GREGORY COMPTON and JAMES WALTERS, Dept of Applied Science, Bluefield State College, Bluefield, WV 24701. Dynamic interactions between lipid droplets and mitochondria during lipid absorption In intestinal enterocytes of zebrafish.

Western diets are abundant in fats and cholesterol that are absorbed during lipid absorption in intestinal enterocytes. However, much remains unknown about the energetic mechanisms regulating dietary lipid processing within intestinal enterocytes. The purpose of this study is to elucidate the dynamic interaction of lipid droplets and mitochondria during lipid absorption in these cells. Prior studies have shown that larvae fed a high fat diet undergo lipid droplet biogenesis. We hypothesized that the process of lipid droplet formation would increase mitochondrial appositions with lipid droplets in enterocytes. We fed larvae a 5% egg yolk diet and prepared them for transmission electron microscopy. Images were analyzed for mitochondria and lipid droplet size, number, and apposition events for 11 time points at one hour intervals. Our preliminary data show that the overall number of mitochondria in the cell during lipid absorption decreased during the first 4 hour points while the average size of the mitochondria increased. The data support the hypothesis that the decreasing number and increase in overall size of mitochondria is directly associated with fusion of smaller mitochondria. Also, the data collected support the hypothesis that lipid droplet formation increases mitochondrial apposition events. To measure the dynamic nature of the lipid droplet and mitochondria interactions the fed zebrafish larvae were fixed in an Epon mold and cut into sections using an ultra-microtome. Sections from the anterior intestine were imaged using transmission electron microscopy. Lipid droplet and mitochondrial dynamics were quantified using NIH ImageJ.