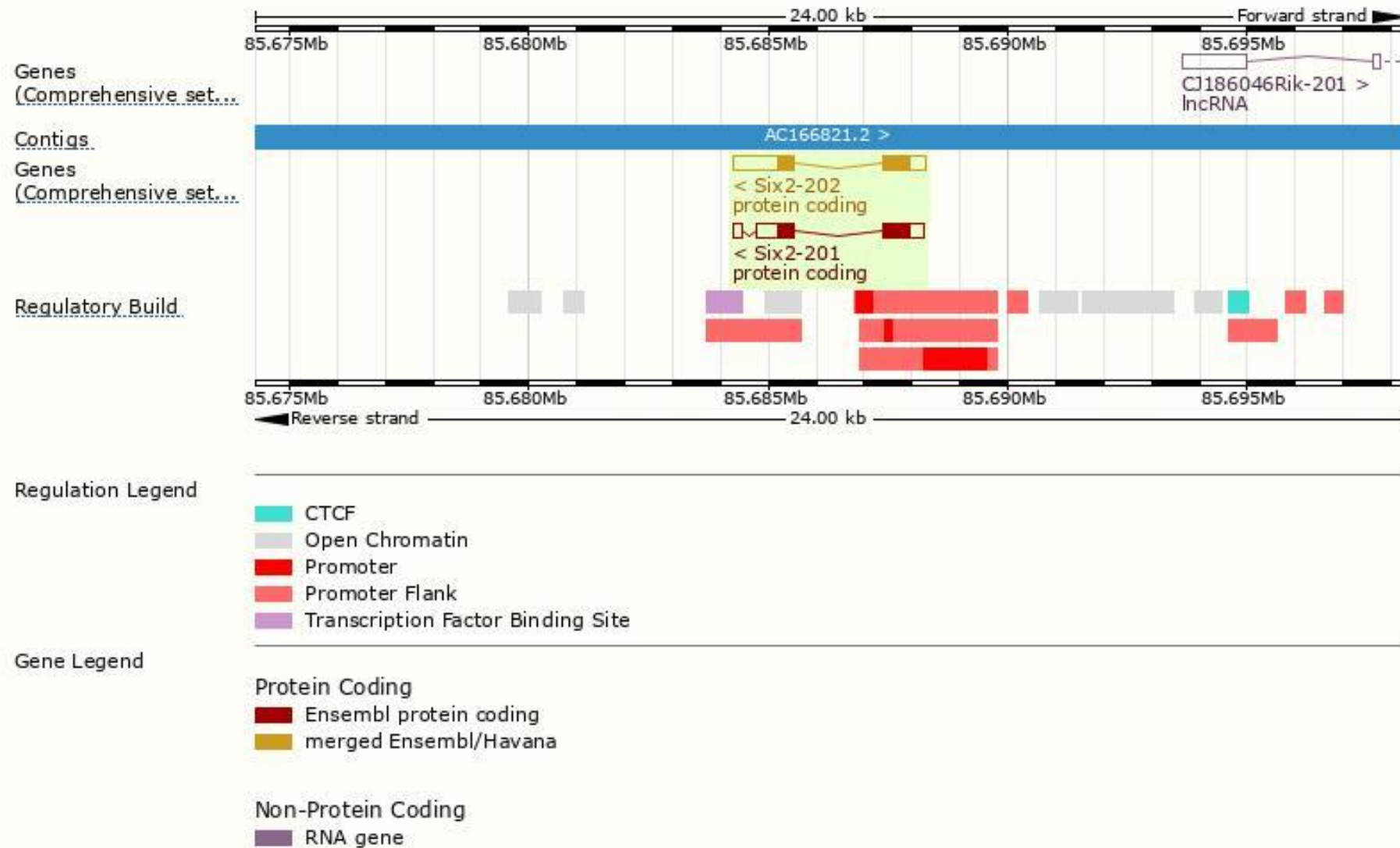
The gene has 2 transcripts,all transcripts are shown below:

Name	Transcript ID	bp	Protein	Biotype	CCDS	UniProt	Flags
Six2-202	<a href="#">ENSMUST00000163568.3</a>	2119	<a href="#">296aa</a>	Protein coding	<a href="#">CCDS29007</a>	<a href="#">Q62232</a>	TSL:1 GENCODE basic APPRIS P1
Six2-201	<a href="#">ENSMUST00000024947.7</a>	1812	<a href="#">296aa</a>	Protein coding	<a href="#">CCDS29007</a>	<a href="#">Q62232</a>	TSL:1 GENCODE basic APPRIS P1

