B6-Chr1^{YP1}-Atp2a2 T484A

Strain Name: C57BL/6JGpt-Chr1^{YP1}Atp2a2$^{em1Cin(T484A)}$/Gpt
Strain Type: Point mutation
Strain Number: T057219
Background: C57BL/6JGpt-Chr1^{YP1}/Gpt

Description

Probable phospholipid-transporting ATPase IIA (ATP2A2), also known as SERCA2, is an isoform of SERCA that regulates cardiac contraction and diastole and mediates the entry of Ca^{2+} from the cytoplasm into the sarcoplasmic reticulum. It has been found that SERCA2 is categorized into two isoforms, SERCA2a and SERCA2b, and that the SERCA2a content in human myocardium decreases with aging[1]. In addition, it was found that specific knockdown of *Atp2a2* in mouse heart caused moderate impairment of cardiac function in mice[2]. It was further found that phosphorylation of Thr484 of SERCA2a in rat cardiomyocytes promotes Ca^{2+} uptake, whereas decreased phosphorylation of Thr484 of SERCA2a in mouse cardiomyocytes leads to impaired cardiac function in mice[3].

The background mouse of B6-Chr1^{YP1}-Atp2a2 T484A is B6-Chr1^{YP1} (strain no. D000750), field-sourced chromosome 1 replacement line mouse with C57BL/6JGpt as a receptor, with metabolic abnormalities such as spontaneous obesity, spontaneous fatty liver and other phenotypes. The T057219 strain developed by GemPharmatech has the *Atp2a2 T484A* mutation in the background of B6-Chr1^{YP1}, which provides a new genetically engineered mouse model for the study of the mechanism of this mutation site.

Strategy

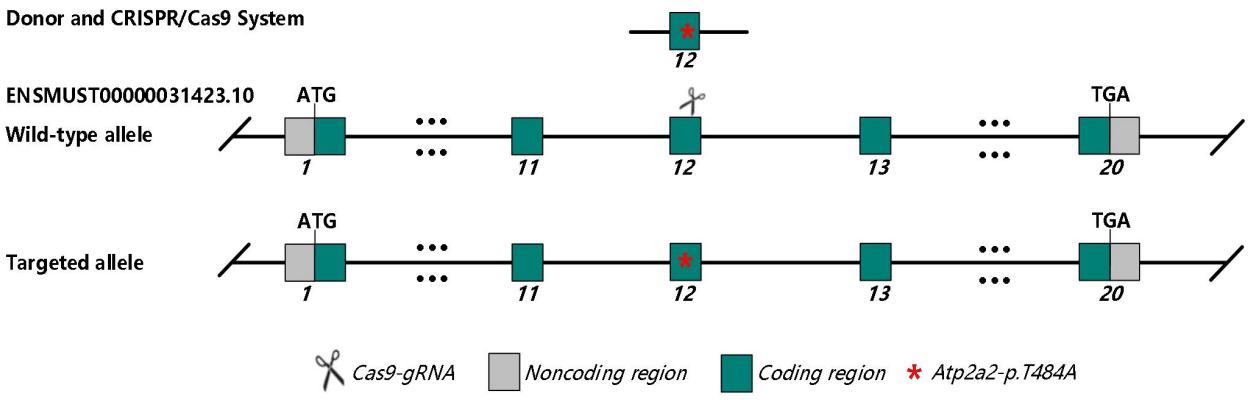

Fig.1 Schematic diagram of B6-Chr1^{YP1}-Atp2a2 R691X model stratery.

