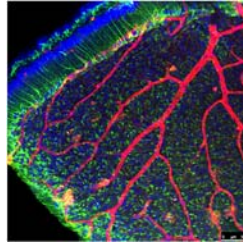


Learning the Hard Way: Role of Vascular Stiffening in Inflammatory Retinal Diseases



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Abstract:

Loss of retinal and choroidal vessels in the eye are hallmarks of the early stages of diabetic retinopathy (DR) and age-related macular degeneration (AMD), major retinal diseases that cause significant vision loss in the diabetic and elderly population, respectively. Since early-stage vascular atrophy is regarded as a risk factor for vessel multiplication and leakiness associated with the late (vision-threatening) stage of these conditions, there is growing interest in understanding how retinal and choroidal vessels degenerate early on in DR and AMD. Past studies have implicated vascular inflammation in early-stage vascular atrophy associated with these conditions. Yet precisely how retinal and choroidal vascular inflammation is regulated in diabetes and aging remains unclear.

Work in our lab has identified vascular ‘stiffening’ as a new paradigm of vascular inflammation associated with early DR and AMD. In this talk, I will present our findings that reveal that retinal and choroidal vessels undergo significant stiffening in diabetes and aging that, in turn, exacerbates the inflammatory effects of high glucose and complement activation, major risk factors for DR and AMD, respectively. The mechanotransduction pathway mediating the effects of vascular stiffening on ECs will also be discussed. By uncovering the previously unknown relationship between vascular stiffening, mechanotransduction, inflammation, and vascular atrophy, this research has the potential to identify new strategies for DR and AMD treatment in the future.

Bio:

Research in the Ghosh Research Group aims to leverage the principles of mechanobiology to examine and treat inflammation-mediated vascular degeneration associated with diabetic retinopathy (DR) and age-related macular degeneration (AMD), the leading causes of vision loss in the diabetic and aging population. These studies are currently supported by two R01 grants from the National Eye Institute (NEI), and a Macular Degeneration Grant from the BrightFocus Foundation. Prof. Ghosh also serves as a participating faculty in the Division of Biomedical Sciences, the Center for Molecular and Translational Medicine, and the Cell, Molecular, and Developmental Biology Program at UC Riverside. Prior to joining UCR, Prof. Ghosh was a postdoctoral fellow in Don Ingber’s lab in the Vascular Biology Program at Children’s Hospital Boston and Harvard Medical School. He received his Ph.D. in Biomedical Engineering from Stony Brook University and his undergraduate degree in Chemical Engineering from National Institute of Technology, Warangal, India.