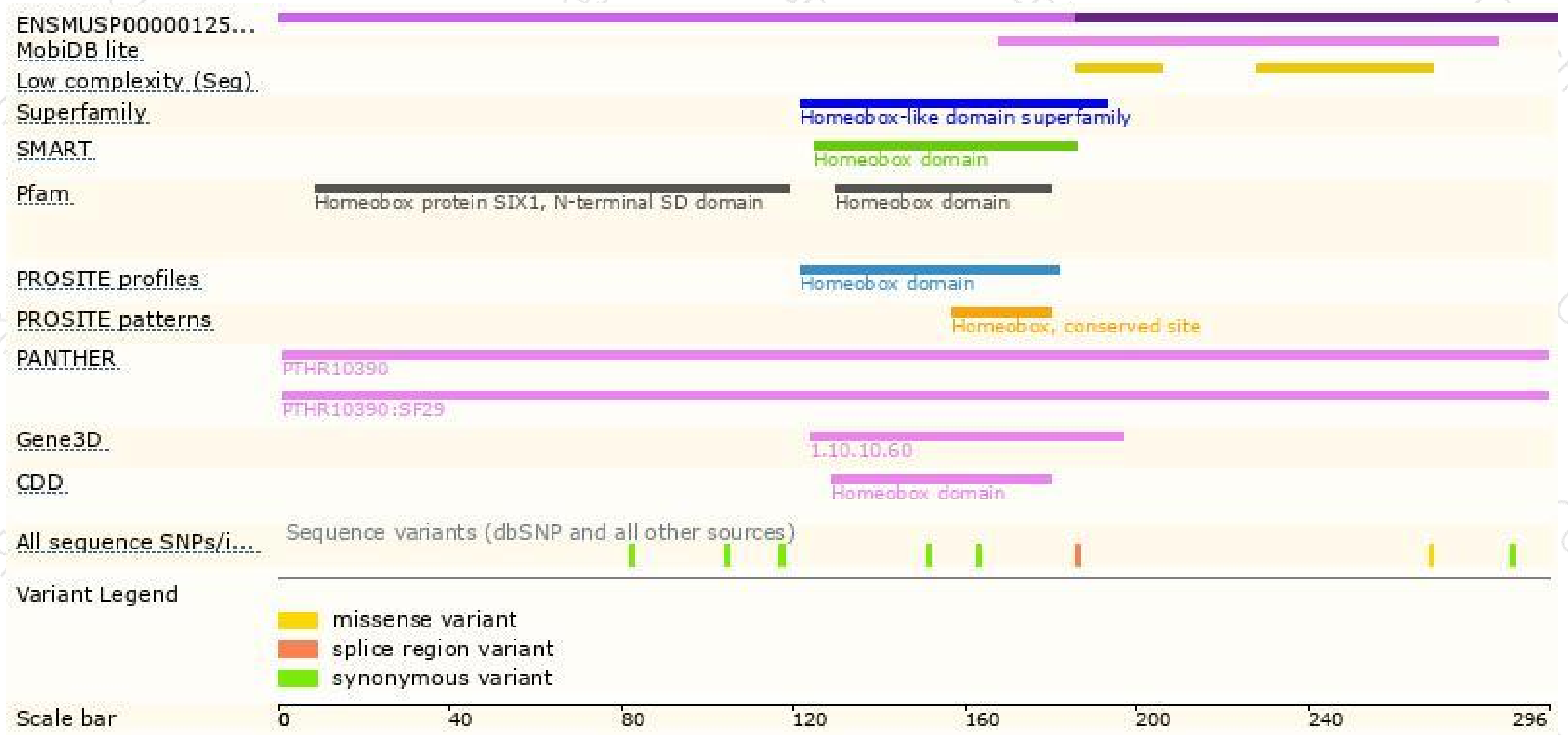
The strategy is based on the design of *Six2-202* transcript,the transcription is shown below:



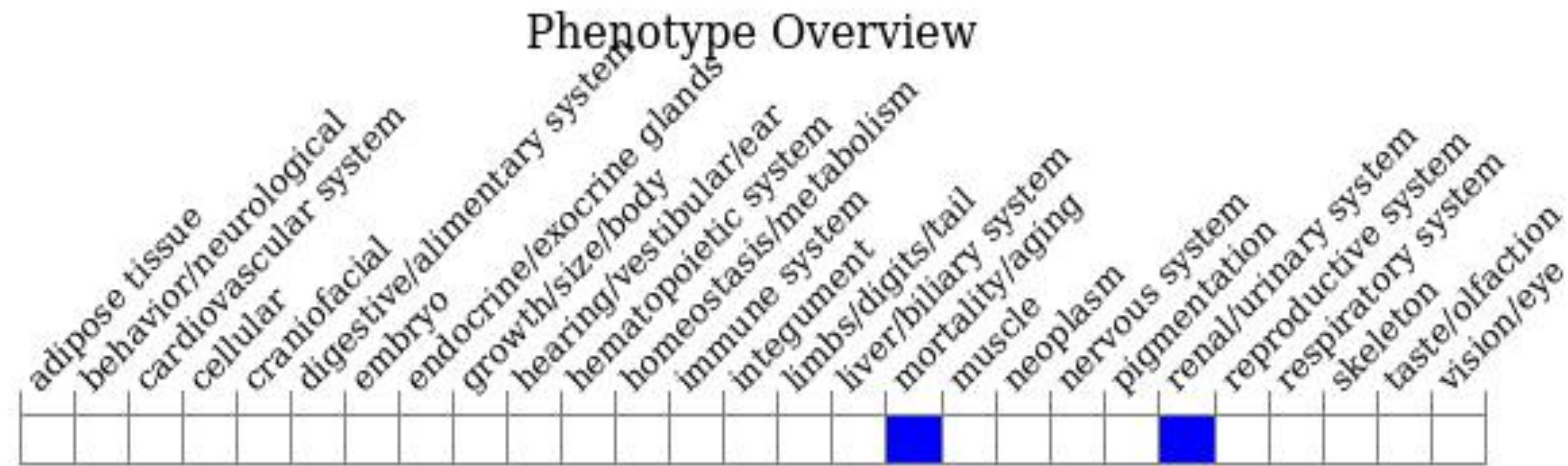
# Genomic location distribution



# 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 shortly after birth and exhibit abnormal kidney development. Abnormalities include small kidney, lack of ureteric bud branches throughout the kidney, increased apoptosis and premature and arrested nephron development.

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

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