

# *Pip4p1* Cas9-KO Strategy

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# Overview

## Target Gene Name

- *Pip4p1*

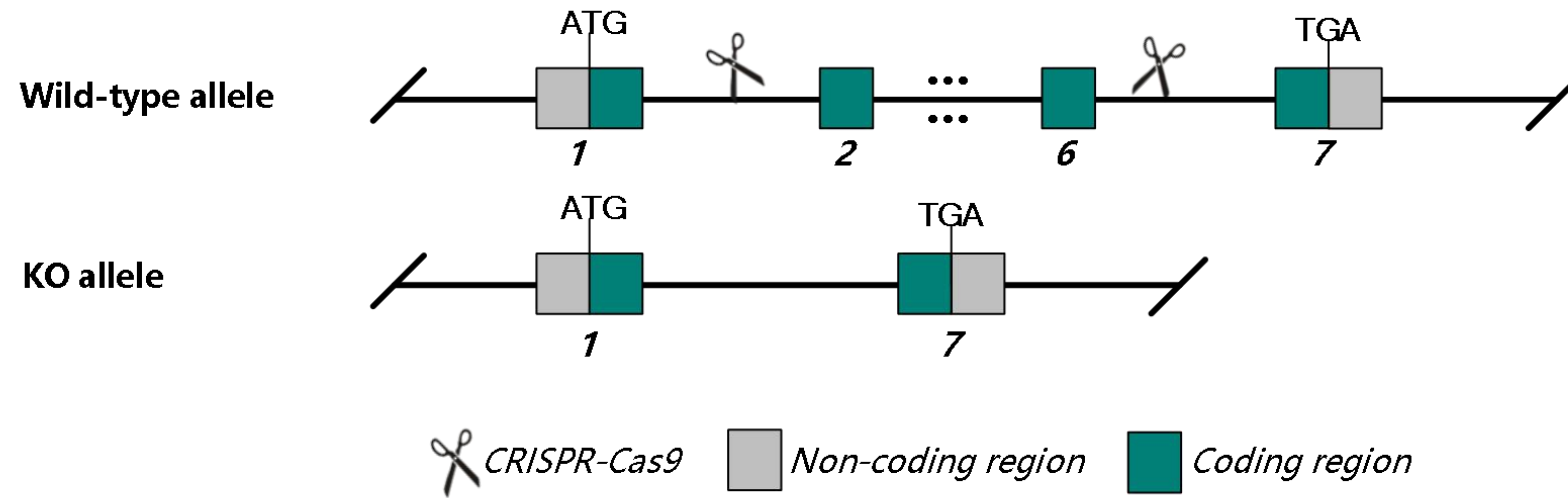
## Project Type

- Cas9-KO

## Genetic Background

- C57BL/6JGpt

# Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Pip4p1* gene.

# Technical Information

- The *Pip4p1* gene has 11 transcripts. According to the structure of *Pip4p1* gene, exon 2-6 of *Pip4p1*-205 (ENSMUST00000160835.9) is recommended as the knockout region. The region contains 548 bp of coding sequence. Knockout the region will result in disruption of gene function.
- In this project we use CRISPR-Cas9 technology to modify *Pip4p1* gene. The brief process is as follows: gRNAs were transcribed in vitro. Cas9 and gRNAs 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 on-target amplicon sequencing. A stable F1-generation mouse strain was obtained by mating positive F0-generation mice with C57BL/6JGpt mice and confirmation of the desired mutant allele was carried out by PCR and on-target amplicon sequencing.

# Gene Information

Pip4p1 phosphatidylinositol-4,5-bisphosphate 4-phosphatase 1 [ *Mus musculus* (house mouse) ]

[Download Datasets](#)

Gene ID: 219024, updated on 31-May-2023

## Summary

**Official Symbol** Pip4p1 provided by [MGI](#)  
**Official Full Name** phosphatidylinositol-4,5-bisphosphate 4-phosphatase 1 provided by [MGI](#)  
**Primary source** [MGI:MGI:2448501](#)  
**See related** [Ensembl:ENSMUSG00000035953](#) [AllianceGenome:MGI:2448501](#)  
**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** Tmem55b  
**Summary** Predicted to enable phosphatidylinositol-4,5-bisphosphate 4-phosphatase activity. Involved in positive regulation of TORC1 signaling and proton-transporting V-type ATPase complex assembly. Located in bounding membrane of organelle and plasma membrane. Orthologous to human PIP4P1 (phosphatidylinositol-4,5-bisphosphate 4-phosphatase 1). [provided by Alliance of Genome Resources, Apr 2022]  
**Expression** Ubiquitous expression in adrenal adult (RPKM 44.4), mammary gland adult (RPKM 32.3) and 28 other tissues [See more](#)  
**Orthologs** [human](#) [all](#)

