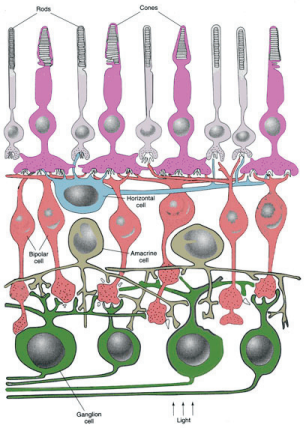

Ron Gregg

Professor and Chairman,
Department of Biochemistry and Molecular Biology

School of Medicine

The long term goal of my research is to understand the molecular events that underlie the formation and function of one of the synaptic layers, the outer plexiform layer (OPL), in the retina. This synapse connects the photoreceptors that collect light and convert it into an electrical signal, to the second order neurons, bipolar and horizontal cells. Early in development the pre- and post-synaptic neurons make contact and begin to form a synapse. This initial contact triggers a series of events that results in a synapse of extraordinary complexity. Three dendrites from post-synaptic neurons invaginate into the axon terminal of the presynaptic cell, which is the photoreceptor in this case. We have discovered a mutant mouse that fails to undergo normal maturation of the synapse and results in night blindness. This model is being used to determine what signals are involved in the maturation of this important synapse.

In a second project, we focus on the molecular components of the signal transduction cascade in the depolarizing bipolar cells. These cells utilize a metabotropic glutamate receptor, GRM6, to modulate the activity of the non-specific cation channel, TRPM1. My lab is investigating how several proteins, GRM6, TRPM1, GPR179, nyctalopin and LRIT3 interact to form a functional

Grants and Awards:

2008-2013NIH R01 2EY12354-09A1. 7/1/08-6/30/13. Isolation of congenital stationary night blindness genes. Total Costs Current Year: $400,065.

2011-2013R21EY021852- 01. 9/1/2011-8-31/2013. Mouse Model of DBC Dysfunction. Total Costs $254,577. PI is Neal Peachey, Cleveland Clinic: Gregg is PI on Sub-contract).

Publications:

Haud N, Kara F, Diekmann S, Henneke M, Willer JR, Hillwig MS, **Gregg RG**, Macintosh GC, Gärtner J, Alia A, Hurlstone AF. (2011). rnaset2 mutant zebrafish model familial cystic leukoencephalopathy and reveal a role for RNase T2 in degrading ribosomal RNA. Proc Natl Acad Sci U S A. 108:1099-103. PMID: 21199949.

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Dhingra A, Fina ME, Neinstein A, Ramsey DJ, Xu Y, Fishman GA, Alexander KR, Qian H, Peachey NS, **Gregg RG**, Vardi N. (2011) Autoantibodies in Melanoma-Associated Retinopathy Target TRPM1 Cation Channels of Retinal ON Bipolar Cells. J Neurosci. 2011 Mar 16;31(11):3962-3967. PMID: 21411639.

Thomas JL, Vihtelic TS, Dendekker AD, Willer G, Luo X, Murphy TR, **Gregg RG**, Hyde DR, Thummel R. (2011). The loss of vacuolar protein sorting 11 (vps11) causes retinal pathogenesis in a vertebrate model of syndromic albinism. Invest Ophthalmol Vis Sci. 52:3119-28. PMID:21330665.

Chen F, Liu Y, Sugiura Y, Allen PD, **Gregg RG**, Lin W. (2011). Neuromuscular synaptic patterning requires the function of skeletal muscle dihydropyridine receptors. Nat Neurosci. 14:570-7. PMID:21441923.

Ball SL, McEnery MW, Yunker AM, Shin HS, **Gregg RG**. (2011). Distribution of voltage gated calcium channel β subunits in the mouse retina. Brain Res. 1412:1-8. PMID:21831364.

Pearring, J.N., Bojang Jr., P., Shen, Y. Koike, C., Furukawa, T., Nawy, S., and **Gregg, R**.R., A role for nyctalopin, a small leucine rich repeat protein, in localizing the TRPM1 channel to retinal depolarizing bipolar cell dendrites. (2011). J. Neuroscience. 31:10060-6. PMID:21734298.

Bojang P Jr, **Gregg RG**. (2012). Topological analysis of small leucine-rich repeat proteoglycan nyctalopin. PLoS One. 2012;7(4):e33137. Epub 2012 Apr 2. PMID:22485138.

Peachey NS, Ray TA, Florijn R, Rowe LB, Sjoerdsma T, Contreras-Alcantara S, Baba K, Tosini G, Pozdeyev N, Iuvone PM, Bojang P Jr, Pearring JN, Simonsz HJ, van Genderen M, Birch DG, Traboulsi EI, Dorfman A, Lopez I, Ren H, Goldberg AF, Nishina PM, Lachapelle P, McCall MA, Koenekoop RK, Bergen AA, Kamermans M, **Gregg RG**. (2012). GPR179 is required for depolarizing bipolar cell function and is mutated in autosomal-recessive complete congenital stationary night blindness. Am J Hum Genet. 10;90:331-9. PMID: 22325362

Orlandi C, Posokhova E, Masuho I, Ray TA, Hasan N, **Gregg RG**, Martemyanov KA (2012). GPR158/179 regulate G protein signaling by controlling localization and activity of the RGS7 complexes. J Cell Biol. 2012 Jun 11;197(6):711-9. PMID:22689652.

External Professional Activities:

2009 NIH, ZRG1 F08-E (20) Fellowship: Genes, Genomes,and Genetics (3 meetings)

2010 NIH, ZRG1 F08-E (20) Fellowship: Genes, Genomes,and Genetics (3 meetings)

2011 NIH, ZRG1 F08-E (20) Fellowship: Genes, Genomes,and Genetics (2 meetings)

2011 NIH BDPE study section. October 2011

2012 NIH BVS study section. June 2012