Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, March 31, 2023 @12:45 p.m.

presented by:

Una Pantic

(Advisor: Dr. Nina Jones)

"Investigating the effect of Nck1 or Nck2 overexpression in human podocyte cells under diabetic conditions"

Diabetes is characterized by the disruption of glucose homeostasis which leads to high blood glucose levels. Without proper treatment, chronic hyperglycemia can damage the ability for kidneys to filter blood, a complication known as diabetic nephropathy. Diabetic nephropathy is characterized by structural and functional changes to the filtration unit of the kidney, the glomerulus, which are often irreversible. A major target of injury in diabetic kidney disease are podocytes, which are specialized epithelial cells with a network of thin actin-rich projections that form part of the filtration barrier. Previous work in our lab has shown that the adaptor proteins Nck1 and Nck2 have an essential role in maintaining podocyte structure. These proteins interact with a number of signaling partners that regulate cytoskeletal remodeling, cell adhesion, and overall cell survival. Although many functions of Nck1 and Nck2 in the cell are redundant, recent studies support the idea that these proteins have unique roles. For example, Nck1 is upregulated and Nck2 in downregulated in human glomeruli from patients with diabetic nephropathy. In addition, preliminary results from our lab show that the loss of Nck2, but not Nck1, predisposes mice to podocyte injury and the development of diabetic nephropathy. Thus, to learn more about the unique roles of these proteins in diabetic pathogenesis it is crucial to try to understand the underlying molecular mechanisms. In this project, we will generate podocyte cell lines with altered expression of Nck1 or Nck2 and characterize their response to diabetic injury.