POSTDOC APPRECIATION WEEK 2022: RESEARCH SPOTLIGHT

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Postdoctoral Associate

Field of Study
Medicine

What impact do you want your research to have?
My research focuses on Sodium-glucose cotransporter 2 inhibitors (SGLT2i). This class of drugs is used to treat type 2 diabetes and prevent glucose reabsorption in proximal tubular cells. Recent clinical trials demonstrated that SGLT2i also improves renal outcomes in non-diabetic patients, indicating SGLT2i may have renoprotective effects beyond glycemic control. I will perform in vitro and in vivo experiments to study the effect of SGLTi on Alport syndrome, a non-diabetic kidney disease. This study is of high translational relevance to support the clinical development of SGLT2i in Alport Syndrome and to offer evidence of a direct metabolic effect of SGLT2i-independent of glycosuria. We demonstrate that SGLT2i reduces renal lipotoxicity and improves kidney function in experimental Alport Syndrome. Thus, our study may reveal novel mechanisms of SGLT2i-mediated renoprotection in non-diabetic kidney disease, as well as expand the utilization of SGLT2i in other relevant diseases.

What inspired you to pursue your area of research?
My long-term research interest is to elucidate key molecular mechanisms that are activated in the kidney as a pathophysiological response to injury, with the ultimate goal to identify new therapeutic strategies for human kidney diseases. My academic training and experiences have allowed me to develop an excellent background in multiple biomedical disciplines including medical sciences, biochemistry, molecular biology, and pharmacology. My interest in translational research began during my master's degree when I learned to use molecular and cellular methods to investigate a biomarker for cancer diagnosis. The eagerness to further deepen my knowledge in exploring disease mechanisms drove me to pursue a Ph.D. degree in the USA. I joined Dr. Fornoni's laboratory as a graduate student in 2016. Under her mentorship, my doctoral dissertation was focused on investigating the contribution of APOL1 risk variants to lipid-mediated podocyte injury and mitochondrial dysfunction in focal segmental glomerulosclerosis. This work was supported by an AHA pre-doctoral fellowship and published in 2021. In my postdoc training, I will expand my knowledge related to the role of lipid and energy metabolism as it relates to the progression of kidney diseases. I will investigate the unexplored effect of SGLT2i to improve kidney function and reduce renal lipotoxicity in Alport syndrome by inducing a metabolic substrate shift in kidney cells.

What is most exciting about your research?
My research will expand our knowledge of podocyte lipotoxicity to the area of fatty acid metabolism and mitochondrial function, which we recently found to be associated with kidney disease progression in Alport syndrome. Overall, my research may uncover novel disease mechanisms that will allow me to identify new therapeutic strategies for the treatment of patients with renal disease.

What makes your research unique?
SGLT2i was recently found to protect from kidney and cardiovascular outcomes in both diabetic and non-diabetic patients with chronic kidney disease. My research tries to identify the effect and mechanism of the FDA-approved diabetic drugs in Alport syndrome (a chronic kidney disease of non-metabolic origin). My research includes both in vitro and in vivo experiments using clinical-relevant models. Results obtained from my study may allow us to define better the mechanisms leading to SGLT2i-mediated renoprotection in non-diabetic kidney disease.

What are your plans after finishing your postdoc at the University?
During my postdoc at the University of Miami, I am taking the opportunity to apply for the AHA postdoc fellowship. This experience will prepare me for the successful application of a transition to independence award after four or five years. In the future, I would like to pursue an independent career at this Institution or elsewhere.

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