

C57BL/6JGpt-H11-Thy1-CreERT2

Strain Name: C57BL/6JGpt-*H11^{em1Cin}*(*Thy1-CreERT2*)/Gpt

Strain Type: Knock-in

Strain Number: T069084

Background: C57BL/6JGpt

Description

This mouse strain expresses CreERT2 inducible recombinase^[1] under the control of the mouse *Thy1* promoter, *Thy1-CreERT2* was precisely inserted into the H11 safe harbor site in mouse Chr11 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 majority of projection neurons populations in the central and peripheral nervous system (such as the cerebral cortex, hippocampus, cerebellum, spinal cord etc.)^[2-3] after tamoxifen administration. Note: mild sperm activity was detected by PCR detection of loxP recombination.

Strategy

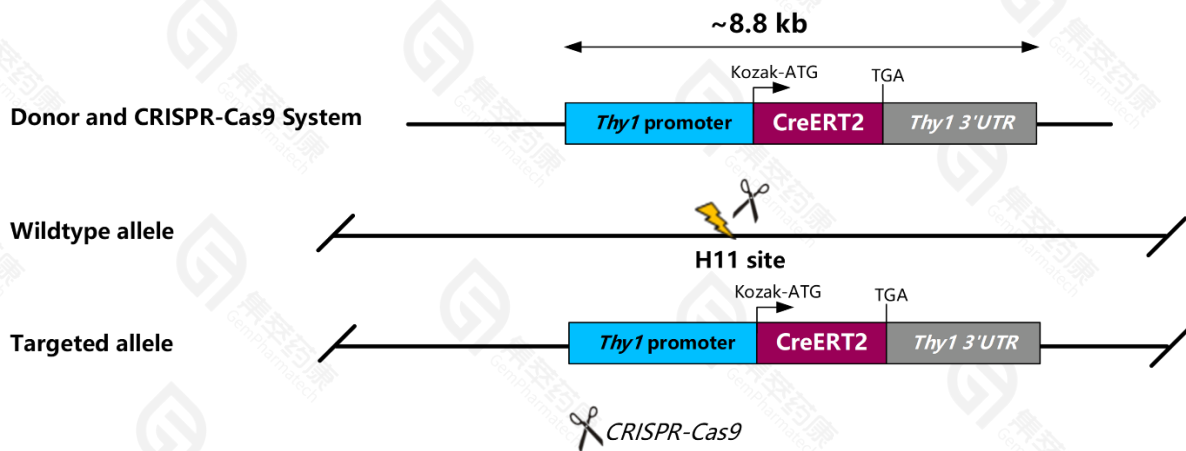


Fig.1 Schematic diagram of C57BL/6JGpt-H11-Thy1-CreERT2 model strategy.

Applications

1. Cre tool mice for specific, tamoxifen dependent induction of loxP recombination in the central and peripheral nervous systems (such as the cerebral cortex, hippocampus, cerebellum, spinal cord etc.) [2-3].

Data support

1. Validation methods & notes

H11-Thy1-CreERT2 mice were crossed with CAG-loxp-Stop-loxp-tdTomato mice with ubiquitous reporter expression, Cre-mediated recombination will the stop cassette and expression of tdTomato, thus gain of red fluorescence will indicate Cre activity. Fluorescence imaging of frozen sections was performed to exhibit Cre activity in various tissues and organs. Imaging sections were performed under a 200x microscopy, brain tissues were imaged using 40x (hippocampus, cortex) and 100x (cerebellum) magnification. For tamoxifen administration, 100 mg/kg tamoxifen was treated through intraperitoneal injection daily from P40 to P46 (5.7 w~6.6 w).

Note: these results may only represent the activity of CreERT2 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.

H11-Thy1-CreERT2 mice exhibited Cre activity in the brain, spinal cord, heart, liver, spleen, lung, kidney, stomach, intestine, with little Cre activity in the skeletal muscle after tamoxifen administration. Due to slight Cre activity in sperm prior to tamoxifen administration, caution is advised when breeding male Cre mice with floxed mice. It should be noted that other tissues remain untested, and the presence of CreERT2 in unexamined organs is not guaranteed.