Application

1. Study on the signaling mechanism of *Atp2a2* related pathway
2. Study on the relevant roles and mechanisms of *Atp2a2* and its mutations in cardiac functions

Data support

1. Detection of mouse *Atp2a2* mRNA level

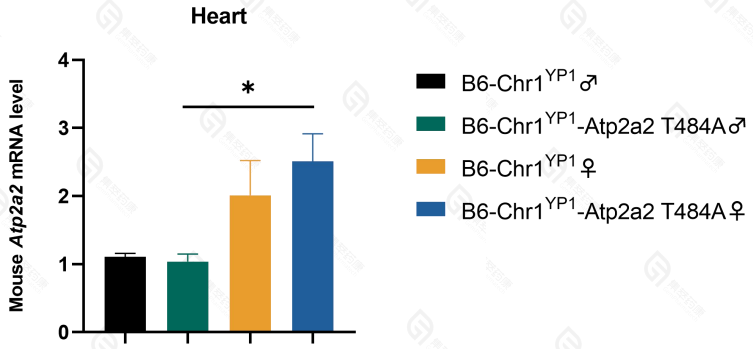

Fig 2. The mRNA expression of mouse *Atp2a2* in B6-Chr1^{YP1}-Atp2a2 T484A.

The mRNA expression of mouse *Atp2a2* in the mice model were detected by RT-qPCR using primer specific to mouse *Atp2a2*. (n=3♂, 3♀)

2. Identification of T484A mutation of *Atp2a2*

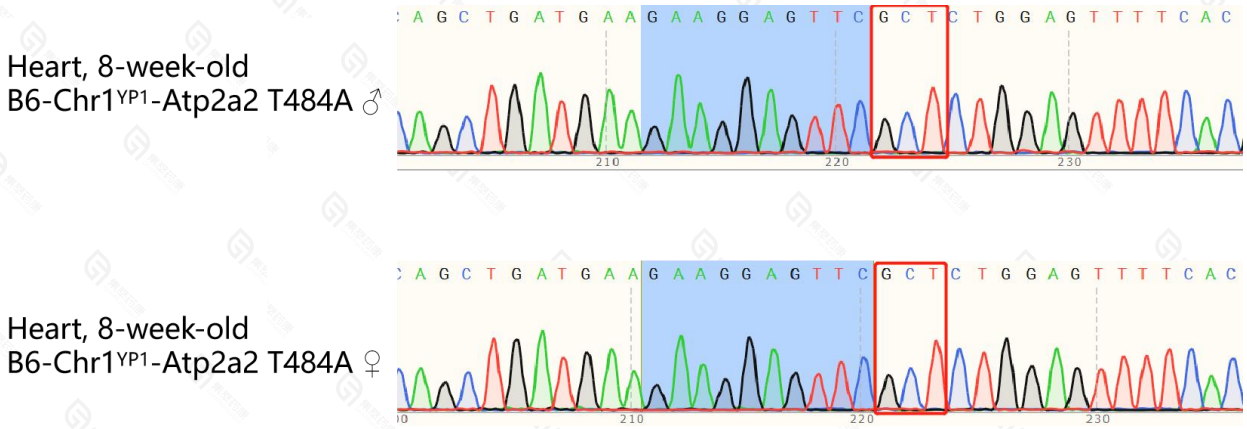

Fig 3. The mutation of T484A was positive in the strain of B6-Chr1^{YP1}-Atp2a2 T484A.

The target fragment including T484A mutation site was obtained by RT-PCR, and then high-throughput sequencing was employed to identify the T484A mutation site in the heart tissue of the B6-Chr1^{YP1}-Atp2a2 T484A mice. (n=1♂, 1♀)

Reference

1. Lennon NJ, Harmon S, Mackey A, Ohlendieck K. Oligomerization of the sarcoplasmic reticulum Ca2+-ATPase SERCA2 in cardiac muscle. Mol Cell Biol Res Commun. 1999 Jun;1(3):182-7.
2. Andersson KB, Birkeland JA, Finsen AV, et al. Moderate heart dysfunction in mice with inducible cardiomyocyte-specific excision of the Serca2 gene. J Mol Cell Cardiol. 2009 Aug;47(2):180-7.
3. Quan C, Li M, Du Q, et al. SPEG Controls Calcium Reuptake Into the Sarcoplasmic Reticulum Through Regulating SERCA2a by Its Second Kinase-Domain. Circ Res. 2019 Mar;124(5):712-726.