Chandler Russell, Jesse Orell, Dakota Parnell, and James Walters Ph.D, Department of STEM, Bluefield State University, Bluefield, WV 24701, “Studying freely fed seven days post fertilization zebrafish larvae with high fat diets versus a microfluidic chip environment.”

Abstract:
Heart disease and diabetes are both in the top ten for leading causes of death in the United States with both being linked to obesity. Studying human metabolism can prove difficult due to ethical concerns with human subjects but zebrafish larvae (*Danio rerio*) are optically transparent. Zebrafish larvae at seven days post fertilization also have fully formed digestive tracts and are actively seeking new food due to exhausting their supply of egg yolk. Free feeding environments are typically the standard when introducing new food to the larvae but lack versatility in their imaging. The Walters lab microfluidic chip can image larvae before, during, and after their introduction to the diet. To compare these feeding environments, we used fluorescent beads mixed into high fat diets and imaged larval guts with a Zeiss Discovery V8 microscope. The “freely feeding” larvae were put into a well filled with diet and allowed to feed for three hours while incubating. After three hours, these larvae were washed and imaged. The microfluidic chip larvae were mounted into the chip and fed a constant flow of diet and imaged *in situ*. We hypothesized that larvae would consume slightly less diet inside of the microfluidic chip than the larvae in free feed. Preliminary data indicates microfluidic chip feeding larvae can consume more oleic acid diet that free feeing larvae (Free Feeding 0.3 Relative Fluorescent Units (RFU) vs. microfluidic chip 1.97 RFU, p-value < 0.0003), though further replicate are required.

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