C57BL/6JGpt-Postn-MerCreMer

Strain Name： C57BL/6JGpt-*Postn*$^{em1Cin(MerCreMer)}$/Gpt
Strain Type： Knock-in
Strain Number： T053779
Background： C57BL/6JGpt

Description

This mouse strain expresses MerCreMer inducible recombinase [1] under the control of the mouse endogenous *Postn* promoter, the construct was inserted into the downstream of ATG of mouse *Postn* gene by CRISPR/Cas9 technology. When crossed with a strain with loxP site flanked sequence in its genome, Cre-mediated recombination will result in excision of the DNA fragment between the two loxPs in myofibroblasts that have undergone tissue damage (e.g. a myocardial infarction (MI) event) after tamoxifen administration.

Strategy

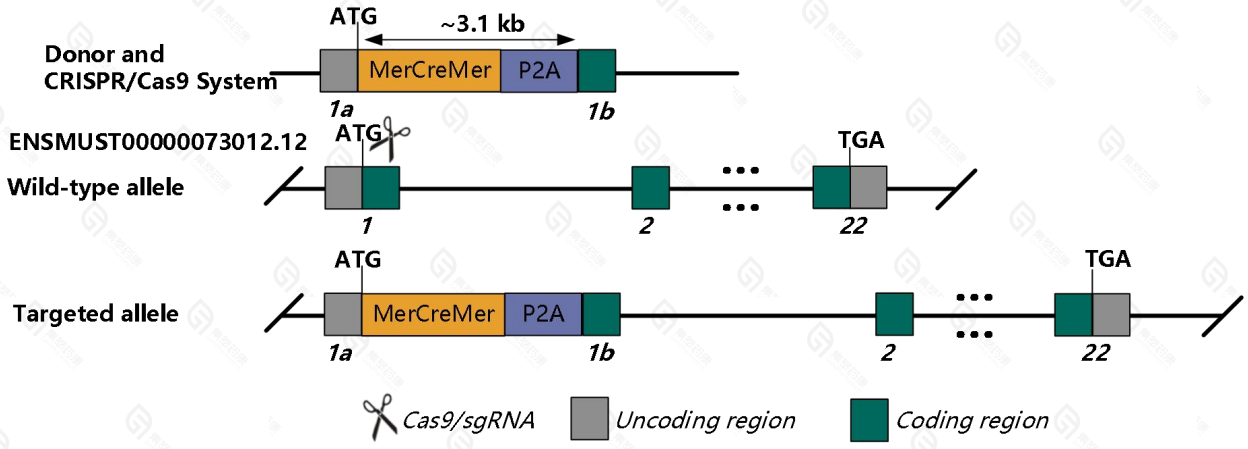

Fig.1 Schematic diagram of C57BL/6JGpt-Postn-MerCreMer model strategy.

Applications

1. Cre tool mice for specific, tamoxifen dependent induction of loxP recombination in myofibroblasts that have undergone tissue damage [2].

Data support

1. Validation methods & notes

Postn-MerCreMer mice was crossed with Rosa26-CAG-LSL-tdTomato-WPRE mice with ubiquitous reporter expression (hereafter referred as R26-tdTomato mice), Cre-mediated recombination will lead to excision of the stop cassette and expression of tdTomato, thus gain of red fluorescence will indicate Cre activity. Fluorescence imaging of immune-stained frozen sections were performed to exhibit Cre activity in heart after MI injury. Imaging of sections were performed under a 100x microscopy. For tamoxifen administration, 1.5 mg tamoxifen was treated through intraperitoneal injection daily from P43 to P46 (6.1 w~6.6 w). Note: these results may only represent the activity of MerCreMer in this strain under this certain tamoxifen treatment condition at the identical stage. Recombinase activity may be different at other stages or under different tamoxifen induction conditions in your application.

2. Timeline of tamoxifen treatment and imaging

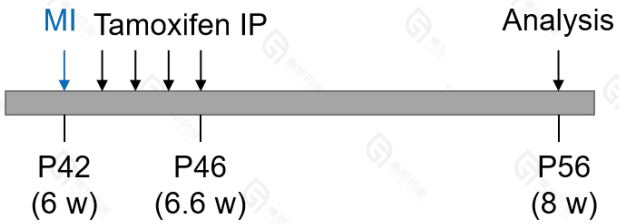

Fig 2. Timeline of tamoxifen treatment and experiment analysis of Postn-MerCreMer mice.

3. Images of tissues and organs with obvious Cre activity

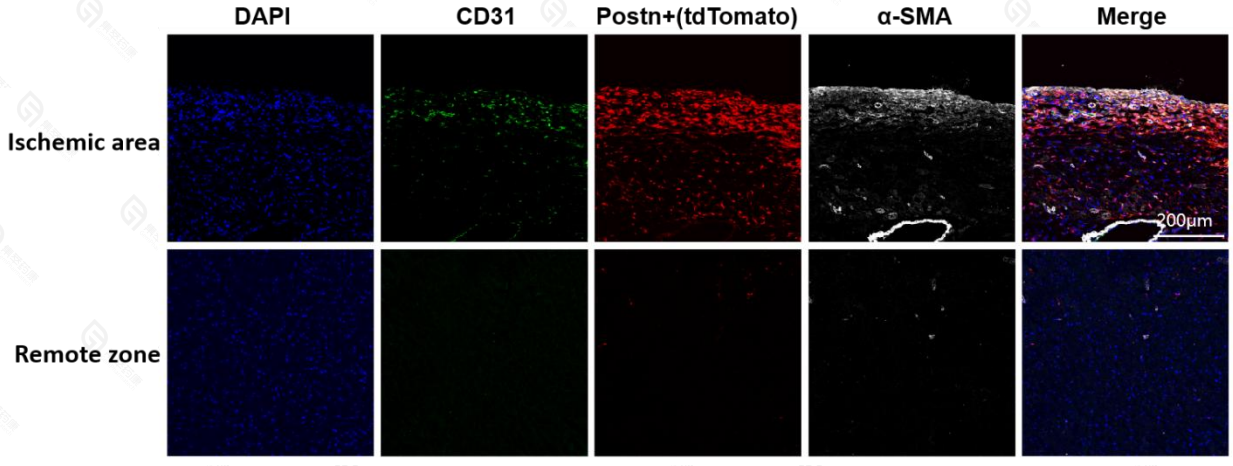

Fig 3. Fluorescence imaging of tissues and organs with obvious Cre activity.

After MI injury and 4 days of tamoxifen administration, the hearts were harvest for staining and imaging. tdTomato positive cells only exist in the ischemic area (left ventricle). tdTomato-positive cells co-localized with α-SMA positive fibroblast marker. There is no co-localization between tdTomato positive cells and CD31 positive non-fibroblast marker.

Reference

1.Verrou C, Zhang Y, Zürn C, et al. Comparison of the tamoxifen regulated chimeric Cre recombinases MerCreMer and CreMer. Biol Chem. 1999, 380(12): 1435-8.
2.Kanisicak O, Khalil H, Ivey MJ, et al. Genetic lineage tracing defines myofibroblast origin and function in the injured heart. Nat Commun. 2016, 7: 12260.