

B6;129S6-*Igs7*^{tm2(tetO-Optopatch2)Acoh} /J

Stock No: **029677** | Optopatch2 Ai141

 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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element (TRE; tetO) and floxed Stop integrated in the *Igs7* (TIGRE) locus. Functionality of Optopatch2 requires the expression of tTA as well as cre recombinase-mediated excision of the floxed Stop. This is line Ai141.

Donating Investigator

Adam E. Cohen, Harvard University

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GENETIC OVERVIEW

Genetic Background

Generation

Igs7^{tm2(tetO-Optopatch2)Acoh}

Allele Type

Targeted (Conditional ready (e.g. floxed), Reporter, Inducible)

Gene Symbol

Igs7

Gene Name

intergenic site 7

VIEW GENETICS

RESEARCH APPLICATIONS

Neurobiology Research

Research Tools

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

Ai141 is a cre recombinase- and tetracycline-controlled transactivator (tTA)-dependent mouse line that conditionally expresses Optopatch2, an optogenetic construct which enables simultaneous optical perturbation and optical readout of membrane potential. The animals express a blue-shifted channelrhodopsin actuator (CheRiff-EGFP) and a near infrared Archaerhodopsin-derived voltage indicator (QuasAr2-dark mOrange2) via a targeted tetracycline responsive element (TRE) and floxed-Stop knock-in of the *Igs7* (intergenic site 7; also called TIGRE) locus. Both tTA and cre recombinase expression are required to achieve Optopatch2 functionality.

Integration of the mutation in the *Igs7* locus rather than *Gt(ROSA)26Sor* gene increases levels of expression above those seen in the Floxopatch mice (see Stock No. [028678](#)). A higher signal to noise ratio is also observed in fluorescence recordings of membrane potential compared to Stock No. [028678](#).

The CheRiff optogenetic actuator is optimally excited by light with a wavelength between 450–490 nm, reaching 50% of maximum photocurrent at an illumination intensity of 25 mW/cm² (488 nm). CheRiff has an opening time of 4.5 ms, twofold faster than that of ChR2 H134R and fourfold faster than that of ChIEF. CheRiff has a closing time of 16 ms, similar to that of ChIEF and 1.5-fold faster than ChR2 H134R. The fluorescence of EGFP in the CheRiff-EGFP fusion can be used to identify expressing cells, though one must remember that the blue light used to image EGFP fluorescence will also excite CheRiff.

The QuasAr2 voltage indicator is optimally excited with a wavelength between 630–640 nm, and emits in a broad band from 660–760 nm. The fluorescence quantum yield of QuasAr2 is low (~1%), so excitation must be provided via a high intensity laser (>100 W/cm²) and detection must be through a high numerical aperture objective and onto a highly sensitive camera (e.g. scientific CMOS or EMCCD). To detect single action potentials requires imaging at >500 frames/s. QuasAr2 reports membrane voltage with a sensitivity of $\Delta F/F \sim 90\%/100 \text{ mV}$ and a response time of ~1.5 ms.

Good expression and function are seen in *Camk2a*-expressing neurons when the Ai141 mice are crossed with *Camk2a*-tTA (see Stock No. [003010](#)) and *Camk2a*-cre animals.

The Ai141 construct is safe to express throughout the whole animal.

Development

Expression Data

Control Suggestions

– Genetics

+ [Igs7^{tm2\(tetO-Optopatch2\)Acoh}](#)

– 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

Heterozygotes and homozygotes are viable and fertile.

[Additional Breeding and Husbandry Support](#)

Citation

When using the Optopatch2 Ai141 mouse strain in a publication, please [cite the originating article\(s\)](#) and include JAX stock #029677 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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Domestic | International

Pricing effective for USA, Canada and Mexico shipping destinations

CRYORECOVERY - DOMESTIC NOT-FOR-PROFIT & ACADEMIC PRICING

SERVICE/PRODUCT	DESCRIPTION	PRICE
Cryo Recovery	Heterozygous or wildtype for Igs7 ^{tm2(tetO-Optopatch2)Acoh} >	\$2,854.50

RELATED PRODUCTS AND SERVICES

Frozen Mouse Embryo	B6;129S6-Igs7 ^{tm2(tetO-Optopatch2)Acoh} /J	\$2595.00
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