2. Timeline of tamoxifen treatment and imaging

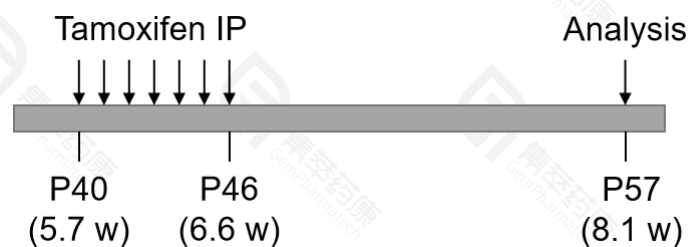
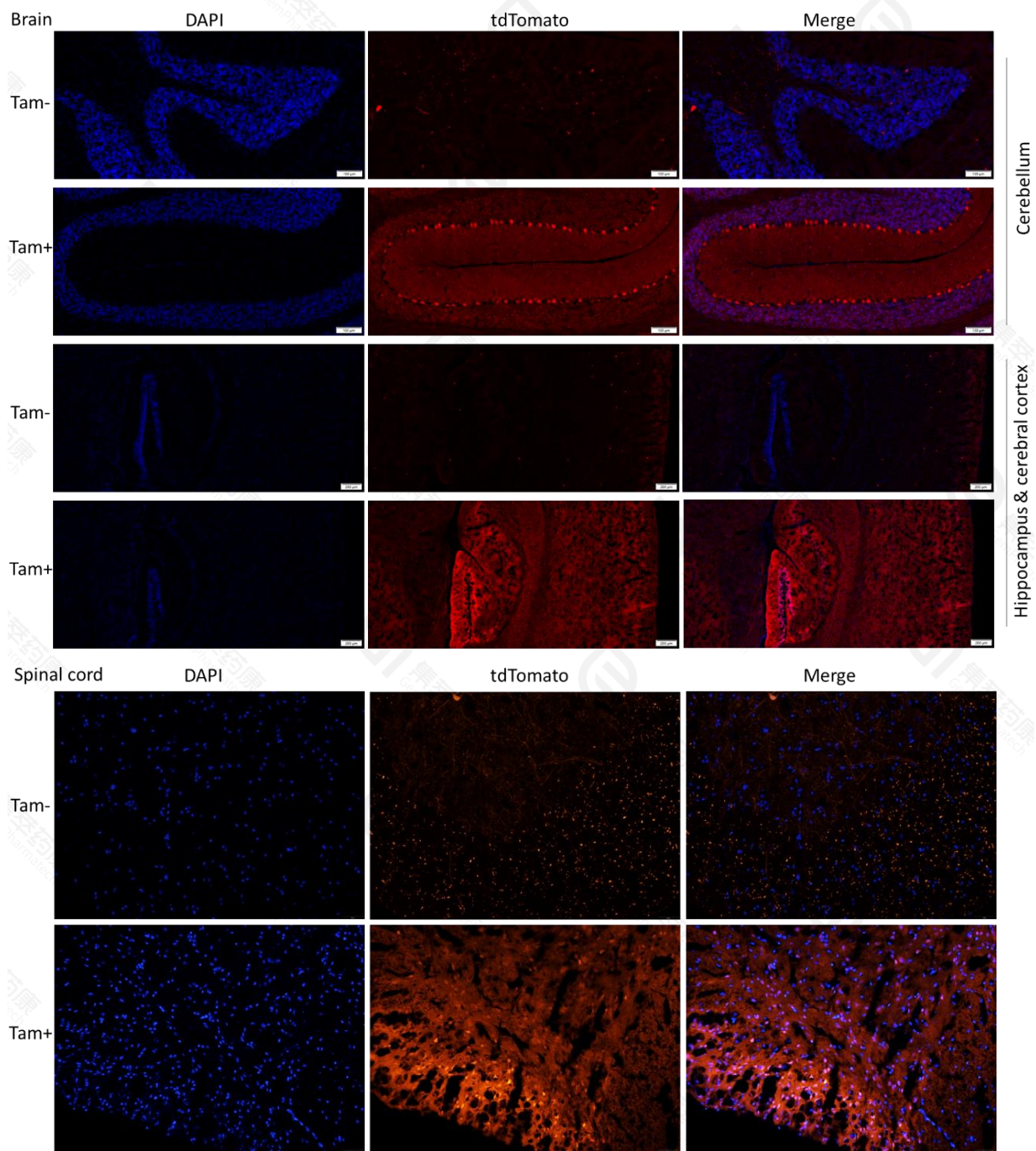
