

B6;SJL-Tg(Thy1-hop/EYFP)2Gfng/J

Stock No: **012332**

 **Transgenic**

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mice can be used for optogenetic studies to express an inhibitory opsin that effectively silences neuron activity.

Donating Investigator

Guoping Feng, Massachusetts Institute of Technology

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GENETIC OVERVIEW

Genetic Background

Generation

Tg(Thy1-hop/EYFP)2Gfng

Alele Type

Transgenic (Reporter)

VIEW GENETICS

RESEARCH APPLICATIONS

Research Tools

Neurobiology Research

Sensorineural Research

VIEW ALL RESEARCH APPLICATIONS

BASE PRICE

Starting at:

\$2,854.50 Domestic price Cryo Recovery

V I E W P R I C E L I S T

Details

Detailed Description

Mice hemizygous for the Thy1-eNpHR-YFP (Thy1-eNpHR2.0-EYFP) transgene are viable and fertile with expression of the eNpHR::YFP fusion protein directed to neural cells by the modified murine *Thy1* promoter region.

Thy1-eNpHR2.0-EYFP mice derived from founder line 2 (Thy1-eNpHR2.0-EYFP line 2) exhibit high levels of eNpHR2.0-EYFP expression in multiple regions of the brain: eNpHR2.0-positive cells included neurons in various regions of the amygdala, midbrain, and lower brainstem, pyramidal cells in layer 5 of the cortex, cells in the anteroventral thalamic nucleus, granule cells in the dentate gyrus and pyramidal cells in hippocampal CA1 region, and mossy fibers in the granule cell layer of the cerebellum.

The eNpHR2.0-EYFP fusion protein is efficiently targeted to the plasma membrane and is not hampered by aggregation/retention within the endoplasmic reticulum. No adverse effects on neuronal electrophysiological properties in the absence of light have been reported to date (November 2013). Photoinhibition is more effective with age at least out to 7-8 weeks of age. This age-dependent increase in the degree of photoinhibition presumably results from higher levels of eNpHR2.0 expression during this time.

Thy1-eNpHR2.0-EYFP line 2 transgenic mice may be useful for rapid control of motor behavior by addition or removal of light, for *ex vivo* and *in vivo* studies of neural circuitry/connectivity following illumination, or for fluorescent labeling of neural tissues. For example, these mice allow *in vivo* photoinhibition of cortical activity and limb movement.

The eNpHR2.0-EYFP fusion protein, designed with halorhodopsin from the halophilic bacterium *Natronomonas pharaonis* (NpHR) fused in-frame with an enhanced yellow fluorescent protein (EYFP), was optimized for expression in mammalian systems and enhanced membrane translocation/reduced bleb formation. Compared to first generation NpHR, eNpHR2.0 is more light-sensitive with significantly faster photoactivation/deactivation kinetics.

The bacterial opsins are retinal-binding proteins that combine a light-sensitive domain with an ion channel or pump; providing light-dependent ion transport, membrane potential alteration, and sensory functions to bacteria. This NpHR functions as a yellow light-driven chloride ion pump that causes hyperpolarization and prevents action potentials. As such, illumination of NpHR-expressing neurons leads to rapid and reversible photoinhibition of action potential firing/neural activity in these cells. In NpHR-expressing neurons, the fluorescence of EYFP fused to eNpHR was 515-555 nm. For activating NpHR, bandpass-filtered light pulses of 545-585 nm may be used.

This optogenetic strain is one of many from the same transgene creator/donating investigator with light-inducible neurobiology applications; including

Thy1-ChR2-YFP line 18 (Stock No. [007612](#)),
Thy1-ChR2-YFP line 9 (Stock No. [007615](#)),
Thy1-eNpHR-YFP line 4 (Stock No. [012334](#)),
Thy1-vChR1-YFP line 1 (Stock No. [012341](#)),
Thy1-vChR1-YFP line 4 (Stock No. [012344](#)),
Thy1-vChR1-YFP line 8 (Stock No. [012348](#)),
Thy1-mhChR2-YFP Line 20 (Stock No. [012350](#)),
Prv-mhChR2-YFP Line 15 (Stock No. [012355](#)),
ChAT-ChR2-YFP line 5 (Stock No. [014545](#)),
ChAT-ChR2-YFP line 6 (Stock No. [014546](#)),
VGAT-ChR2-YFP line 8 (Stock No. [014548](#)),
and TpH2-ChR2-YFP line 5 (Stock No. [014555](#)).

[+ Development](#)

[+ Expression Data](#)

[+ Control Suggestions](#)

[- Genetics](#)

[+ Tg\(Thy1-hop/EYFP\)2Gfng](#)

[- Disease/Phenotype](#)

[+ Disease Terms](#)

[+ Research Areas By Phenotype](#)

[+ Mammalian Phenotype Terms by Genotype](#)

[+ References](#)

[- Technical Support](#)

C O N T A C T T E C H N I C A L S U P P O R T

Genotyping Protocols

Standard PCR:[Tg\(Thy1-HOP/EYFP\)](#)

[Genotyping resources and troubleshooting](#)

Breeding Considerations

When maintaining a live colony, hemizygous mice may be bred with wildtype (noncarrier) mice from the colony or with C57BL/6J inbred mice (Stock No. [000664](#)).

[Additional Breeding and Husbandry Support](#)

Citation

When using the B6;SJL-Tg(Thy1-hop/EYFP)2Gfng/J mouse strain in a publication, please [cite the originating article\(s\)](#) and include JAX stock #012332 in your Materials and Methods section.

Animal Health Reports

[Facility Barrier Level Descriptions](#)

Production of mice from cryopreserved embryos or sperm occurs in a maximum barrier room, G200

➔ Pricing & Availability



Cryo
Recovery

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RELATED PRODUCTS AND SERVICES

Frozen Mouse Embryo	B6;SJL-Tg(Thy1-hop/EYFP)2Gfng/J	\$2595.00
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