Introducing Marie E. Burns, the 2009 Recipient of the Cogan Award

It is a great pleasure to introduce Dr. Marie Burns, this year’s Cogan Awardee. As of July 1 this year, Marie will be Professor of Ophthalmology and Director of the Center for Visual Sciences at UC Davis. She has risen through the ranks very quickly, having joined UC Davis as a beginning Assistant Professor only in 2001.

She graduated as valedictorian from Susquehanna University in 1992 and received her PhD in neuroscience from Duke University in 1996, working on the vesicular-release mechanism in synapses. Afterward, she joined Denis Baylor’s laboratory at Stanford as a postdoctoral fellow, thus beginning her career in vision research. Over the past 13 years, both as a postdoc and in her own laboratory, Marie has made remarkable advances in the understanding of rod phototransduction. She is a bright young star in this field.

She has done classic work on the mechanisms underlying the shutoff of rod phototransduction, which turns out to be much more complex than the activation process. In particular, in collaboration with Steve Tsang and Vadim Arshavsky, she verified in intact rods that the normal deactivation of transducin, which is the G protein downstream of rhodopsin, requires its interaction with its target enzyme, the cGMP phosphodiesterase.

She has also examined the calcium feedback in phototransduction. In a particularly elegant study with Denis Baylor and Jeannie Chen, Marie showed that the decrease in intracellular calcium accompanying the light response is more rapid and powerful than previously expected, and dramatically shapes the amplitude and time course of the single-photon response. Moreover, at the dim-flash level, the calcium feedback to the guanylate cyclase, which is the cGMP-synthesizing enzyme, appears to be the only dynamic calcium feedback in operation. In other words, the calcium feedbacks to other targets occur only after larger or longer lasting changes in calcium.

More recently, Marie has tackled an important, unresolved problem in phototransduction—namely, the identity of the slowest, or rate-limiting, step in photoresponse decay. These studies culminated in 2006, when her laboratory in collaboration with Jason Chen’s group at Virginia Commonwealth University showed, in a classic study using overexpression of G-protein regulators, that the rate-limiting step in rod phototransduction shutoff in fact resides precisely in G-protein deactivation rather than in rhodopsin deactivation.

Marie is also an outstanding citizen in the scientific community. At a relatively young age, she is already serving as chairperson of her study section, which speaks well for her scientific judgment, fairness, and leadership qualities. In summary, Marie is a top-notch vision scientist, a young leader in her field. She has high intelligence, thoughtfulness, a no-nonsense attitude, a meticulousness, a steely determination to make experiments work, and, above all, a real passion for science. I am sure that she will continue to be highly successful.

Congratulations, Marie, on receiving the Cogan Award!

King-Wai Yau

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