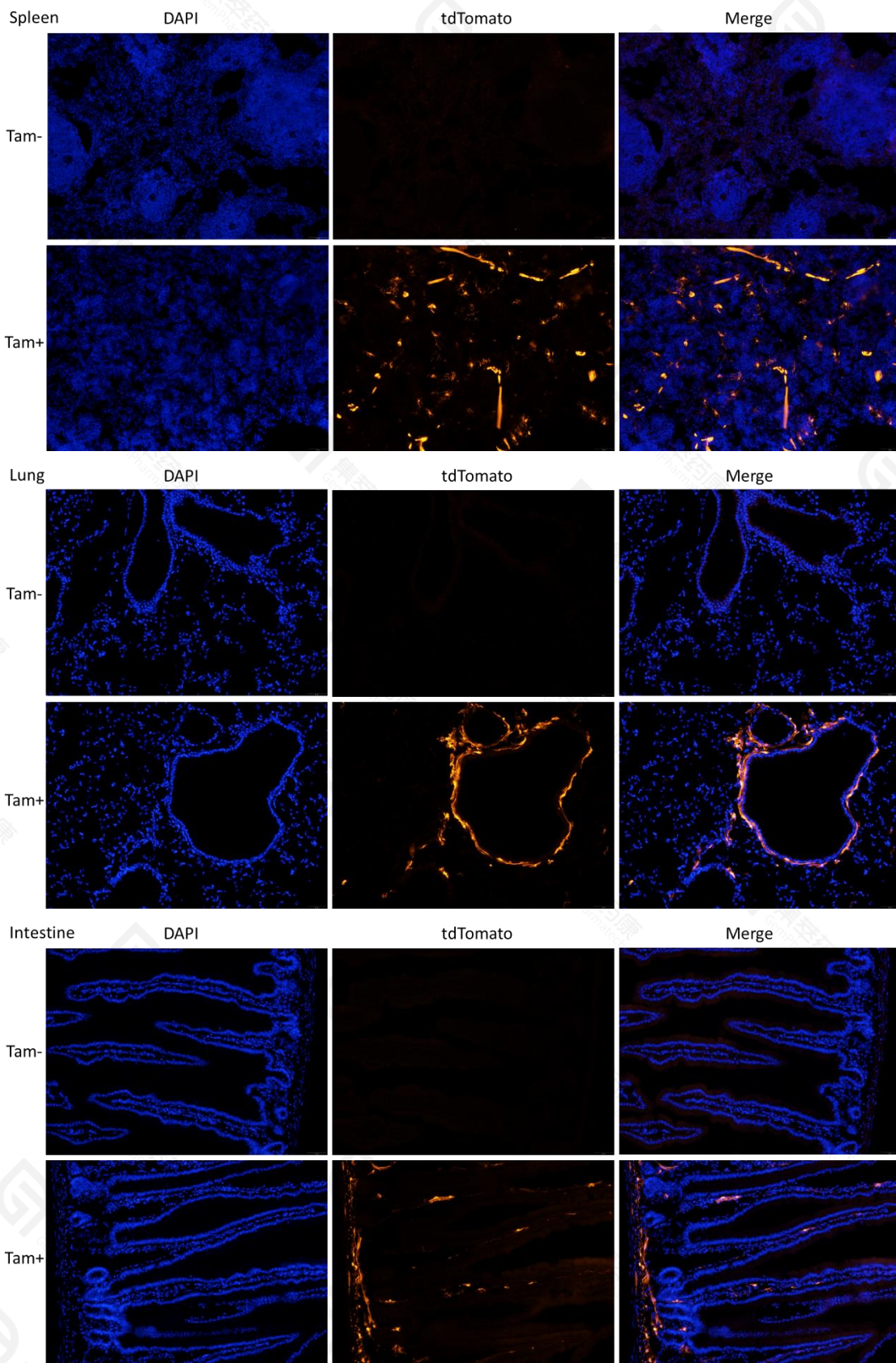
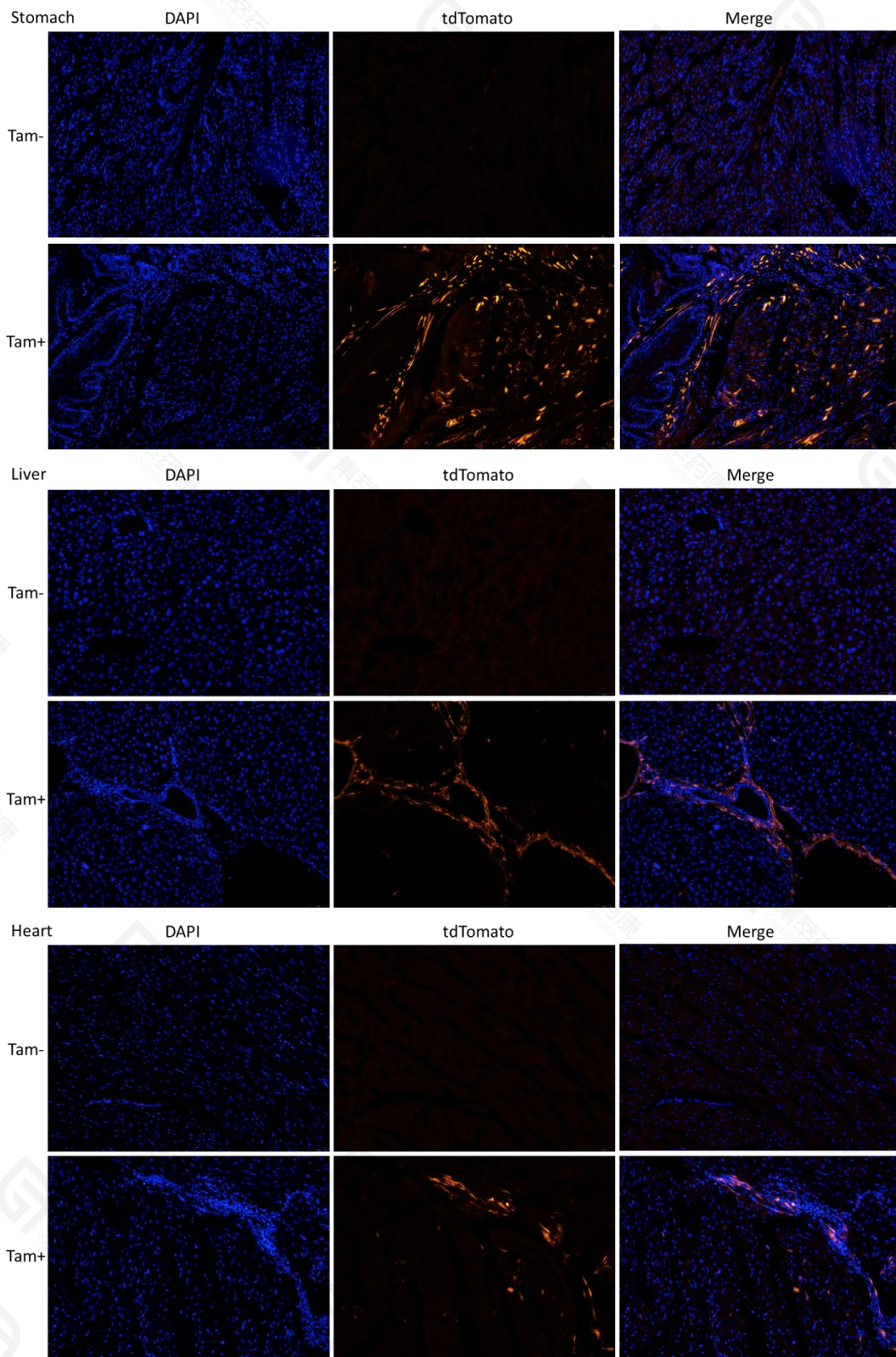


