School of Medical Sciences Research Seminar Series

Wednesday 8th of April2020

3:00 – 4:00pm with networking until 4:30pm
LG03, Wallace Wurth Building

Professor Mary Ann Stepp

Professor of Anatomy and Cell Biology, Professor of Ophthalmology *(Secondary)*
School of Medicine and Health Sciences, GWU Medical School

"Using Focused Ion Beam Scanning Electron Microscopy (FIB-SEM) to study the intraepithelial corneal nerves and their response to injury"

Bio: Dr. Stepp obtained her PhD in Biochemistry at the Boston University School of Medicine, working with Dr. Gail Sonenshein on translational control of collagen synthesis in aortic smooth muscle cells. In 1985, she began postdoctoral work at MIT with Dr. Richard O. Hynes. In 1987 Dr. Stepp moved to the Harvard Schepen's Eye Research Institute, where she continued to study cell matrix adhesion and learned about the cornea as a model system for the study of cell adhesion. In 1992, Dr. Stepp relocated her lab to the George Washington University Medical School and was promoted to Professor in 2004. Dr. Stepp has published over 100 scientific articles, served on several scientific advisory boards, and currently is on the editorial board of *Experimental Eye Research*. She was made a Gold Fellow of the Association for Research in Vision and Ophthalmology (ARVO) in 2011 and awarded the Distinguished Researcher award from GWUMC.

Abstract: Intraepithelial corneal nerves (ICNs) innervating the corneal epithelium are maintained through interactions with corneal epithelial cells and the extracellular matrix they produce. One to several axons are bundled within the basal cell layer and either extend parallel to the ocular surface or branch and extend apically. Using 3-dimentional (3D) ultrastructural reconstructions of control and trephine injured mouse corneal epithelium and stroma, produced using Focused Ion Beam Scanning Electron Microscopy (FIB-SEM), we ask whether corneal epithelial cells or epithelium-resident immune cells remove axonal debris and degrade it after trephine corneal injury. We indicate that axonal fragments are internalized to lysosomes of corneal epithelium and immune cells within 3hr of trephine injury. Confocal imaging showed fewer CD45+ immune cells in corneal epithelium after trephine injury compared to controls. The resolution obtained with FIB-SEM revealed that close contact between ICNs and the anterior of the epithelial basement membrane (EBM) is associated with reduction of EBM electron density. We also show using FIB-SEM and confocal imaging that superficial trephine injuries that do not penetrate the stroma, damage anterior stromal nerve integrity. These studies are the first to assess mouse cornea after nerve injury using FIB-SEM.

Early Career Researchers ~ Lunch with Prof Mary Ann Stepp
Please register your interest with Dr Nicola J Smith nicola.smith@unsw.edu.au.