Dmd C3197T

Strain Name： C57BL/10ScSnJNju-*Dmd*$^{em1Cin(C3197T)}$/Gpt
For short： Dmd C3197T
Strain type： Knock-in
Strain number： T014593
Background： C57BL/10ScSnJNju

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, both of morbidity in our country at a high level, thus further pathogenesis of such diseases will be studied focus.

Using CRISPR/Cas9 KI technology, we introduced the C3197T mutation into exon23 of *Dmd* gene to obtain B10-*Dmd* C3197T (*Dmd* C3197T) mouse model. The *Dmd* C3197T mice showed movement disorder at the age of 8 months, and muscle fiber atrophy, muscle fiber necrosis, inflammatory cell infiltration and fibrous tissue hyperplasia in the muscles at 8-month-old. *Dmd* C3197T mice can be used to screening the therapeutic drugs for muscular dystrophy and the study of pathophysiology of muscular dystrophy.

Strategy

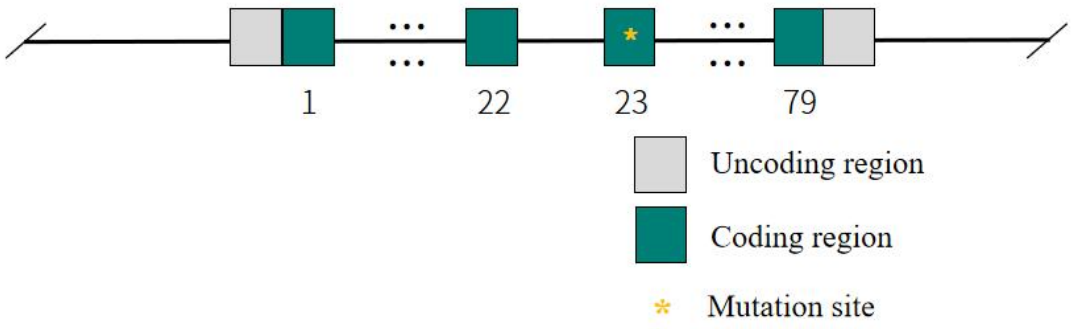

Fig 1. Schematic diagram of *Dmd* C3197T model stratery.

Applications

1.Screening of anti-muscular dystrophy drugs

2.Pathophysiology of muscular dystrophy

Data support

1. Motor performances deficiency in *Dmd* C3197T mice

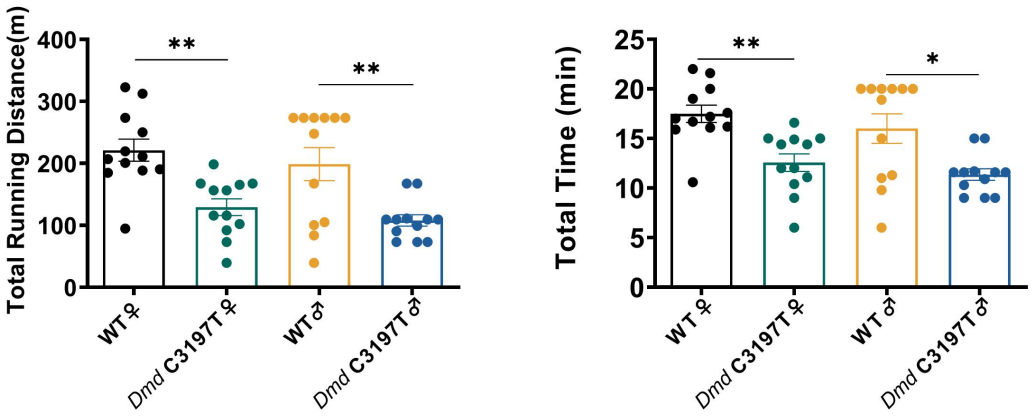

FIG 2. Detection of motor ability in *Dmd* C3197T mice

The running distance and time of mice at 8 months of age in the treadmill tatigue test.

n=12, MEAN ± SEM,*p<0.05, **p < 0.01, T test.

2. Pathological examination of *Dmd* C3197T muscle

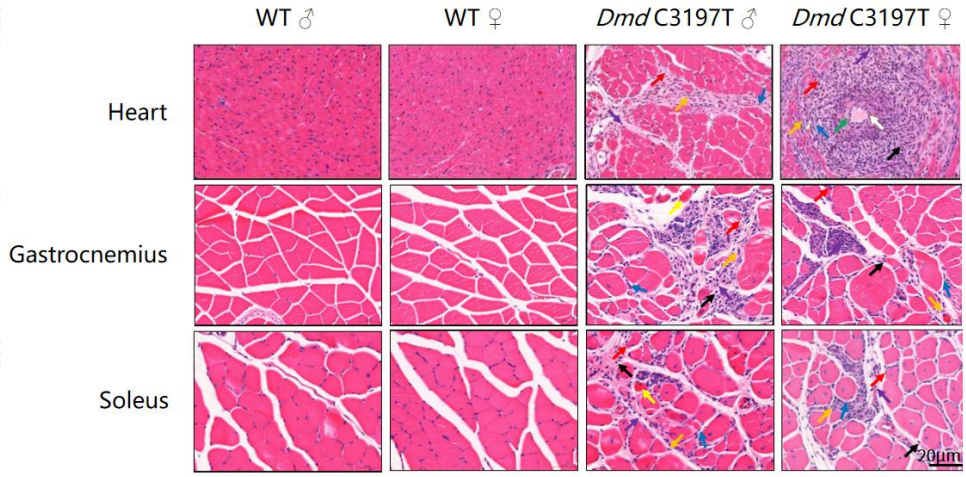

FIG 3. Pathological examination in *Dmd* C3197T mice

Representative images of HE staining in the heart and muscle of *Dmd* C3197T mice at 8-month- old. Compared with WT mice, the heart of *Dmd* C3197T mice showed myocardial fiber atrophy, myocardial fiber necrosis, inflammatory cell infiltration and fibrous tissue hyperplasia, the gastrocnemius and soleus showed muscle fiber atrophy, muscle fiber necrosis, inflammatory cell infiltration and fibrous tissue hyperplasia.

Note: Muscle fiber necrosis (red arrow),Vascular wall necrosis (green arrow), Fibrocytes (blue arrow), Neutrophils (black arrow), Lymphocytes (purple arrow), Fibroblasts (orange arrow), Endothelial cells protrude into the lumen (white arrow), Atrophy of muscle fibers (yellow arrows). Scale, 20μm.

Reference:

1. Bresolin, N., et al. "Cognitive impairment in Duchenne muscular dystrophy." Neuromuscular Disorders 4.4 (1994): 359-369.
2. Wilson, Kristin, et al. "Duchenne and Becker muscular dystrophies: a review of animal models, clinical end points, and biomarker quantification." Toxicologic pathology 45.7 (2017): 961-976.