

# ***Ptpn6 Cas9-KO Strategy***

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**Reviewer :**

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# Project Overview

**Project Name**

*Ptpn6*

**Project type**

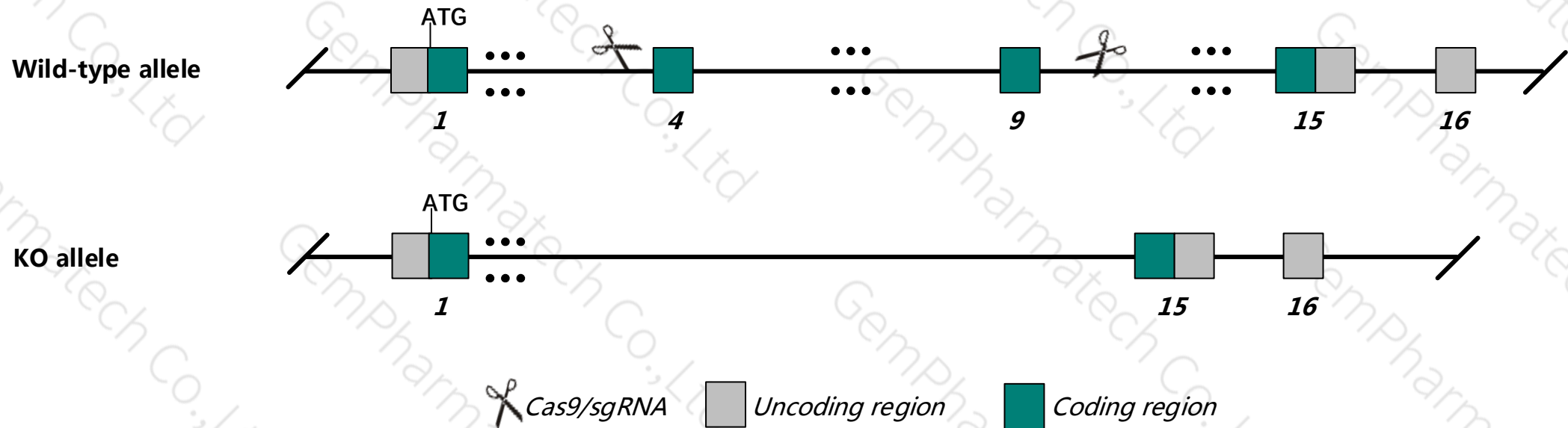
Cas9-KO

**Animal background**

C57BL/6JGpt

# Knockout strategy

This model will use CRISPR/Cas9 technology to edit the *Ptpn6* gene. The schematic diagram is as follows:



# Technical routes

- The *Ptpn6* gene has 11 transcripts, According to the structure of *Ptpn6* gene, exon4-exon9 of *Ptpn6*-203 transcript is recommended as the knockout region. The region contains the 748bp coding sequence. Knock out the region, result in destruction of protein.
- This project uses CRISPR/Cas9 technology to modify *Ptpn6* gene. The brief process is as follows: sgRNA was transcribed in vitro, Cas9, sgRNA were microinjected into fertilized eggs of C57BL/6JGpt mice and homologous recombination was carried out to obtain F0 mice. A stable and hereditary F1 generation mouse model was obtained by mating F0 generation mice with C57BL/6JGpt mice which were confirmed positive by PCR-sequencing.

- According to the existing MGI data , Homozygous mutants are immunodeficient and autoimmune and exhibit neutrophilic skin lesions that disrupt hair follicles and give the moth-eaten appearance. Alleles vary in severity, with death occurring at 6-9 weeks postnatally due to severe pneumonitis.
- Transcript *Ptpn6-208* and *Ptpn6-209* may not be affected.
- The *Ptpn6* gene is located in the Chr6. If the knockout mice are mixed with other mice, two target genes are avoided on the same chromosome as possible, otherwise the offspring of mice with double gene positive and homozygous gene knockout can not be obtained.
- This Strategy is designed based on genetic information in existing databases. Due to the complexity of gene transcription and translation processes, all risks cannot be predicted under existing information.

# Gene information ( NCBI )

## Ptpn6 protein tyrosine phosphatase, non-receptor type 6 [ *Mus musculus* (house mouse) ]

Gene ID: 15170, updated on 5-Feb-2019

### Summary

|                    |                                                                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Official Symbol    | Ptpn6 provided by <a href="#">MGI</a>                                                                                                                                     |
| Official Full Name | protein tyrosine phosphatase, non-receptor type 6 provided by <a href="#">MGI</a>                                                                                         |
| Primary source     | <a href="#">MGI:MGI:96055</a>                                                                                                                                             |
| See related        | <a href="#">Ensembl:ENSMUSG000000004266</a>                                                                                                                               |
| Gene type          | protein coding                                                                                                                                                            |
| RefSeq status      | VALIDATED                                                                                                                                                                 |
| Organism           | <a href="#">Mus musculus</a>                                                                                                                                              |
| Lineage            | Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus |
| Also known as      | me; hcp; Hcph; Ptp1C; SHP-1; 70Z-SHP; SH-PTP1; PTPTY-42                                                                                                                   |
| Expression         | Biased expression in spleen adult (RPKM 123.8), thymus adult (RPKM 59.8) and 14 other tissues <a href="#">See more</a>                                                    |
| Orthologs          | <a href="#">human</a> <a href="#">all</a>                                                                                                                                 |

