

HEATHER PRICE*, JAMES WALTERS*, *Dept. of Applied Science and Mathematics, Bluefield State College, Bluefield, WV 24701. Transcriptional profiling of mitochondrial metabolic regulatory genes during lipid absorption in larval *Danio rerio* (zebrafish).

Mitochondrial associated genes play an important role in metabolic processes that are linked to major diseases in the human body such as cardiovascular disease, diabetes, and cancer. Two such genes that relate to these processes are PCK1, linked to regulating gluconeogenesis working in conjunction with the citric acid cycle, and SLC25a33, a solute carrier associated with mitochondrial biogenesis and ROS levels. An initial RNAseq experiment comparing oleic acid and oleic acid plus cholesterol diets identified 57 genes responsive to cholesterol metabolism. Genes were then mapped using Cytoscape and literature databases to identify potential genes involved in cardiovascular disease. PCK1 and SLC25a33, were chosen due to their increased-up regulation in the initial RNAseq experiment and their association with mitochondrial functions. The original experiment was repeated with the three dietary challenges – 2% BSA, 2% BSA and Oleic Acid (OAD), and 2%BSA Oleic Acid and Cholesterol (OACD). Zebrafish larvae were used to model the human intestinal tract during dietary absorption. Intestinal dissections were performed after a 3-hour feeding period of each condition. Subsequently a cDNA library was made of each replicate and qRT-PCR was performed to assess the differential regulation of genes involved in metabolic adaption to the diets. We found PCK1 and Timm10b were up-regulated in the OAD diet as compared to OACD and SLC25a33 showed the opposite regulation with these diets. *This work was supported by NIH Grant P20GM103434 to the West Virginia IDeA Network for Biomedical Research Excellence and NIH Grant P20GM103434 awarded to Bluefield State College.*