BIOGRAPHICAL SKETCH

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NAME: Lamba, Deepak A.

POSITION TITLE: Associate Professor

eRA COMMONS USER NAME (credential, e.g., agency login): lambad

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 Mumbai	M.B.B.S. (MD)	01/1999	Medicine and Surgery
University of Illinois, Chicago	M.S.	08/2003	Bioengineering
University of Washington, Seattle	Ph. D.	12/2007	Neurobiology and Behavior
University of Washington, Seattle	Post-doc	06/2010	Embryonic stem cells and retina

A. Personal Statement

Based on my diverse training in medicine, bio-engineering and stem cell technologies with relation to the retina, I have the relevant expertise to combine the three technologies to come up with novel solution to the 3D retina challenge.
My lab focuses on retinal repair and disease modeling for which I have gained relevant expertise by working with stem cell technologies for retinal repair for over 14 years. This provided me with unique and extensive knowledge and skills to carry out the proposed work. We have developed *in vitro* methodologies for generating all the various retinal cell types, including retinal neurons and retinal pigment epithelium cells, from both human embryonic stem cells and human induced pluripotent stem cells. I was one of the first to publish directed retinal differentiation protocols in the US during my PhD work. In October 2011, I established my own lab at the Buck Institute for Research on Aging. We are now focused on exploring the potential and challenges in retinal repair. These include (1) exploring the potential and challenges in retinal repair and (2) using stem-cell based *in vitro* model system to understand various age-associated retinal degenerations including macular degeneration. These application is an extension of this work to create relevant disease-in-a-dish model by combining stem cells with biomaterial engineering something I have previously been involved (McUsic et al. 2012).

a. Lamba DA, Karl MO, Ware CB, Reh TA. (2006). Efficient generation of retinal progenitor cells from human embryonic stem cells. Proc Natl Acad Sci USA;103:12769-12774. PMCID: PMC1568922.
b. McUsic AC, Lamba DA, Reh TA. (2012). Guiding the morphogenesis of dissociated newborn mouse retinal cells and hES cell-derived retinal cells by soft lithography-patterned microchannel PLGA scaffolds. Biomaterials. Feb;33(5):1396-405. PMCID: PMC3249403.
c. McUsic AC, Lamba DA, Reh TA. (2012). Guiding the morphogenesis of dissociated newborn mouse retinal cells and hES cell-derived retinal cells by soft lithography-patterned microchannel PLGA scaffolds. Biomaterials, 33(5):1396-405. PMCID: PMC3249403.
d. Garcia TY, Gutierrez M, Reynolds J, Lamba DA. (2015). Modeling the Dynamic AMD-Associated Chronic Oxidative Stress Changes in Human ESC and iPSC-Derived RPE Cells. Invest. Ophthalmol. Vis. Sci.;56(12):7480-8. PMCID: NA.

B. Positions and Honors

Positions and Employment

1999-2000 Clinical Intern: Grant Medical College, Mumbai, India.
2000-2001 Resident Medical Officer: Inlaks General Hospital and Sitla Nursing Home, Mumbai, India.

2002-2003 Graduate Research Assistant: Dept. of Bioengineering, UIC, Chicago, IL
2004-2007 Graduate Research Assistant: Dept. of Biological Structure, UW, Seattle, WA
2007-2010 Senior Fellow: Dept. of Biological Structure, UW, Seattle, WA
2010-2011 Research Assistant Professor: Dept. of Ophthalmology, UW, Seattle, WA
2011-2016 Assistant Professor: Buck Institute for Research on Aging. Novato, CA
2011- Affiliate Assistant Professor: Dept. of Ophthalmology, UW, Seattle, WA
2017- Associate Professor, Buck Institute for Research on Aging. Novato, CA

Honors

2011 ARVO-AFER/Merck Innovative Ophthalmology Research Award in Stem Cells-1st Place.

C. Contribution to Science

While training to become a medical doctor, I experienced first-hand the need for newer therapeutic strategies for various blinding disorders. During my PhD, I applied retinal developmental biology principles to pluripotent stem cells in Dr. Thomas Reh's lab. **These studies led to the first published directed differentiation protocols for generating retinal neurons from human embryonic stem cells (Lamba et al. 2006). This protocol was then shown to be applicable to human induced pluripotent stem cells as well (Lamba et al. 2010). The studies above then lead to the first demonstration that these human photoreceptors have the potential to restore light-responsiveness in a model of congenital blindness (Lamba et al. 2009). We have now focused our efforts on identifying and modulating barriers to successful integration and this lead to a recent publication showing the immune-modulation of the host environment can promote both retinal repair as well as enhance successful integration of donor photoreceptors (Neves et al. 2016, Zhu et al. 2016).**

a. Lamba DA, Karl MO, Ware CB, Reh TA. (2006). Efficient generation of retinal progenitor cells from human embryonic stem cells. Proc Natl Acad Sci USA;103:12769-12774. PMCID: PMC1568922.
b. Lamba DA, Reh TA, Gust J. (2009). Transplantation of human embryonic stem cell-derived photoreceptors restores some visual function in Crx-deficient mice. Cell Stem Cell. 4(1):73-9. PMCID: PMC2713676.
c. Neves J, Zhu J, Sousa-Victor P, Konjikusic M, Riley R, Chew S, Qi Y, Jasper H, Lamba DA. Immune modulation by MANF promotes tissue repair and regenerative success in the retina. Science. 2016 Jul 1;353(6294):aaf3646. PMCID: In Process.
d. Zhu J, Cifuentes H, Reynolds J, Lamba DA. (2016) Immunosupression via loss of IL2rg enhances long-term functional integration of hESC-derived photoreceptors in mouse retina. Cell Stem Cell 20 1-11. PMCID: NA.

My Master's thesis project involved development of a retinal prosthesis project. Another focus of my lab is to use the *in vitro* pluripotent stem cell system to explore tissue development and disease modeling in a dish. This has allowed us to recently publish two papers using the human RPE cell culture system to understand and modulate to our therapeutic advantage two critical signaling pathways, NRF2 (Garcia et al. 2015) and AhR (Gutierrez et al. 2016).

a. McUsic AC, Lamba DA, Reh TA. (2012). Guiding the morphogenesis of dissociated newborn mouse retinal cells and hES cell-derived retinal cells by soft lithography-patterned microchannel PLGA scaffolds. Biomaterials, 33(5):1396-405. PMCID: PMC3249403.
b. Garcia TY, Gutierrez M, Reynolds J, Lamba DA. (2015). Modeling the Dynamic AMD-Associated Chronic Oxidative Stress Changes in Human ESC and iPSC-Derived RPE Cells. Invest. Ophthalmol. Vis. Sci.;56(12):7480-8. PMCID: NA.
c. Gutierrez MA, Davis SS, Rosko A, Nguyen SM, Mitchell KP, Mateen S, Neves J, Garcia TY, Mooney S, Perdew GH, Hubbard TD, Lamba DA, Ramanathan A. A novel AhR ligand, 2AI, protects the retina from environmental stress. Sci Rep. 2016 Jul 1;6:29025; PMCID: PMC4929558.

Complete List of Published Work in MyBibliography:
http://www.ncbi.nlm.nih.gov/sites/myncbi/1vctJQ9z_H5Av/bibliography/41368694/public/?sort=date&direction=ascending