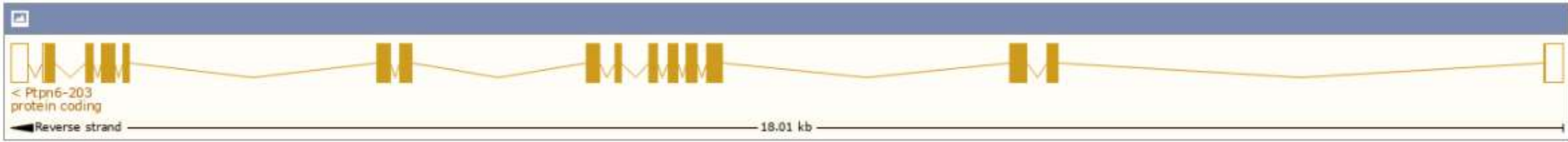
# Transcript information ( Ensembl )

The gene has 11 transcripts, and all transcripts are shown below :

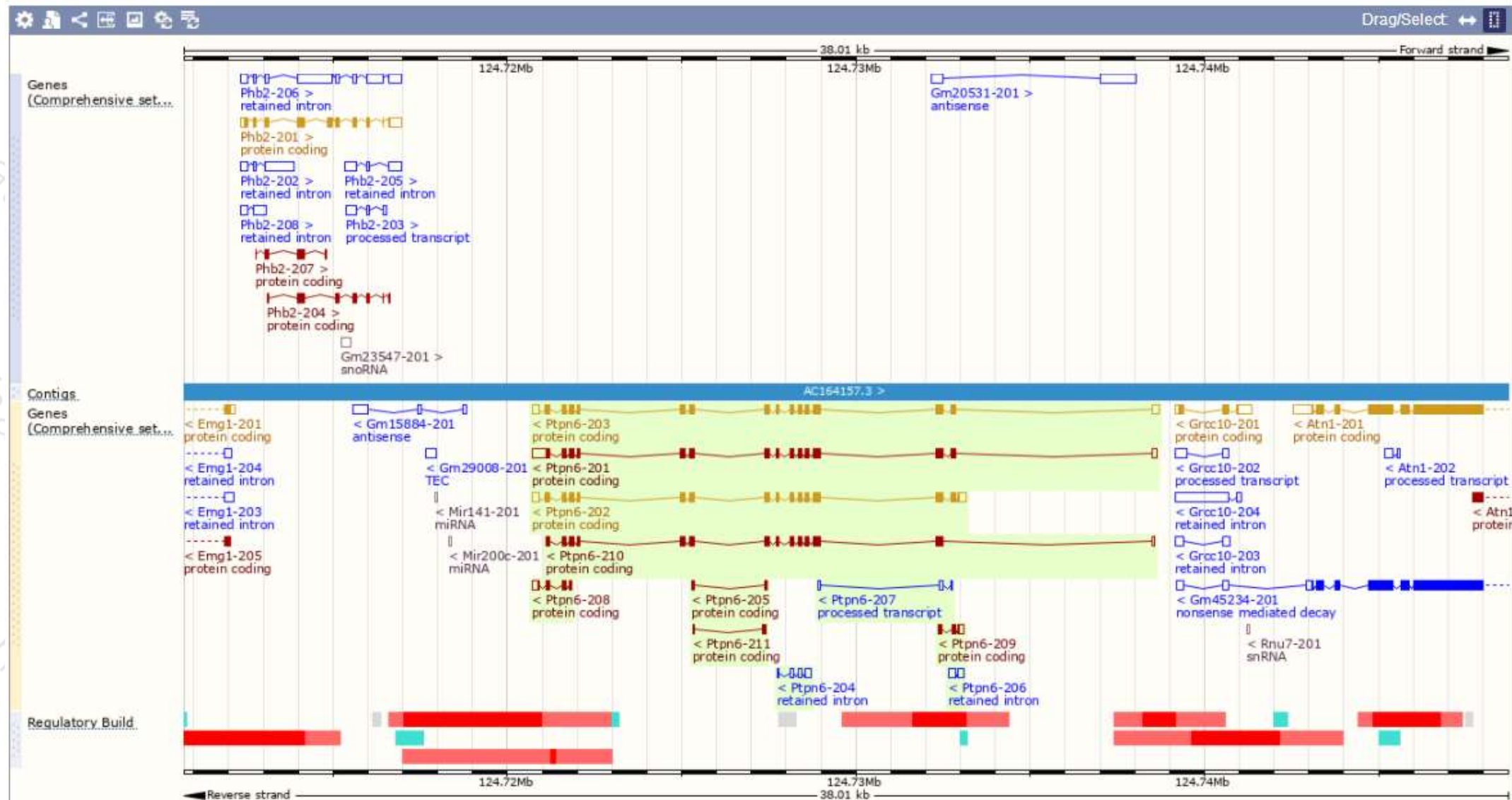
Show/hide columns (1 hidden) Filter

| Name      | Transcript ID                         | bp   | Protein               | Biotype              | CCDS                      | UniProt                                       | RefSeq                                                       | Flags                           |
|-----------|---------------------------------------|------|-----------------------|----------------------|---------------------------|-----------------------------------------------|--------------------------------------------------------------|---------------------------------|
| Ptpn6-201 | <a href="#">ENSMUST00000004377.14</a> | 2308 | <a href="#">597aa</a> | Protein coding       | <a href="#">CCDS51908</a> | <a href="#">P29351</a> <a href="#">Q3UCJ0</a> | -                                                            | TSL:1 GENCODE basic APPRIS ALT1 |
| Ptpn6-203 | <a href="#">ENSMUST00000171549.8</a>  | 2226 | <a href="#">597aa</a> | Protein coding       | <a href="#">CCDS51908</a> | <a href="#">P29351</a> <a href="#">Q3UCJ0</a> | <a href="#">NM_001077705</a><br><a href="#">NP_001071173</a> | TSL:1 GENCODE basic APPRIS ALT1 |
| Ptpn6-202 | <a href="#">ENSMUST00000112484.9</a>  | 2219 | <a href="#">595aa</a> | Protein coding       | <a href="#">CCDS39628</a> | <a href="#">P29351</a>                        | <a href="#">NM_013545</a><br><a href="#">NP_038573</a>       | TSL:1 GENCODE basic APPRIS P3   |
| Ptpn6-210 | <a href="#">ENSMUST00000174265.1</a>  | 1743 | <a href="#">556aa</a> | Protein coding       | -                         | <a href="#">P29351</a>                        | -                                                            | TSL:5 GENCODE basic             |
