

# ***Pbx3 Cas9-CKO Strategy***

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Design Date: 2019-8-9

# Project Overview

**Project Name**

*Pbx3*

**Project type**

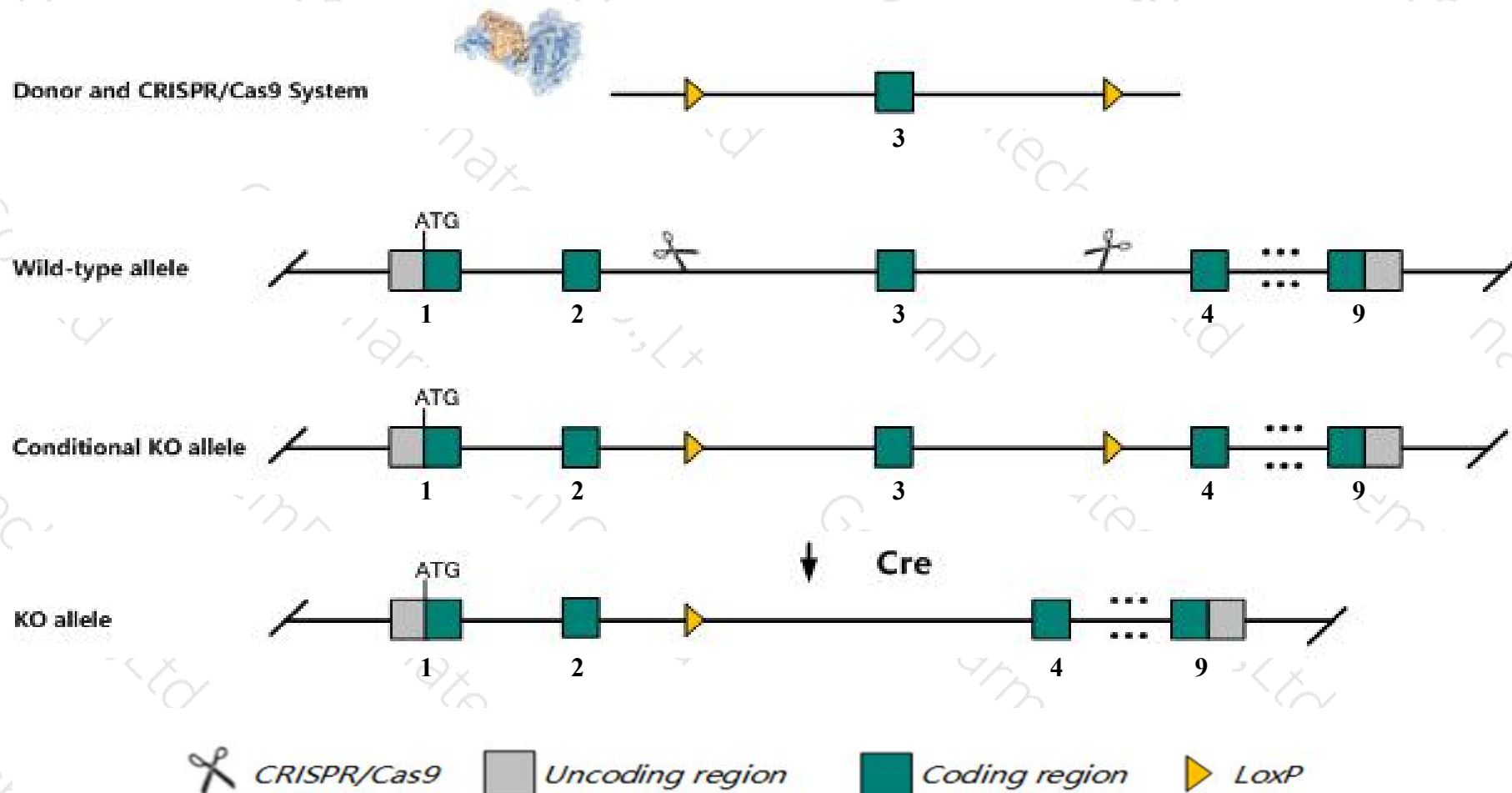
**Cas9-CKO**

**Strain background**

**C57BL/6JGpt**

# Conditional Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Pbx3* gene. The schematic diagram is as follows:



- The *Pbx3* gene has 10 transcripts. According to the structure of *Pbx3* gene, exon3 of *Pbx3-201* (ENSMUST00000040638.14) transcript is recommended as the knockout region. The region contains 242bp coding sequence. Knock out the region will result in disruption of protein function.
- In this project we use CRISPR/Cas9 technology to modify *Pbx3* gene. The brief process is as follows: gRNA was transcribed in vitro, donor was constructed. Cas9, gRNA 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 null mice display neonatal lethality with hypoventilation and respiratory failure.
- Transcript *Pbx3*-208 may not be affected.
- The *Pbx3* 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 loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at existing technological level.



# Gene information (NCBI)

## Pbx3 pre B cell leukemia homeobox 3 [Mus musculus (house mouse)]

Gene ID: 18516, updated on 31-Jan-2019

### Summary



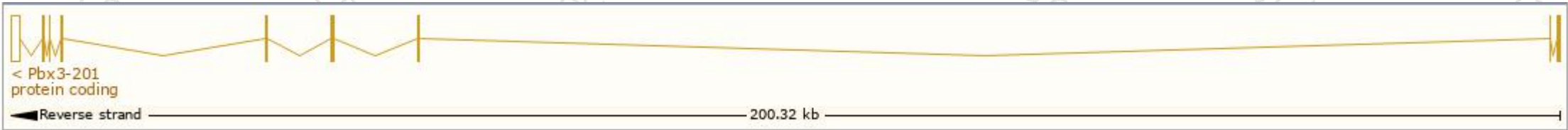
|                           |                                                                                                                                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Official Symbol</b>    | Pbx3 provided by <a href="#">MGI</a>                                                                                                                                      |
| <b>Official Full Name</b> | pre B cell leukemia homeobox 3 provided by <a href="#">MGI</a>                                                                                                            |
| <b>Primary source</b>     | <a href="#">MGI:MGI:97496</a>                                                                                                                                             |
| <b>See related</b>        | <a href="#">Ensembl:ENSMUSG000000038718</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>         | Broad expression in whole brain E14.5 (RPKM 32.9), CNS E14 (RPKM 31.9) and 21 other tissues <a href="#">See more</a>                                                      |
| <b>Orthologs</b>          | <a href="#">human</a> <a href="#">all</a>                                                                                                                                 |

