



FUNCTIONAL CHARACTERIZATION OF INSULIN RECEPTOR IN ZEBRAFISH KIDNEY

Iyinyeoluwa Okulate; Tracy D. Bell, PhD

University of Maryland Eastern Shore, Princess Anne, MD 21853

The sodium-proton exchanger 3, NHE3, is an important protein in the proximal tubule of the kidney responsible for the majority of sodium-water reabsorption. It is important to understand the mechanisms that regulate NHE3 in the kidney because it is linked to an increase in blood volume and blood pressure. Studies have shown that insulin increases the activity of nhe3, therefore the goal of this study was to determine the effects of insulin on nhe3 expression using zebrafish as a model organism. Adult zebrafish were divided randomly into groups (5 fish/group) and injected intraperitoneally (10 μ L) with vehicle (saline) or insulin (0.01 U, 0.1 U, and 1 U/kg). On average fish weighed 0.29 \pm 0.04g. Following the i.p. injection and a thirty-minute recovery period, fish were euthanized by cold water immersion and their kidneys dissected and prepared for analysis. The kidneys from 5 fish per treatment group were pooled together for RNA extraction. Gene expression analysis using RT-PCR revealed that insulin injection stimulated mRNA expression of nhe3b and nhe3a. This data suggests a link between insulin and nhe3 in the proximal tubule of the kidney. This provides insights into how hypertension in patients with Type 2 diabetes or hyperinsulinemia may develop.

I would like to acknowledge and appreciate Dr. Tracy Bell, my research mentor, and Sherene Black, the graduate student in our lab, for the guidance. I also appreciate LSAMP and the NSF for the opportunity to conduct and present this research.