Spring 2025

Biochemistry and Molecular Biology Brown Bag Series

Alexis Bailes

Undergraduate Student

"Exploring the Impact of Zinc Deficiency on Kidney Health"

Tuesday, April 1, 2025

11:00 AM

Location 125 Oelman Hall

Lab: Clintoria Williams, Ph.D.

Boonshoft School of Medicine
WRIGHT STATE UNIVERSITY

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https://science-math.wright.edu/biochemistry-and-molecular-biology

Abstract

Background: Zinc Deficiency (ZnD) is a common comorbidity with diseases such as diabetes and chronic kidney disease (CKD). Recently, we reported that ZnD promotes hypertension and kidney damage in male mice. However, the impact of ZnD on females was not investigated.

Objective: The objectives of this study were to 1) investigate the impact of ZnD on kidney health on both males and females and 2) determine if there are sex differences.

Experimental Design: To this end, male and female adult mice were fed a Zn^{2+}-adequate (ZnA) or a Zn^{2+}-deficient (ZnD) diet for 6 weeks. To assess the impact of Zn on blood pressure regulation, systolic blood pressure and urinary Na^{+} excretion were examined. To assess kidney damage, urinary protein concentrations were measured.

Results: While ZnD increased BP in both males and females, the onset of hypertension was accelerated in males. In both males and females, urinary Na^{+} excretion corresponded to blood pressure changes. Specifically, hypertensive periods were accompanied with reduced Na^{+} excretion. In males, multiple periods of proteinuria were observed. However, in females there was an initial spike in urinary protein followed by low excretion.

Conclusion: These results suggest that ZnD causes hypertension in both male and female mice. However, in male mice the onset of hypertension was accelerated, and kidney damage was prolonged.

Significance: Understanding the impact of ZnD on kidney health may improve therapeutic strategies in chronic diseases.