# Transcript information (Ensembl)

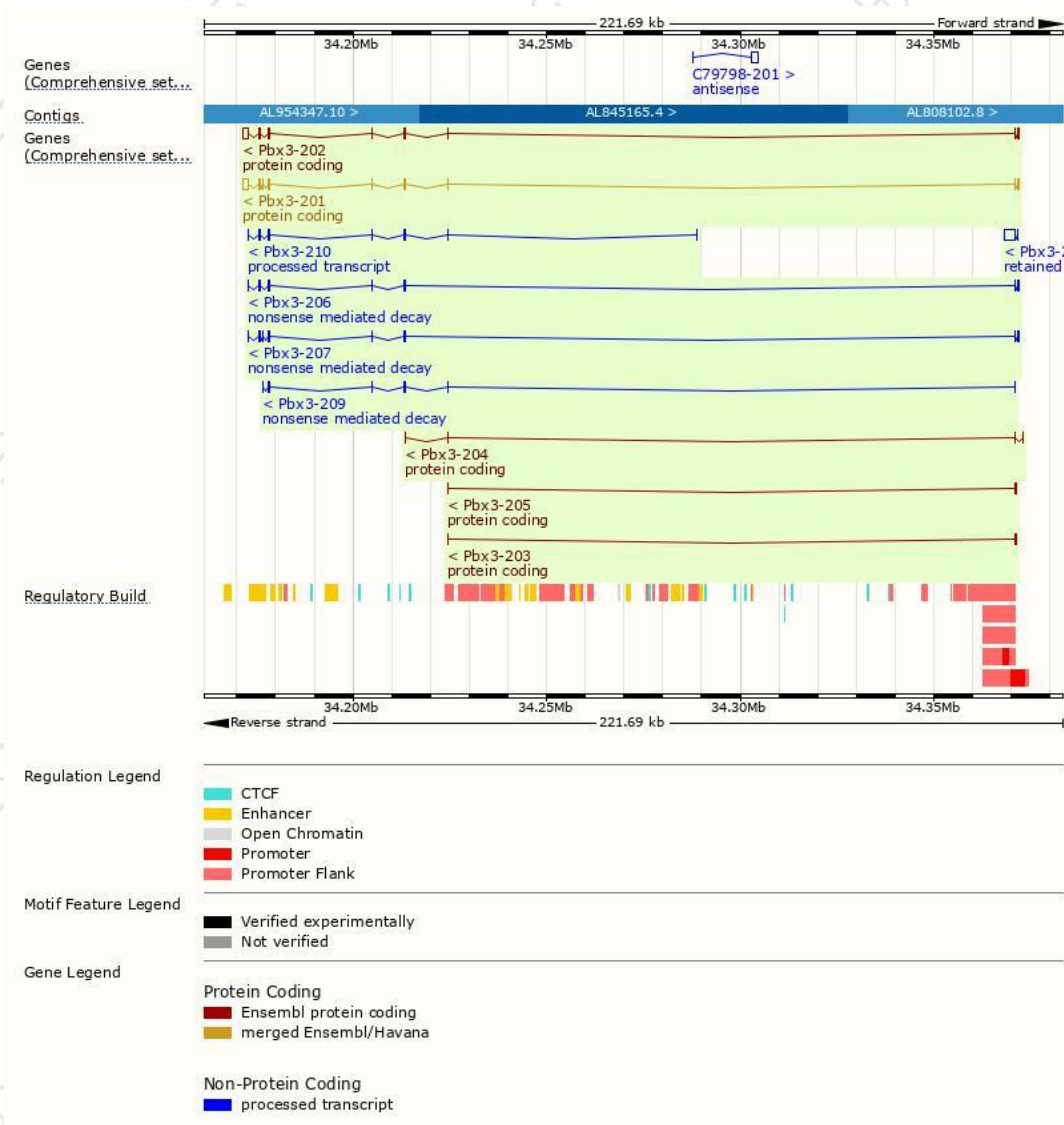
The gene has 10 transcripts,all transcripts are shown below:

| Name     | Transcript ID                         | bp   | Protein               | Biotype                 | CCDS                      | UniProt                | Flags                           |
|----------|---------------------------------------|------|-----------------------|-------------------------|---------------------------|------------------------|---------------------------------|
| Pbx3-202 | <a href="#">ENSMUST00000113132.8</a>  | 2734 | <a href="#">351aa</a> | Protein coding          | <a href="#">CCDS71033</a> | <a href="#">Q35317</a> | TSL:1 GENCODE basic APPRIS ALT1 |
| Pbx3-201 | <a href="#">ENSMUST00000040638.14</a> | 2587 | <a href="#">434aa</a> | Protein coding          | <a href="#">CCDS15947</a> | <a href="#">Q35317</a> | TSL:1 GENCODE basic APPRIS P3   |
| Pbx3-205 | <a href="#">ENSMUST00000141653.2</a>  | 518  | <a href="#">96aa</a>  | Protein coding          | -                         | <a href="#">B2FDH3</a> | CDS 3' incomplete TSL:3         |
| Pbx3-204 | <a href="#">ENSMUST00000138021.3</a>  | 447  | <a href="#">128aa</a> | Protein coding          | -                         | <a href="#">H3BK27</a> | CDS 3' incomplete TSL:3         |
| Pbx3-203 | <a href="#">ENSMUST00000127353.2</a>  | 440  | <a href="#">54aa</a>  | Protein coding          | -                         | <a href="#">B2FDH2</a> | CDS 3' incomplete TSL:3         |
| Pbx3-207 | <a href="#">ENSMUST00000153278.7</a>  | 1063 | <a href="#">93aa</a>  | Nonsense mediated decay | -                         | <a href="#">D6RCU6</a> | TSL:5                           |
| Pbx3-206 | <a href="#">ENSMUST00000143776.7</a>  | 950  | <a href="#">93aa</a>  | Nonsense mediated decay | -                         | <a href="#">D6RCU6</a> | TSL:5                           |
| Pbx3-209 | <a href="#">ENSMUST00000175855.2</a>  | 621  | <a href="#">44aa</a>  | Nonsense mediated decay | -                         | <a href="#">H3BLL9</a> | CDS 5' incomplete TSL:5         |
| Pbx3-210 | <a href="#">ENSMUST00000176213.7</a>  | 1026 | No protein            | Processed transcript    | -                         | -                      | TSL:5                           |
| Pbx3-208 | <a href="#">ENSMUST00000155423.2</a>  | 2858 | No protein            | Retained intron         | -                         | -                      | TSL:1                           |

The strategy is based on the design of *Pbx3-201* transcript,The transcription is shown below



# Genomic location distribution

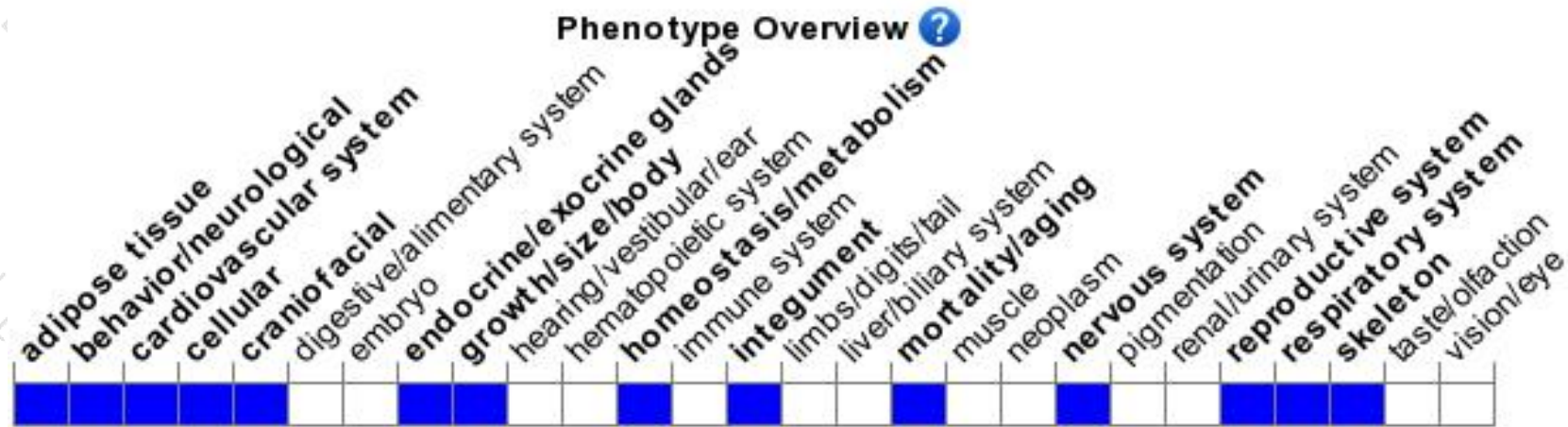




# Protein domain



# 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 null mice display neonatal lethality with hypoventilation and respiratory failure.

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

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