BIOGRAPHICAL SKETCH

NAME: Donald G. Puro, M.D., Ph.D.

POSITION TITLE: Professor, Ophthalmology & Visual Sciences
and Molecular & Integrative Physiology
University of Michigan

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Pennsylvania, Philadelphia, PA	B.A.	05/1969	Biochemistry
University of Rochester, Rochester, NY	M.D.	05/1974	Medicine
University of Rochester, Rochester, NY	Ph.D.	05/1975	Physiology
Strong Memorial Hospital, U.of R., Rochester, NY	Internship	06/1975	Pathology
National Institute of General Medical Sciences, National Institutes of Health, Bethesda, MD	Postdoc	06/1977	Pharmacology
University of Miami, Bascom Palmer Eye Institute, Miami, FL	Residency	06/1980	Ophthalmology

A Personal Statement: As an ophthalmologist-scientist my career goals have been to elucidate mechanisms of ocular pathophysiology, to train research-oriented ophthalmologists and to provide excellent clinical care. A general aim of my research has been to better understand the role of ion channels, which are potentially druggable targets, in mediating the pathological effects of disorders such as diabetes and dry eye. Over the years, more than three dozen young ophthalmologists trained in my laboratory prior to beginning their academic careers. In the clinic, I chiefly focus on providing ophthalmic care to those afflicted with diabetes, but in addition I also evaluate and treat patients who have a spectrum of acute and chronic eye problems.

B. Positions and Honors

Positions and Employment

1995- Professor, Departments of Ophthalmology & Visual Sciences and Molecular & Integrative Physiology, University of Michigan

1990-1995 Professor, Department of Ophthalmology and Associate Professor, Department of Physiology, University of Michigan School, Ann Arbor, MI

1985-1990 Associate Professor, Department of Ophthalmology (Bascom Palmer Eye Institute) and Department of Physiology & Biophysics, University of Miami, Miami, FL

1980-1985 Medical Officer, United States Public Health Service; Principal Investigator, National Eye Institute, National Institutes of Health, Bethesda, MD

Honors

2018 Elected a fellow in the American Association for the Advancement of Science (AAAS)

2016 Stein Innovation Award from Research to Prevent Blindness

2016- Castle Connolly Top Doctor

2009 Inaugural class of ARVO fellows (Association for Research in Vision and Ophthalmology)
2007 Best Doctors in America
2002 Harrington Research to Prevent Blindness Senior Scientific Investigator
2002- American Ophthalmological Society member
1992 Research to Prevent Blindness-Senior Scientific Investigator Award
1986 William and Mary Greve Research Scholar Award from Research to Prevent Blindness
1974 National Foundation Award for research in developmental biology
1974 Robert Kates Award for excellence in clinical medicine and research, University of Rochester
1973 Alpha Omega Alpha Honor Medical Society

C. Contributions to Science

1. My initial research project as a Principal Investigator supported by the National Eye Institute/NIH was to better understand how the development of retinal neurons is regulated.

   Representative publication: Puro DG and Agardh E: Insulin-mediated regulation of neuronal maturation. *Science* 225:1170-1172, 1984.

2. In a subsequent series of NEI/NIH research grants, I explored the role of ion channels in the physiology and pathobiology of retinal Müller cells, which are the principal non-neuronal cells in the retina.

   Puro DG and Mano T: Modulation of calcium channels in human retinal glial cells by basic fibroblast growth factor: a possible role in retinal pathobiology. *Journal of Neuroscience* 11:1873-1880, 1991.

   Puro DG: Growth factors and Müller cells. *Progress in Retinal and Eye Research* 15:89-101, 1995.

3. To maintain creativity, I periodically shift my research focus. Thus, after nearly two decades of studying retinal glia and neurons, I focused on the retinal vasculature, which is of keen interest due to its critical role in diabetic retinopathy. With the support of a new series of NEI/NIH grants, my team provided the first description of the biophysical architecture of this vasculature. We discovered that the functional expression of specific types of ion channels in the capillaries of the retina make these blood vessels particularly vulnerable to the lethal impact of diabetes.

   Zhang T, Wu DM, Xu G-z and Puro DG: The electronic architecture of the retinal microvasculature. *Journal of Physiology*, 589:2383-2399, 2011. PMCID: PMC3098709.

   Fukumoto M, Nakaizumi A, Zhang T, Lentz SI and Puro DG: Vulnerability of the retinal microvasculature to oxidative stress: ion-channel-dependent mechanisms. *American Journal of Physiology*, 302: C113-C1420, 2012. PMCID: PMC3361947

   Puro, DG: Retinovascular physiology and pathophysiology: New experimental approach/new insights. *Progress in Retinal and Eye Research*,31:258-270, 2012. NIHMSID #355389.

4. Next, I directed attention to the clinical problem of retinal neovascularization, which is a major cause of blindness in diabetics. In our NEI/NIH-supported research, we used a novel experimental approach to elucidate the electrophysiology of pathological neovessels located in complexes surgically excised from patients with diabetic retinopathy as well as those developing in rodent models of aberrant retinal angiogenesis. We discovered that pathological new blood vessels generate a function-altering voltage that sustains the pathogenesis of sight-threatening neovascularization.

   Puro DG, Kohmoto R, Fujita Y, Gardner TW and Padovani-Claudio DA: Bioelectric impact of pathological angiogenesis on vascular function. *Proceedings of the National Academy Sciences USA*. 113:9934-9939 (2016). PMCID: PMC5024585.

5. Most recently, a Stein Innovation Award from Research to Prevent Blindness provided the opportunity to better understand the clinical problem of dry eye. This laboratory investigation revealed that ion channels play previously unappreciated roles in the pathogenesis of this uncomfortable sight-impairing disorder.

    Puro DG: Role of ion channels in the functional response of conjunctival goblet cells to dry eye. *American Journal of Physiology* 315:C236-C246, 2018 PMCID: PMC6139504. (*The American Physiological Society selected this as one of the "best of the best" scientific papers published in the society's journals during 2018*.)

    Puro DG: Bioelectric responses of conjunctival goblet cells to dry eye: impact of ion channels on exocytotic function and viability. *International Journal of Molecular Science* 2020;21(24). PMID: 33321932

    Puro DG: How goblet cells respond to dry eye: adaptive and pathological roles of voltage-gated calcium channels and $P2X_7$ purinoceptors. *American Journal of Physiology* 318:C1305-C1315, 2020 PMID: 323448177.

D. **Research Support**: I have served as the principal investigator on research projects supported by the National Eye Institute/NIH, Research to Prevent Blindness, Fight for Sight and the American Diabetes Association.