**NEW** Try the new [Gene table](#)  
Try the new [Transcript table](#)

## Genomic context

Location: 14; 14 C1

Exon count: 7

See Pip4p1 in [Genome Data Viewer](#)

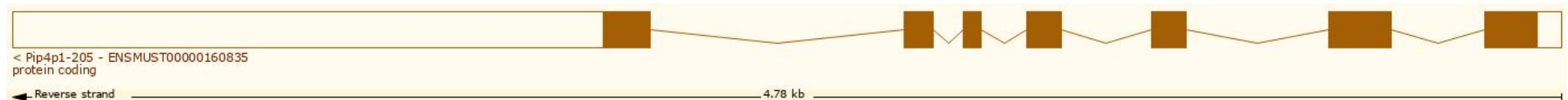
<https://www.ncbi.nlm.nih.gov/gene/219024>

# Transcript Information

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

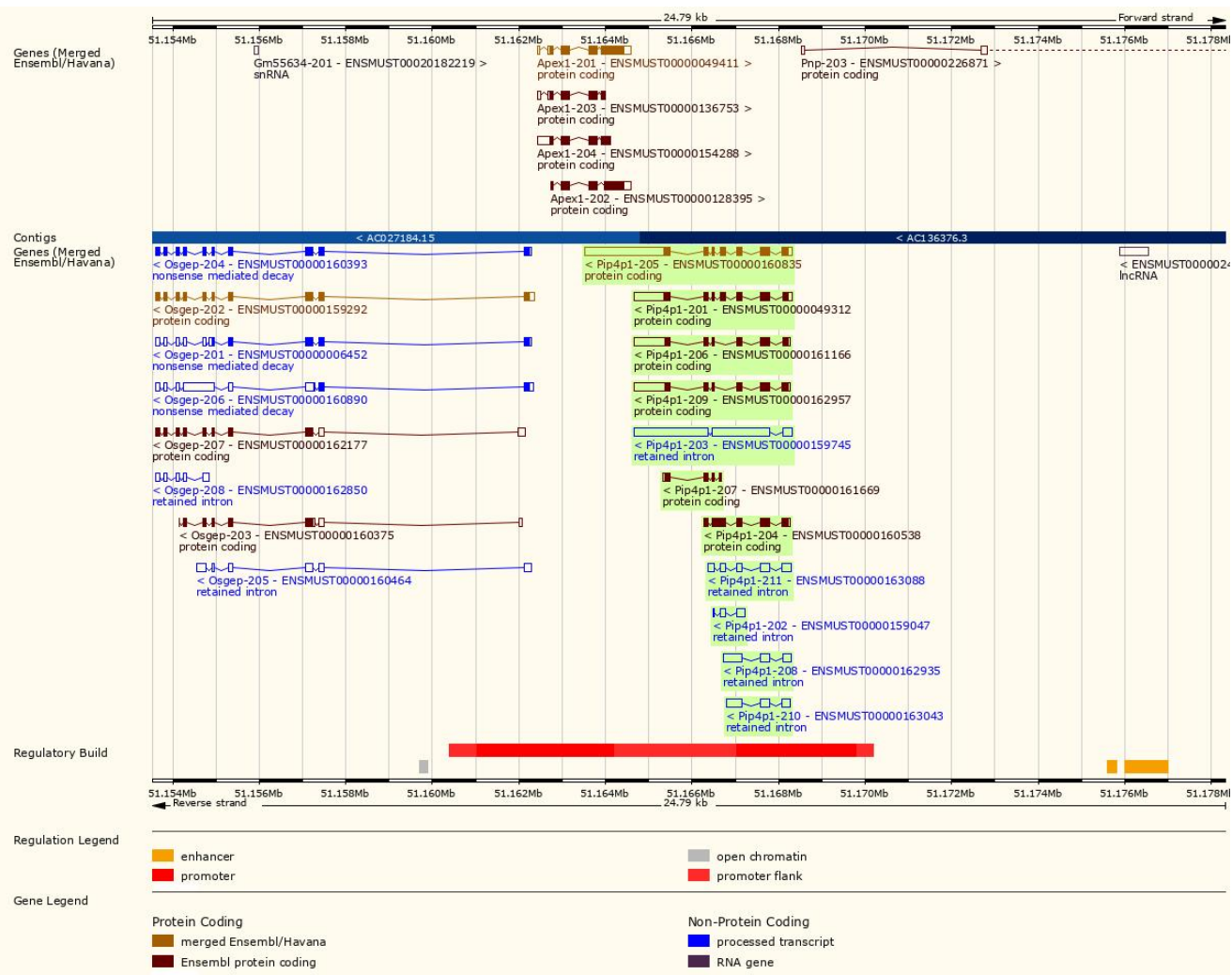
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
<a href="#">ENSMUST00000163088.8</a>	Pip4p1-211	762	No protein	Retained intron		-	TSL:2
<a href="#">ENSMUST00000163043.2</a>	Pip4p1-210	735	No protein	Retained intron		-	TSL:2
<a href="#">ENSMUST00000162957.8</a>	Pip4p1-209	1465	<a href="#">238aa</a>	Protein coding	<a href="#">CCDS79322</a>	<a href="#">E0CZ18</a>	GENCODE basic TSL:1
<a href="#">ENSMUST00000162935.8</a>	Pip4p1-208	829	No protein	Retained intron		-	TSL:2
