GemPharmatech™

Atp5po Cas9-CKO Strategy

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Design Date: 2024-4-22

Overview

Target Gene Name

- Atp5po

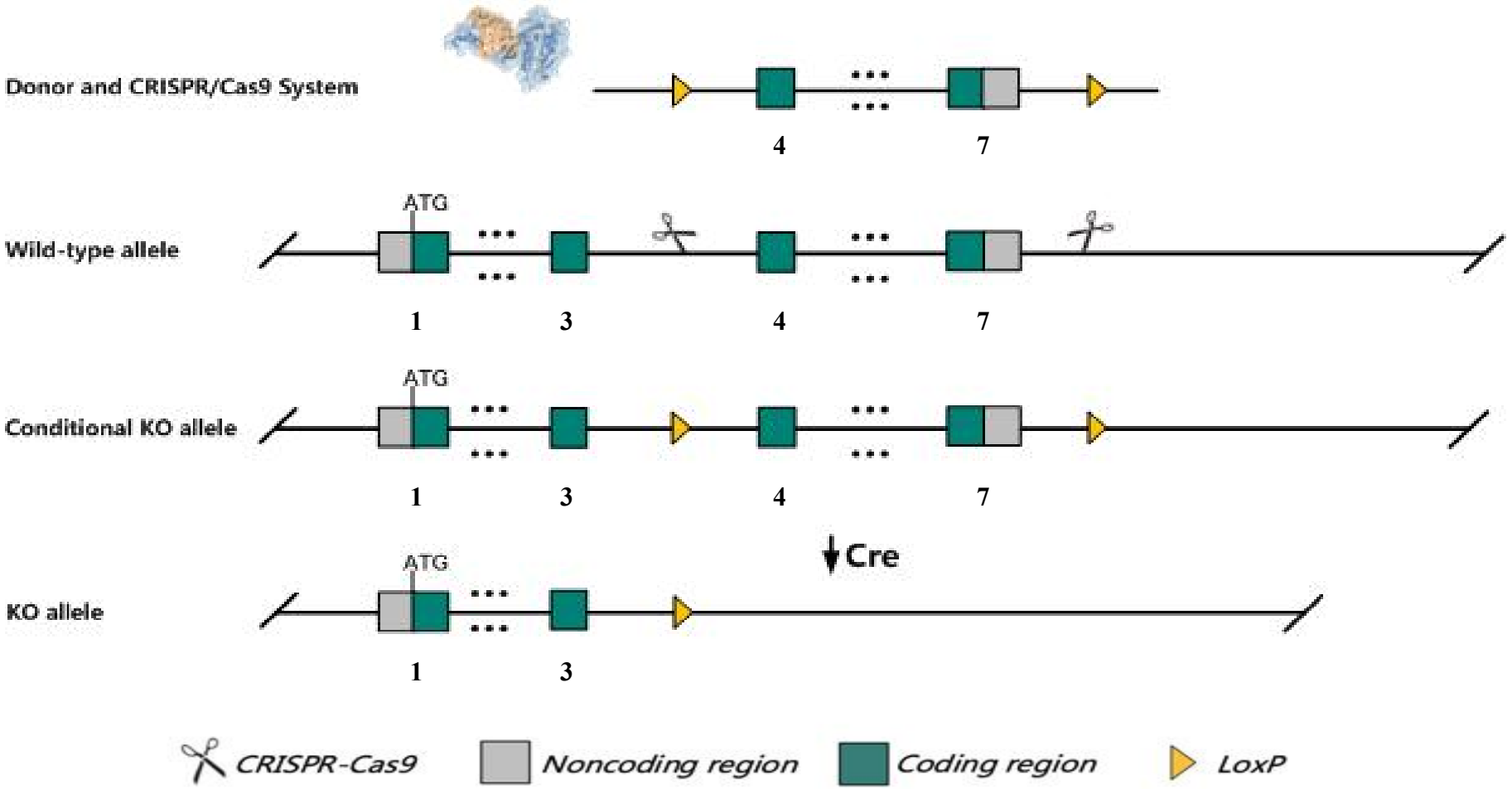
Project Type

- Cas9-CKO

Genetic Background

- C57BL/6JGpt

Strain Strategy



Schematic representation of CRISPR-Cas9 engineering used to edit the *Atp5po* gene.

