B10-Dmd-KO

Strain Name: C57BL/10ScSnJGpt-*Dmd*^{em3Cd4}/Gpt
Strain Type: Knock-out
Strain ID: T003035
Background: C57BL/10ScSnJGpt

Description

Duchenne muscular dystrophy (DMD) belongs to the X-linked recessive genetic disease. The disease is characterized by progressive atrophy of proximal skeletal muscles of the extremities, pseudo hypertrophy of the calf gastrocnemius, and affects both the myocardium and respiratory muscles, and can die early in the onset of the disease [1]. This disease also affects the development of some central nervous systems and organs [2]. The *DMD* gene encodes a large rod-shaped cytoskeleton protein (Dystrophin), which is mainly distributed on the inner surface of bone and myocardial muscle fibers. Anti-dystrophin helps muscle fibers maintain their integrity and elasticity during contraction. And it is a component of the dystrophin complex and plays a very important role in maintaining the structure of cells. Mutations of this gene in humans can cause the Duchenne and Becker muscular dystrophy [3], both of morbidity in our country at a high level, thus further pathogenesis of such diseases will be studied focus.

We constructed the gRNA of the mouse *Dmd* gene, used CRISPR/Cas9 technology and blastocyst injection technology to target Exon 4 of the mouse *Dmd* gene, and screened mouse models that could cause frameshift mutations in the *Dmd* gene. *Dmd* deficient mouse validated by phenotypic analysis will become an important model for screening drugs or pathophysiology research for muscular dystrophy.

Strategy

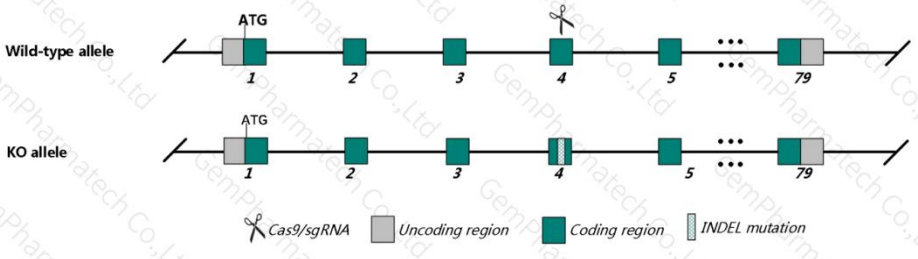

Fig1. Schematic diagram of B10-Dmd-KO model strategy.

Applications

1. Screening of anti-muscular dystrophy drugs
2. Pathophysiological of muscular dystrophy

Data support

1. IHC analysis of DMD

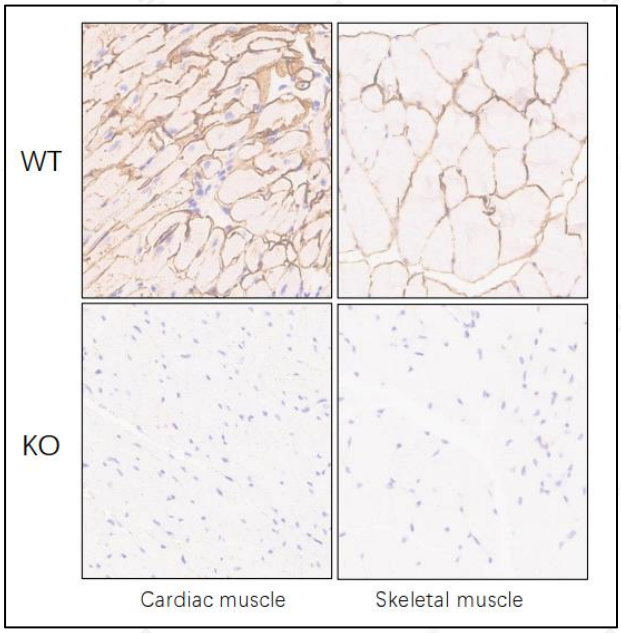

Fig2. Representative IHC of DMD in cardiac muscle and skeletal muscle tissues.

IHC analysis of CD38 in cardiac muscle and skeletal muscle tissues using specific antibody (Abcam, ab218198). WT: C57BL/10ScSnJGpt wildtype mice and KO: B10-Dmd-KO homozygous mice. (Data source: Abcam collaborative verification).

2. Serum Creatine Kinase content

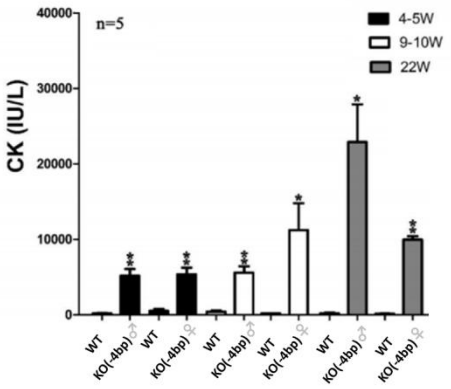

Fig3. Serum creatine kinase content in B10-Dmd-KO mice.

CK level in B10-Dmd-KO group was significantly higher than that in the control group, suggesting muscle injury in B10-Dmd-KO mice.

3. HE staining

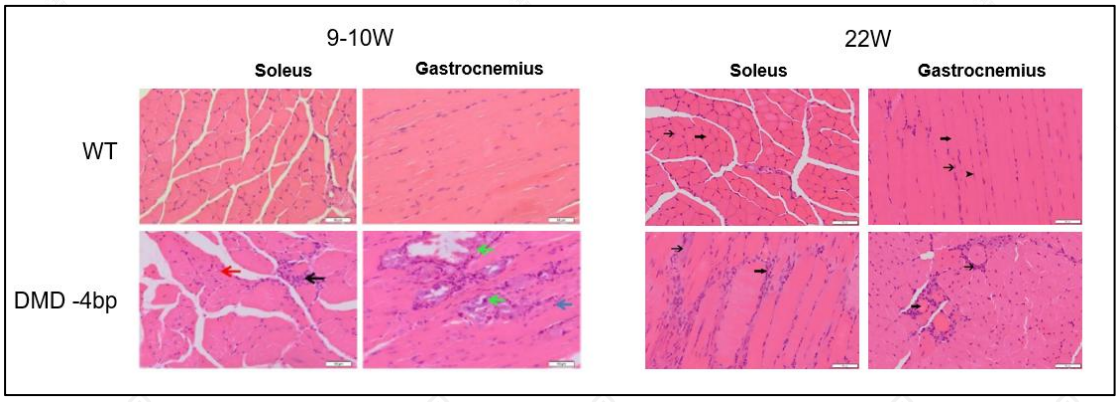

Fig4. HE staining of B10-Dmd-KO mice.

Muscle fiber degeneration, necrosis, fibrous tissue proliferation and inflammatory cell infiltration were seen in the soleus and gastrocnemius muscles of the experimental group of mice.

References

1. Nigro G, et al. The incidence and evolution of cardiomyopathy in Duchenne muscular dystrophy. Int J Cardiol. 1990;26:271-7.
2. Emery A, Muntoni F. Duchenne muscular dystrophy. 3rd ed. Oxford: Oxford University Press; 2003.
3. Bresolin N, et al. Cognitive impairment in Duchenne muscular dystrophy. Neuromuscul Disord. 1994;4:359-69.