Marie E. Burns, Ph.D.

Clinical Interests

Trained as a biochemist and electrophysiologist, Marie E. Burns studies the temporal regulation of signal transduction mechanisms in neurons. Much of her work has investigated the deactivation of the G protein cascade in photoreceptor cells of the retina. Her future studies will seek to understand the mechanisms by which different G protein cascades yield signals of varying amplitude and durations, such as in the rod and cone photoreceptors in the retina.

Research/Academic Interests

Dr. Burns studies photoreceptors in the retina in both health and disease. When photoreceptors die, they cause an inflammatory response that further damages the retina. The Burns Lab seeks to understand this inflammation and harness it to mitigate the damage during retinal degenerative disease.

Title

Professor, Department of Ophthalmology & Vision Science, Division of Cell Biology and Human Anatomy

Specialty

Ophthalmology

Department

Ophthalmology & Vision Science

Division

Ophthalmology

Center/Program Affiliation

Center for Neuroscience

Eye Center

Address/Phone

Tupper Hall, Davis, CA 95616

Education

Ph.D., Neurobiology, Duke University, Durham NC 1996

B.S., Susquehanna University, Selinsgrove PA 1992

Fellowships

Neurobiology, Stanford University, Stanford CA 1996-2000

Professional Memberships

American Society for Cell Biology

Association for Research in Vision and Ophthalmology

Association for the Advancement of Science

Biophysical Society

MBL Society

Society for Neuroscience

Honors and Awards

Faculty Service Award, Neuroscience Graduate Group, 2015

Outstanding Graduate Mentor in Neuroscience, UC Davis Neuroscience Graduate Students, 2013

Alumni Achievement Award, Susquehanna University, 2010

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Kavli Fellow, National Academy of Sciences, 2009

Cogan Award, Association for Research in Vision and Ophthalmology, 2009

Select Recent Publications

Ronning KE, Karlen SJ, Miller EB, et al. Molecular profiling of resident and infiltrating mononuclear phagocytes during rapid adult retinal degeneration using single-cell RNA sequencing. Sci Rep. 2019;9;4858. doi:10.1038/s41598-019-41141-0.

Karlen SJ, Miller EB, Wang X, Levine ES, Zhang P, Goswami M, Zawadzki RJ, Pugh Jr. EN, Burns ME. Monocyte infiltration rather than microglia proliferation dominates the early immune response to widespread photoreceptor degeneration. J. Neuroinflammation. 2018;15:344.

Ronning KE, Allina GP, Miller EB, Zawadzki RJ, Pugh EN Jr, Herrmann R, Burns ME. Loss of cone function without degeneration in a novel Gnat2 knock-out mouse. Exp Eye Res. 2018 Jun;171: 111-118. doi:10.1016/j.exer.2018.02.024. Epub 2018 Mar 5. PMID:29518352.

Wang X, Miller EB, Goswami M, Zhang P, Ronning KE, Karlen SJ, Zawadzki RJ, Pugh EN Jr, Burns ME. Rapid monocyte infiltration following retinal detachment is dependent on non-canonical IL6 signaling through gp130. J Neuroinflammation. 2017 Jun 23;14(1):121. doi:10.1186/s12974-017-0886-6. PMID:28645275.

Peinado Allina G, Fortenbach C, Naarendorp F, Gross OP, Pugh EN Jr, Burns ME. Bright flash response recovery of mammalian rods in vivo is rate limited by RGS9. J Gen Physiol. 2017 Apr 3; 149(4):443-454. doi:10.1085/jgp.201611692. Epub 2017 Mar 16. PMID:28302678.

Gross OP, Pugh EN Jr, Burns ME. cGMP in mouse rods: the spatiotemporal dynamics underlying single photon responses. Front Mol Neurosci. 2015 Mar 4;8:6. doi:10.3389/fnmol.2015.00006. PMID:25788876.

Gross OP, Pugh EN Jr, Burns ME. Calcium feedback to cGMP synthesis strongly attenuates single-photon responses driven by long rhodopsin lifetimes. Neuron. 2012 Oct 18;76(2):370-82. doi:

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10.1016/j.neuron.2012.07.029. Epub 2012 Oct 17. Erratum in: Neuron. 2013 Jun 5;78(5):949. PMID:23083739.

Gross OP, Pugh EN Jr, Burns ME. Spatiotemporal cGMP dynamics in living mouse rods. Biophys J. 2012 Apr 18;102(8):1775-84. doi:10.1016/j.bpj.2012.03.035. PMID:22768933.

Fortenbach CR, Kessler C, Peinado Allina G, Burns ME. Speeding rod recovery improves temporal resolution in the retina. Vision Res. 2015 May;110(Pt A):57-67. doi:10.1016/j.visres.2015.02.011. Epub 2015 Mar 5. PMID:25748270.

Levine ES, Zam A, Zhang P, Pechko A, Wang X, FitzGerald P, Pugh EN Jr, Zawadzki RJ, Burns ME. Rapid light-induced activation of retinal microglia in mice lacking Arrestin-1. Vision Res. 2014 Sep;102:71-9. doi:10.1016/j.visres.2014.07.011. Epub 2014 Aug 1. PMID:25091460.

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