

B6;129S-Igs7^{tm79.1(tetO-hop/EGFP)Hze} /J
 Stock No: **023529** | Ai79(TITL-Jaws)-D or Ai79D
 Targeted Mutation

Typically mice are recovered in 10-14 weeks. Contact Customer Service to place an order or for more information.

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Igs7 locus (TIGRE; an intergenic region on mouse chromosome 9 that allows reporter expression to be tightly regulated). Following Cre-mediated removal of the STOP cassette, they may be used to generate Tet-Off/Tet-On mutant animals with conditional (inducible/reversible) expression of an improved Halorhodopsin/EGFP fusion protein (Halo57*K200R*W214F/EGFP or Jaws). Subsequent illumination of Jaws-expressing (EGFP fluorescent) cells with yellow-to-red light leads to reversible photoinhibition of action potential firing/neural activity in these cells.

Donating Investigator

Hongkui Zeng, Allen Institute for Brain Science

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GENETIC OVERVIEW

Genetic Background Generation

Igs7^{tm79.1(tetO-hop/EGFP)Hze}

Alele Type	Gene Symbol	Gene Name
Targeted (Conditional ready (e.g. floxed), Reporter, Inducible)	<i>Igs7</i>	intergenic site 7

VIEW GENETICS

RESEARCH APPLICATIONS

Research Tools
 Neurobiology Research

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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

Ai79(TITL-Jaws)-D mice are a Cre/Tet-dependent, optogenetic line, created by targeted insertion at the *Igs7* locus (TIGRE; an intergenic region on mouse chromosome 9 that allows reporter expression to be tightly regulated). Ai79D mice harbor the TIGRE-Ins-TRE-LSL-Jaws conditional allele, designed with a modified Tet response element (TRE or *tetO*) and *loxP*-flanked STOP cassette upstream of an improved Halorhodopsin/EGFP fusion protein (Jaws; see detailed description below). When bred with other mice expressing Cre recombinase, tetracycline-controlled transactivator protein (tTA) and/or reverse tetracycline-controlled transactivator protein (rtTA), Jaws expression in cells/tissues where the expression patterns of the individual promoters driving Cre and tTA/rtTA overlap can be regulated with tetracycline or its analog doxycycline (dox). Following induction of Jaws expression (EGFP fluorescence), illuminating Jaws-expressing neurons with yellow-to-red light leads to reversible photoinhibition of action potential firing/neural activity in these cells.

Specifically, the donating investigator reports Ai79D mice have no reported levels of EGFP fluorescence in absence of Cre and tTA. When Ai79D mice are bred with tTA-driver and Cre-driver lines to create triple transgenic animals (Jaws+/tTA+/Cre+), cells expressing both tTA and Cre exhibit robust fluorescence. Light-induced expression of the inhibitory opsin is expected to occur at levels sufficient to effectively silence the activity of cortical neurons. Jaws expression/function in tissues other than brain has not yet been evaluated by the donating investigator (March 2014).

Heterozygous Ai79D mice are viable and fertile with no reported gross physical or behavioral abnormalities. As of April 2017, it is the experience of The Jackson Laboratory that homozygous Ai79D mice are viable and fertile.

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. The *Halobacterium halobium* (strain shark)-derived halorhodopsin Halo57 is an inward chloride ion pump that causes hyperpolarization and prevents action potentials. Halo57 allows robust photocurrents/action potential inhibition when exposed to light ranging from yellow to red (~540-640 nm, peak ~600 nm), with function out to the hemoglobin absorption trough range (~660 nm). Halo57 is significantly red-light shifted relative to other opsins; displaying larger red-light induced photocurrents and less aggregation than NpHR.

The Jaws fusion protein (Halo57*K200R*W214F/EGFP) is composed of a modified Halo57 fused in-frame to EGFP. The Halo57 sequence has K200R and W214F mutations to substantially boost photocurrents. An endoplasmic reticulum exporting sequence (ER2) from the *Kir2.1* inward rectifier potassium channel gene at the C-terminal of EGFP improves membrane trafficking/prevents aggregation. The Halo57*K200R*W214F variant in Jaws exhibits photocurrents driven by red light that are over three times greater than those of previous neural silencing opsins, and illumination of Jaws-expressing neurons leads to reversible photoinhibition (silencing) of action potential firing/neural activity in these cells in the awake mammalian brain with millisecond latency.

Development

[+ Expression Data](#)

[+ Control Suggestions](#)

[+ Selected References](#)

[- Genetics](#)

[+ *Igs7^{tm79.1\(tetO-hop/EGFP\)Hze}*](#)

[- 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:[Igs7](#)

[Genotyping resources and troubleshooting](#)

Breeding Considerations

When maintaining a live colony, heterozygous mice may be bred to wildtype mice from the colony or to C57BL/6J inbred mice (Stock No. [000664](#)). As of April 2017, it is the experience of The Jackson Laboratory that homozygous Ai79D mice are viable and fertile. Therefore, this colony may also be maintained by breeding homozygous mice together.

[Additional Breeding and Husbandry Support](#)

Citation

When using the Ai79(TITL-Jaws)-D or Ai79D mouse strain in a publication, please [cite the originating article\(s\)](#) and include JAX stock #023529 in your Materials and Methods section.

Animal Health Reports

[Facility Barrier Level Descriptions](#)

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➔ Pricing & Availability



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