| Ptpn6-208 | <a href="#">ENSMUST00000173315.7</a>  | 456  | <a href="#">101aa</a> | Protein coding       | -                         | <a href="#">G3UYY5</a>                        | -                                                            | CDS 5' incomplete TSL:2         |
| Ptpn6-209 | <a href="#">ENSMUST00000173647.1</a>  | 330  | <a href="#">67aa</a>  | Protein coding       | -                         | <a href="#">G3UXM2</a>                        | -                                                            | CDS 3' incomplete TSL:5         |
| Ptpn6-205 | <a href="#">ENSMUST00000172690.1</a>  | 134  | <a href="#">45aa</a>  | Protein coding       | -                         | <a href="#">G3UZU6</a>                        | -                                                            | CDS 5' and 3' incomplete TSL:1  |
| Ptpn6-211 | <a href="#">ENSMUST00000174787.1</a>  | 120  | <a href="#">40aa</a>  | Protein coding       | -                         | <a href="#">G3UWU7</a>                        | -                                                            | CDS 5' and 3' incomplete TSL:1  |
| Ptpn6-207 | <a href="#">ENSMUST00000173228.1</a>  | 198  | No protein            | Processed transcript | -                         | -                                             | -                                                            | TSL:1                           |
| Ptpn6-204 | <a href="#">ENSMUST00000172613.1</a>  | 421  | No protein            | Retained intron      | -                         | -                                             | -                                                            | TSL:5                           |
| Ptpn6-206 | <a href="#">ENSMUST00000172770.1</a>  | 371  | No protein            | Retained intron      | -                         | -                                             | -                                                            | TSL:3                           |

