

B6;129P2-Gucy1b2^{tm2Mom}/MomJStock No: **017517** | Gucy1b2-KO Targeted Mutation

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Type B cells from mice homozygous for this targeted null allele fail to flux calcium in response to reduced oxygen and homozygotes fail to respond normally to a low oxygen environment in a conditioned place aversion test.

Donating Investigator

Peter Mombaerts, Max Planck Research Unit for Neurogenetics

[R E A D M O R E +](#)**GENETIC OVERVIEW****Genetic Background****Generation***Gucy1b2^{tm2Mom}***Allele Type**Targeted (Reporter,
Null/Knockout)**Gene Symbol***Gucy1b2***Gene Name**

guanylate cyclase 1, soluble, beta 2

[V I E W G E N E T I C S](#)**RESEARCH APPLICATIONS**Cell Biology Research
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Research Tools
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V I E W P R I C E L I S T

Details

Detailed Description

Type B olfactory sensory neurons of the main olfactory epithelium have a distinctive expression profile, most notably expressing GUCY1B2, CNGA2, and TRPC2 (a cation channel typically expressed by vomeronasal sensory neurons), but not expressing ADCY3 or odorant receptors, which usually are expressed by olfactory sensory neurons. Type B cells have been shown to respond rapidly and in a graded manner to reduced oxygen levels and this response requires functional GUCY1B2 and TRPC2, as well as extracellular calcium cations. Type B cells from wild type mice flux calcium in response to 3-isobutyl-1-methylxanthine, a phosphodiesterase inhibitor, and 8-bromo-cGMP, but were found not to respond to forskolin, carbon disulfide, mouse urine, or an array of other odorants. Inhibition of nitric oxide synthases did not interfere with the response of type B cells to reduced oxygen. Strong expression of *Gucy1b2* in the brain appears restricted to this subset of olfactory sensory neurons.

Type B cells from mice homozygous for this targeted null allele of *Gucy1b2* respond normally to 8-bromo-cGMP or KCl, but fail to flux calcium in response to reduced oxygen. The impact of this was evidenced by assessing the activation of postsynaptic olfactory bulb neurons in the vicinity of type B cell glomeruli subsequent to exposure to environmental hypoxia. These post-synaptic olfactory bulb neurons showed increased FOS immunoreactivity, indicative of activation, in controls and heterozygotes but not in homozygotes. The essential role for GUCY1B2 in environmental hypoxia sensing was further confirmed in a conditioned place aversion test. Wild-type controls and heterozygotes responded with place aversion to a reduced oxygen area, where homozygotes did not. Homozygotes on the [129S6 congenic background](#) were found to have a normal hyperventilation response to low environmental oxygen, consistent with normal carotid body function, further proving that Type B cells assess the oxygen content of the air, not the oxygenation in the body. Homozygotes performed normally in a Morris water maze for both latency to reach the platform and reference memory.

Expression Data

Control Suggestions

Selected References

Genetics

Gucy1b2^{tm2Mom}

– 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

Separated PCR: [Gucy1b2-D-IRES-tau](#)

[Genotyping resources and troubleshooting](#)

Citation

When using the Gucy1b2-KO mouse strain in a publication, please [cite the originating article\(s\)](#) and include JAX stock #017517 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



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