Fig 2. Timeline of tamoxifen treatment and experiment analysis of H11-Thy1-CreERT2 mice.

3. Images of tissues and organs with obvious Cre activity







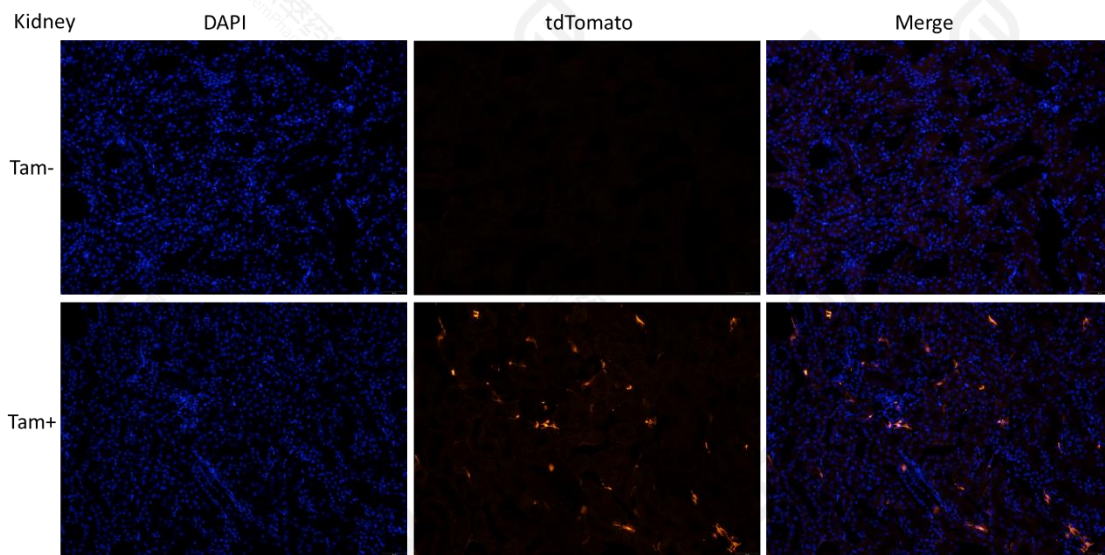


Fig 3. Fluorescence imaging of tissues and organs with obvious Cre activity.

Organ name was indicated in the left top of each subfigure group. Tam-: H11-Thy1-CreERT2, CAG-loxp-Stop-loxp-tdTomato double positive individuals without tamoxifen administration; Tam+: H11-Thy1-CreERT2, CAG-loxp-Stop-loxp-tdTomato double positive individuals with tamoxifen administration.

4. Images of tissues and organs with little or no Cre activity

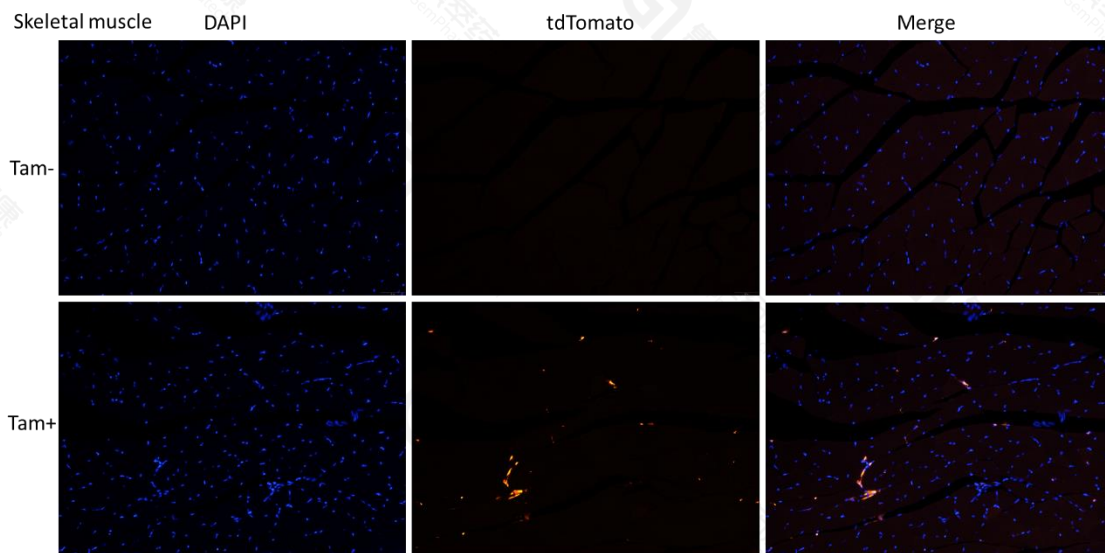


Fig4. Fluorescence imaging of tissues and organs with little or no Cre activity.

Organ name was indicated in the left top of each subfigure group. Tam-: H11-Thy1-CreERT2, CAG-loxp-Stop-loxp-tdTomato double positive individuals without tamoxifen administration; Tam+: H11-Thy1-CreERT2, CAG-loxp-Stop-loxp-tdTomato double positive individuals with tamoxifen administration.

Reference

1. Feil R, Wagner J, Metzger D, et al. "Regulation of Cre recombinase activity by mutated estrogen receptor ligand-binding domains." *Biochem Biophys Res Commun*, 1997, 237(3): 752-757.
2. Caroni, Pico. "Overexpression of growth-associated proteins in the neurons of adult transgenic mice." *Journal of neuroscience methods* 71.1 (1997): 3-9.
3. Young, Paul, et al. "Single-neuron labeling with inducible Cre-mediated knockout in transgenic mice." *Nature neuroscience* 11.6 (2008): 721-728.