

**Project:** **Sexual dimorphism of collecting duct renin and prorenin receptor (PRR) during high salt intake in chronic Angiotensin II- hypertensive rats.**

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**Project description:**

The deleterious effects of high blood pressure (hypertension) include stroke, atherosclerosis, heart and renal diseases. These effects are, at least in part, due to a systemic and tissue overactivation of the renin angiotensin system (RAS) and increased levels of Angiotensin II (Ang II), the major hormone of the RAS. It is well known that salt intake inhibits the RAS, but when Ang II levels are not suppressed, increased salt intake exacerbates hypertension and renal injury. We have previously demonstrated that renin, the rate-limiting enzyme in the RAS, is not only present in the juxtaglomerular apparatus (JG) cells of the kidney, but also in distal tubular segments. Our laboratory has also shown that in Ang II-dependent hypertension, renin is up-regulated in the distal portions of the nephron (collecting ducts-CD) of chronic Ang II-infused and Goldblatt hypertensive rats. In addition, we have found that prorenin receptor (PRR) expression is also higher in Goldblatt hypertensive rats and chronic Ang II-infused rats than controls. However, it is not known whether these two elements of the intrarenal RAS exhibit sex differences neither if their gene expression change during increased salt intake. This project will attempt to determine whether the pressor response to Ang II and levels of gene expression of renin and PRR in the distal nephron segment of chronic Ang II-infused rats exhibit sex differences during high salt (HS) intake and endogenous RAS blockade.

The student who undertakes this project will perform immunohistochemistry studies on rat kidney sections by immunoperoxidase technique and quantitate the specific immunoexpression of renin and PRR using imaging analysis software (Image ProPlus). The student will also assist the principal investigator in the collection of biological samples and recording metabolic variables such as body weight, food and water intake, and blood pressure daily. As the project is completed, the student will develop excellent skills for small animals handling for metabolic studies as well as tissue harvesting, and learn to use automatic systems to support histology techniques and tissue/cell specific semi-quantitative analysis. It is anticipated that the skills developed by the student will be of a great value for future cell/tissue research work, especially those planning to go on to graduate or medical school.

**Objectives:**

During the 10-week period, the student will gain experience with:

- Formulating and testing scientific hypotheses;
- Systolic blood pressure measurements in small animals, tissues harvesting and samples collection, and immunohistochemistry.
- Data analysis and poster or oral presentation

**Prerequisites:**

The student must have successfully completed the sophomore year with a GPA of 3.00 or higher, finished introductory chemistry and/or biology with laboratories and be willing to learn new techniques.

The undergraduate student will work on this project, advised by Dr. Prieto-Carrasquero. To apply, please send application materials through the LAMP, including a short letter expressing your future educational, employment plans and career goals. In addition, please include a copy of your application to the mentor, Minolfa Prieto-Carrasquero., MD., PhD. Tulane University School of Medicine. Department of Physiology, (SL39). 1430 Tulane Avenue. New Orleans, LA 70112. Phone: (504) 988-2445; Fax: (504) 988-2657. E-mail: [mprieto@tulane.edu](mailto:mprieto@tulane.edu).