B6;129S6-Gt(ROSA)26Sor^{im1Acoh}/J

Stock No: 028678 | Floxopatch, Optopatch2, Ai130

- Congenic, Targeted Mutation

PLACE ORDER

3–6 week average lead time depending on quantity and age requests are not accepted

Overview

Also Known As: Floxopatch, Optopatch2, Ai130

Floxopatch (also called Optopatch) mice are a sensitive, fast optogenetic tool for targeted, simultaneous optical perturbation and
measurement of membrane voltage. Animals express variants of a near-infrared archaerhodopsin-based voltage indicator (QuasAr2-dark mOrange2; QuasAr2 is near infrared fluorescent, dark mOrange2 is non-fluorescent) and a blue light-gated channelrhodopsin actuator (CheRiff-EGFP; green fluorescent) in the cell plasma membrane after cre-mediated excision of a floxed Stop cassette.

Donating Investigator

Adam E. Cohen, Harvard University

GENETIC OVERVIEW

<table>
<thead>
<tr>
<th>Genetic Background</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>?+pN1F3</td>
<td>(2018-01-01 00:00:00)</td>
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**Gt(Rosa26)Sor<sup>im1Acoh</sup>**

<table>
<thead>
<tr>
<th>Allele Type</th>
<th>Gene Symbol</th>
<th>Gene Name</th>
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<td>Targeted (Conditional ready (e.g. floxed), Reporter)</td>
<td>Gt(Rosa26)Sor</td>
<td>gene trap ROSA 26, Philippe Soriano</td>
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RESEARCH APPLICATIONS

Neurobiology Research
Research Tools

BASE PRICE

Starting at:

$263.00 Domestic price for female

Details

Detailed Description

Floxopatch (also called A130, or Optopatch) is a cre-dependent mouse line that incorporates the Optopatch2 (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 floxed-Stop knock-in of the Gt(Rosa26)Sor gene.
Neurons from Floxopatch mice crossed with a variety of cre driver lines report spontaneous and optically-evoked activity in vitro, in acute brain slice, and in vivo in somatosensory ganglia.

QuasAr2 and CherRiff show greatly improved performance for all-optical electrophysiology. Neuronal excitation can be probed across spatial and temporal scales - from single dendritic spines to fields containing dozens of neurons measured in parallel, and from microsecond delays associated with action potential propagation to days-long changes in excitability.

The CherRiff construct shows good expression and membrane trafficking in cultured rat hippocampal neurons. Under typical neural culture conditions, CherRiff passes a photocurrent of 1 nA at a whole-cell illumination intensity of 22 +/- 10 MW/cm2 (9-fold lower than is required for channelrhodopsin 2 (ChR2) H134R). CherRiff shows twofold larger maximal photocurrents than ChR2 H134E or ChIEF. CherRiff has an opening rate twofold faster than that of ChR2 H134R and fourfold faster than that of ChIEF. CherRiff has a similar closing rate to that of ChIEF and is 1.5-fold faster than ChR2 H134R.

Floxopatch mice were crossed with central nervous system (CNS)-specific cre driver lines, including parvalbumin-cre (Stock No. 008069), somatostatin-IRES-Cre (Stock No. 013044), and CAG-CreER (Stock No. 004682). Histology shows patterns of EGFP fluorescence matching expression patterns reported in the Allen Brain Atlas. Examination at cellular resolution reveals that each cre line drives expression in cells with distinct locations and morphology. Expression in the soma membrane and throughout the dendritic arbor is demonstrated.

The Optopatch2 construct is safe to express in neuronal sub-populations, but not at a high level throughout the whole animal. Mice derived from crosses of the Floxopatch mice with CAG-CreER (Stock No. 004682) and induced with tamoxifen grow more slowly after induction, have smaller body and organ sizes, and typically die between 7 and 9 days after induction. Tissues from these mice show intense EGFP fluorescence throughout the body. Littermates carrying only CAG-CreER (and not Octopatch2) show no ill-effects following tamoxifen injection.

Parvalbumin-cre (Stock No. 008069) was also used to test expression in the peripheral nervous system (PNS). Near predicted levels of expression were observed in dorsal root ganglia (DRG) neuron subtypes.

Animals homozygous for the Floxopatch allele and heterozygous for the Nav1.8-cre (Scn10a-cre) allele show a blue light threshold for triggering spikes that are 36% lower than that of mice heterozygous for both Floxopatch and Nav1.8-cre. The signal-to-noise ratio of spikes in QuasAr2 fluorescence is approximately twice as high in homozygous Floxopatch/heterozygous Nav1.8-cre mice.
Mammalian Phenotype Terms by Genotype

References

Technical Support

Contact Technical Support

Genotyping Protocols
MELT: Generic mOrange
SEPARATED MELT: Gt(ROSA)26Sor^{tm}Ac0h,-Alternate 4
Genotyping resources and troubleshooting

Breeding Considerations
Homozygotes and heterozygotes are viable and fertile.
Additional Breeding and Husbandry Support

Mating System
Homozygote x homozygote

Citation
When using the FVB/129P2-PxP.Y21I;Ppятitch2, A1130 mouse strain in a publication, please cite the originating article(s) and include JAX stock #028678 in your Materials and Methods section.
Facility Barrier Level Descriptions

AX9 (Standard)

Pricing & Availability

3-6 week average lead time depending on quantity and age requests are not accepted

Repository Live

Domestic
International
Pricing effective for USA, Canada and Mexico shipping destinations

Live Mouse

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<th>AGE</th>
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<th>PRICE</th>
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<td>Approx 4-8 weeks</td>
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<td>Homozygous for Gt(ROSA)26Sor^{tm}Ac0h</td>
<td>$263.00</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Homozygous for Gt(ROSA)26Sor^{tm}Ac0h</td>
<td>$263.00</td>
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Frozen Mouse Embryo

$2,595.00 per straw or vial

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- By Gene
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