<a href="#">ENSMUST00000161669.2</a>	Pip4p1-207	356	<a href="#">98aa</a>	Protein coding		<a href="#">F7CNA9</a>	TSL:1 CDS 5' incomplete
<a href="#">ENSMUST00000161166.8</a>	Pip4p1-206	1445	<a href="#">231aa</a>	Protein coding	<a href="#">CCDS79323</a>	<a href="#">E0CZF6</a>	GENCODE basic TSL:1
<a href="#">ENSMUST00000160835.9</a>	Pip4p1-205	2755	<a href="#">284aa</a>	Protein coding	<a href="#">CCDS27028</a>	<a href="#">Q3TWL2</a>	Ensembl Canonical GENCODE basic APPRIS P4 TSL:1
<a href="#">ENSMUST00000160538.2</a>	Pip4p1-204	877	<a href="#">283aa</a>	Protein coding		<a href="#">E0CYE6</a>	TSL:5 CDS 3' incomplete
<a href="#">ENSMUST00000159745.2</a>	Pip4p1-203	3232	No protein	Retained intron		-	TSL:2
<a href="#">ENSMUST00000159047.2</a>	Pip4p1-202	321	No protein	Retained intron		-	TSL:3
<a href="#">ENSMUST00000049312.14</a>	Pip4p1-201	1594	<a href="#">277aa</a>	Protein coding	<a href="#">CCDS79324</a>	<a href="#">F8WHW3</a>	GENCODE basic APPRIS ALT1 TSL:1