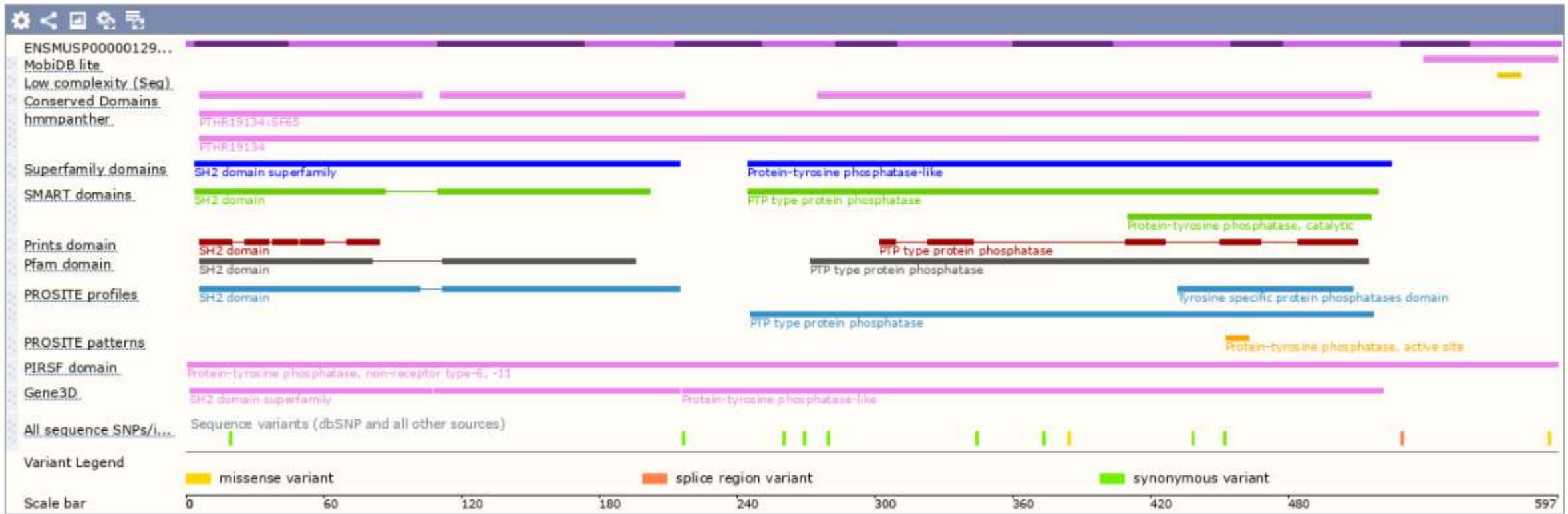
The strategy is based on the design of *Ptpn6-203* transcript,The transcription is shown below :



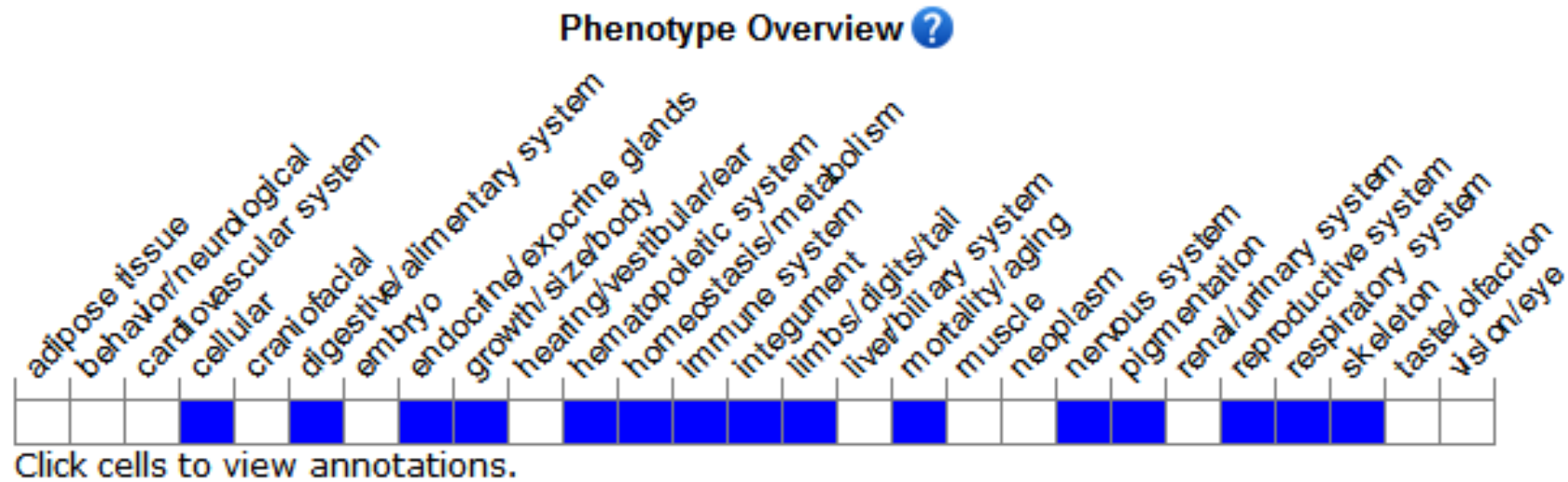
# Genomic location distribution



# 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 mutants are immunodeficient and autoimmune and exhibit neutrophilic skin lesions that disrupt hair follicles and give the moth-eaten appearance. Alleles vary in severity, with death occurring at 6-9 weeks postnatally due to severe pneumonitis.

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