Technical Information

- The *Atp5po* gene has 6 transcripts. According to the structure of *Atp5po* gene, exon4-exon7 of *Atp5po*-201 (ENSMUST00000023677.10) transcript is recommended as the knockout region. The region contains most of the coding sequence. Knocking out the region will result in disruption of protein function.
- In this project we use CRISPR-Cas9 technology to modify *Atp5po* 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 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.
- 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.

Gene Information

Atp5po ATP synthase peripheral stalk subunit OSCP [*Mus musculus* (house mouse)]

Download Datasets

Gene ID: 28080, updated on 18-Apr-2024

Summary

Official Symbol	Atp5po provided by MGI
Official Full Name	ATP synthase peripheral stalk subunit OSCP provided by MGI
Primary source	MGI:MGI:106341
See related	Ensembl:ENSMUSG00000022956 AllianceGenome:MGI:106341
Gene type	protein coding
RefSeq status	PROVISIONAL
Organism	Mus musculus
Lineage	Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Euarchontoglires; Glires; Rodentia; Myomorpha; Muroidea; Muridae; Murinae; Mus; Mus
Also known as	ATPO; OSCP; Atp5o; D12Wsu28e
Summary	Predicted to enable estradiol binding activity. Predicted to contribute to ATP hydrolysis activity and proton-transporting ATP synthase activity, rotational mechanism. Predicted to be involved in mitochondrial ATP synthesis coupled proton transport. Predicted to act upstream of or within ion transport. Located in mitochondrion and myelin sheath. Is expressed in several structures, including alimentary system; cardiovascular system; genitourinary system; integumental system; and nervous system. Orthologous to human ATP5PO (ATP synthase peripheral stalk subunit OSCP). [provided by Alliance of Genome Resources, Apr 2022]
Expression	Ubiquitous expression in heart adult (RPKM 233.2), placenta adult (RPKM 134.9) and 28 other tissues See more
Orthologs	human all

NEW Try the new Gene table

Try the new Transcript table

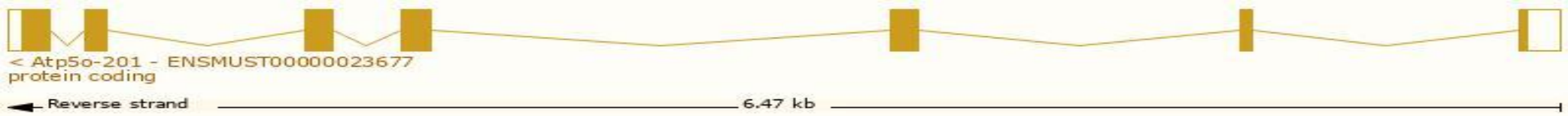
Source: https://www.ncbi.nlm.nih.gov/

Transcript Information

The gene has 6 transcripts,all transcripts are shown below:

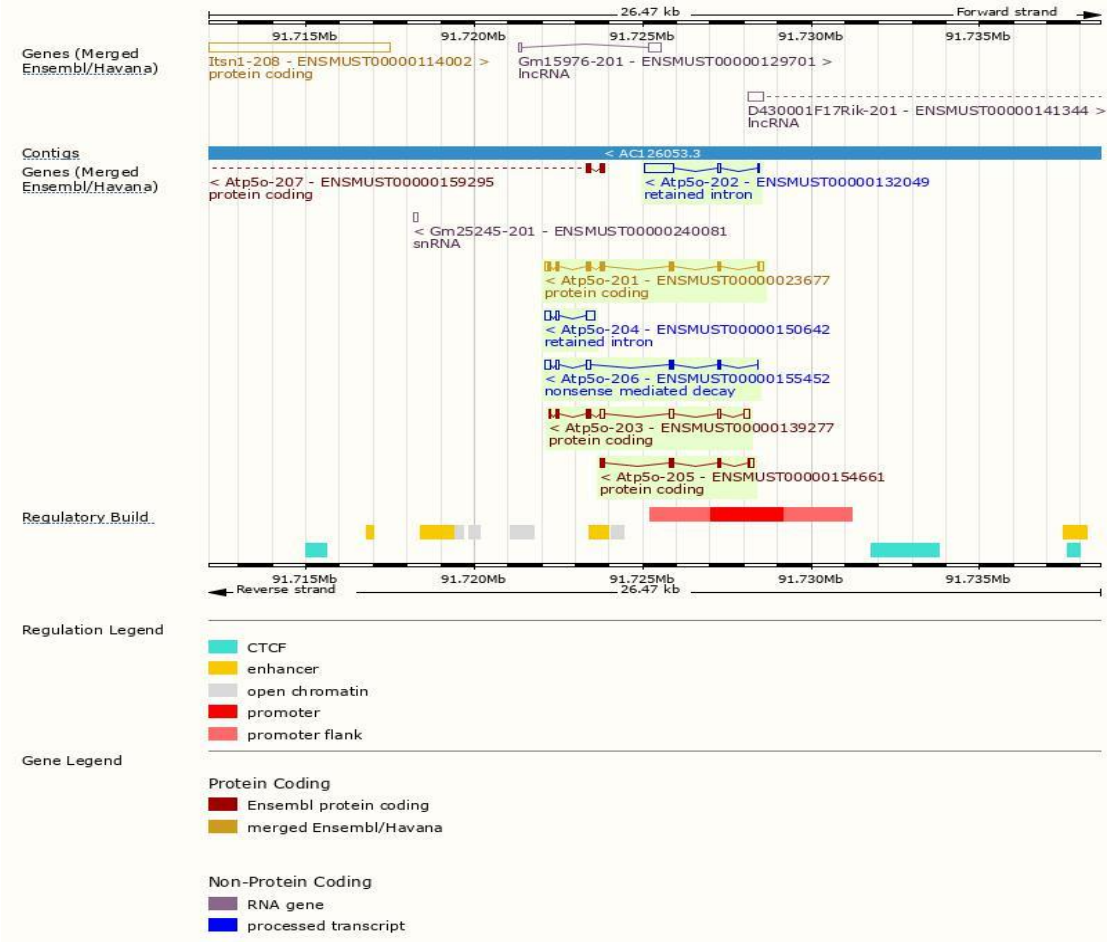
Transcript ID	Name	bp	Protein	Biotype	CCDS	UniProt Match	Flags
ENSMUST00000132049.2	Atp5po-202	932	No protein	Retained intron		-	TSL:2
ENSMUST00000150642.8	Atp5po-204	486	No protein	Retained intron		-	TSL:2
ENSMUST00000023677.10	Atp5po-201	838	213aa	Protein coding	CCDS28331	Q9DB20	Ensembl Canonical GENCODE basic APPRIS P1 TSL:1
ENSMUST00000139277.8	Atp5po-203	710	94aa	Protein coding		A0A338P7G3	TSL:3 CDS 3' incomplete
ENSMUST00000154661.8	Atp5po-205	457	109aa	Protein coding		A0A338P776	TSL:5 CDS 3' incomplete
ENSMUST00000155452.8	Atp5po-206	560	71aa	Nonsense mediated decay		F6XVM5	TSL:5 CDS 5' incomplete

The strategy is based on the design of *Atp5po*-201 transcript, the transcription is shown below:



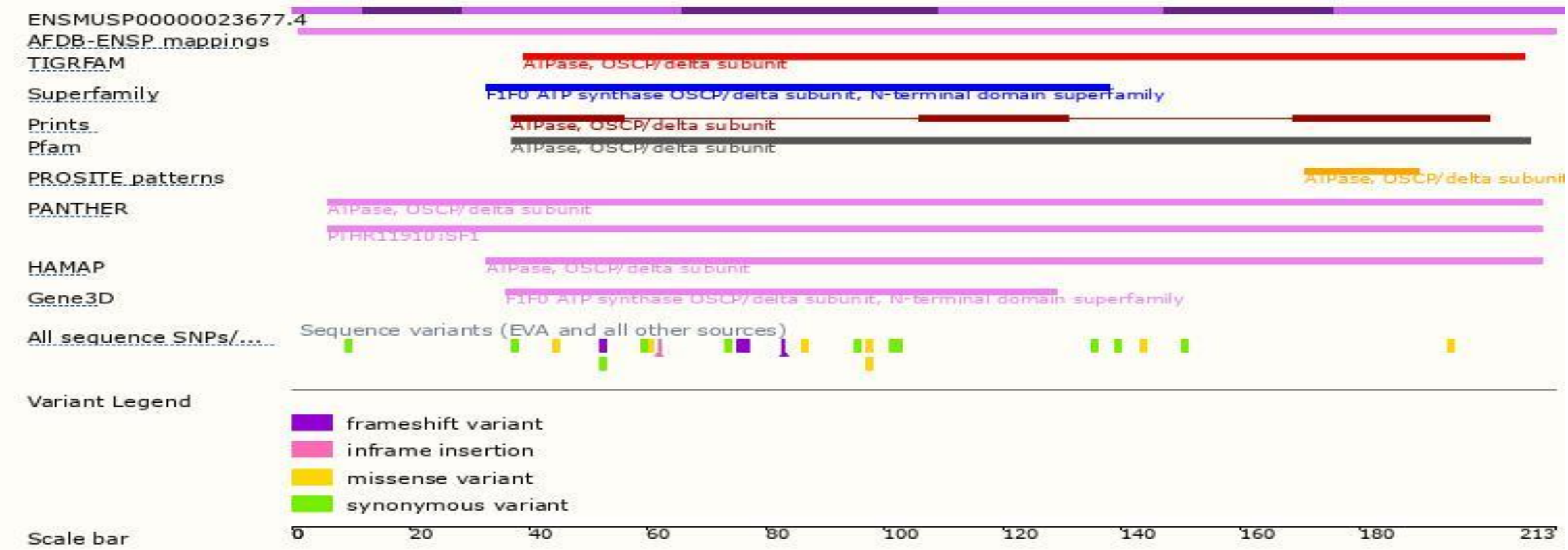
Source: https://www.ensembl.org

Genomic Information



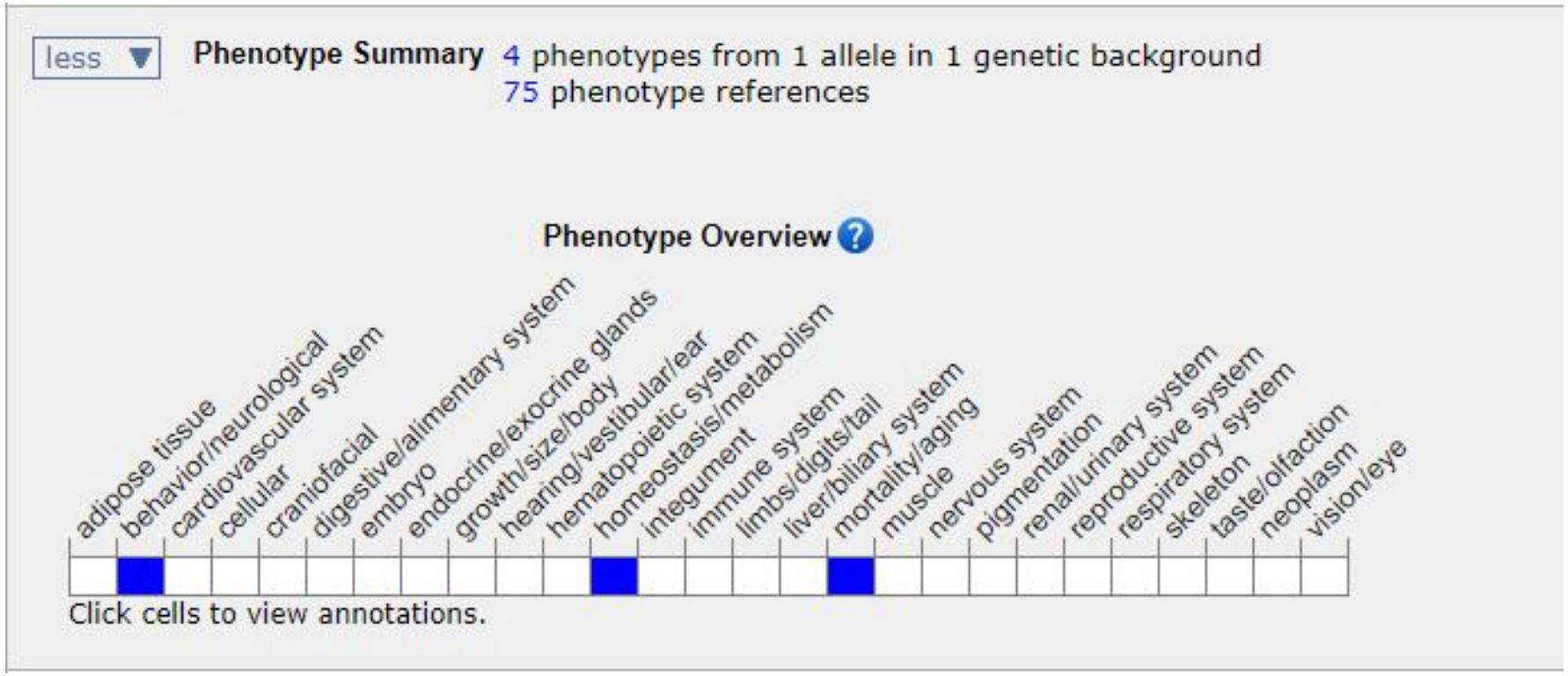
Source: : https://www.ensembl.org

Protein Information



Source: : https://www.ensembl.org

Mouse Phenotype Information (MGI)

- 

Source: https://www.informatics.jax.org

Important Information

- According to the existing MGI data: some homozygous mice die during embryonic stage.
- The flox region is in the intron of gene *GM15976*, this strategy may affect the normal function of gene *GM15976*.
- The transcript-202 is not affected.
- *Atp5po* is located on Chr16. 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 risk of loxp insertion on gene transcription, RNA splicing and protein translation cannot be predicted at the existing technology level.

Reference

Summary | Mutation origin | Mutation description | Find Mice (IMSR) | References

Summary	Symbol:	**Atp5po^{em2Cya}**
	Name:	ATP synthase peripheral stalk subunit OSCP; endonuclease-mediated mutation 2, Cyagen Biosciences
	MGI ID:	MGI:7582496
	Synonyms:	Atp5po^{em1flox}
	Gene:	Atp5po *Location:* Chr16:91722111-91728518 bp, - strand *Genetic Position:* Chr16, 53.26 cM
	Alliance:	Atp5po^{em2Cya} page
Mutation origin	Strain of Origin:	C57BL/6J
Mutation description	Allele Type:	Endonuclease-mediated (Conditional ready, No functional change)
	Mutation:	Insertion
		Exon 4~7 will be selected as conditional knockout region (cKO region). (*J:326541*)
	Inheritance:	Not Specified
Find Mice (IMSR)	Mouse strains and cell lines available from the International Mouse Strain Resource (IMSR)	
	Carrying this Mutation:	Mouse Strains: 0 strains available Cell Lines: 0 lines available
	Carrying any Atp5po Mutation:	15 strains or lines available
References	Original:	J:326541 Cyagen Biosciences Inc., Cyagen Biosciences Website. 2022;
	All:	1 reference(s)