The strategy is based on the design of *Pip4p1-205* transcript, the transcription is shown below:



Source: <http://asia.ensembl.org/>

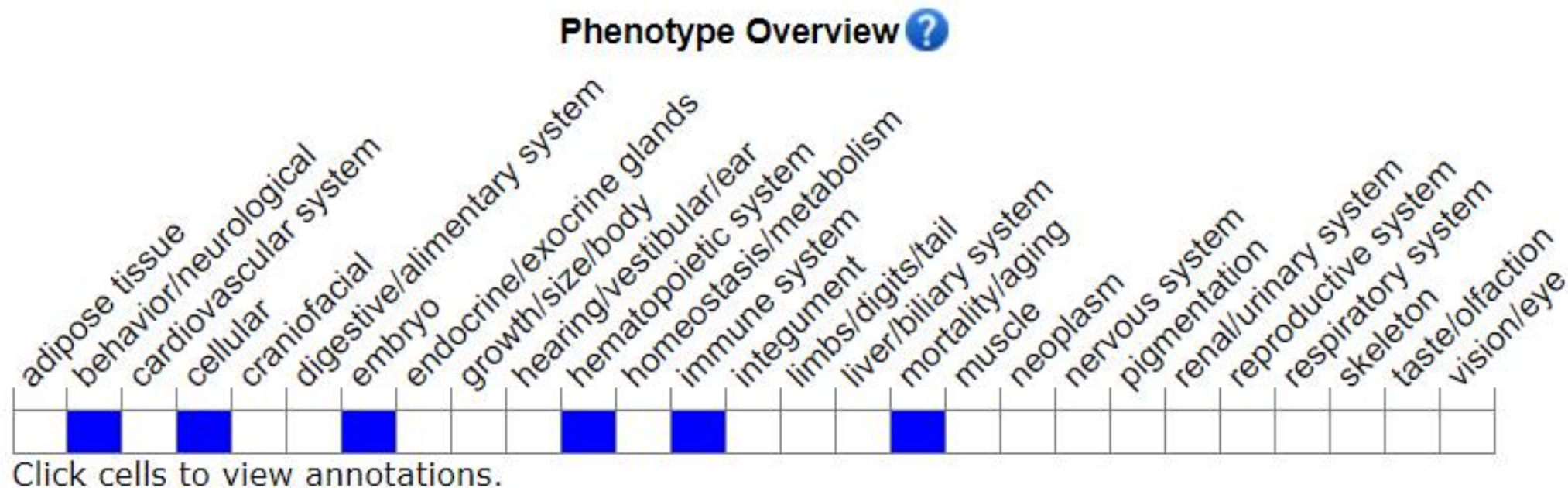
# Genomic Information



# Protein Information



# Mouse Phenotype Information (MGI)

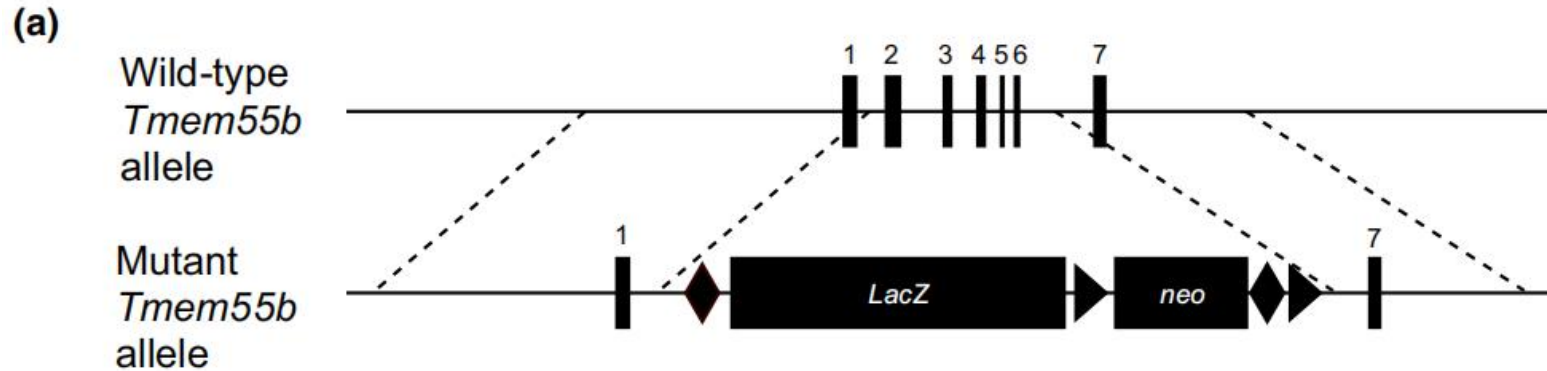


Mice homozygous for a knock-out allele exhibit complete embryonic lethality associated with embryonic growth arrest at E9.5.

# Important Information

- According to the existing MGI data, mice homozygous for a knock-out allele exhibit complete embryonic lethality associated with embryonic growth arrest at E9.5.
- The knockout region is about 1.2 kb away from the 3' of the *Apex1* gene, which may affect the regulation of this gene.
- The knockout region is about 3.4 kb away from the 5' of the *Osgep* gene, which may affect the regulation of this gene.
- The knockout region is about 0.5 kb away from the 5' of the *Pnp* gene, which may affect the regulation of this gene.
- *Pip4p1* is located on Chr 14. If the knockout mice are crossed with other mouse strains to obtain double homozygous mutant offspring, please avoid the situation that the second gene is on the same chromosome.
- This strategy is designed based on genetic information in existing databases. Due to the complexity of biological processes, all risks of the mutation on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

# Reference



To examine further the physiological function of TMEM55B, we generated mice deficient in this protein. The *Tmem55b* gene was disrupted in mouse embryonic stem cells by replacement of exons 2 to 6 with IRES-*lacZ* and PGK-*neo*-poly(A)-loxP cassettes (Figure 4a). Adult mice heterozygous

[1] Hashimoto Y, Shirane M, Nakayama K I. TMEM 55B contributes to lysosomal homeostasis and amino acid-induced mTORC 1 activation[J]. *Genes to Cells*, 2018, 23(6): 418-434.