HEALTH RESEARCH ABSTRACT SUBMISSIONS #30

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Educational Level *	Undergraduate
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College *	College of Liberal Arts and Sciences
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Title of Research *	ALCOHOL AFFECTS MICROGLIAL MORPHOLOGY IN VITRO: THE BRAIN'S IMMUNE SYSTEM IN FETAL ALCOHOL SYNDROME
Other Authors *	Kate Ahlers, Ukpong Eyo, Leah Fuller and Michael Dailey

Introduction & Purpose *

Fetal Alcohol Syndrome (FAS) is a disease caused by maternal alcohol use during pregnancy. Symptoms include abnormal facial features, growth deficiency, and central nervous system (CNS) problems. FAS prevalence is estimated at 1/1000 newborn children, and costs the US about $2 million during a child's lifetime as estimated for 2002. It is important to learn as much as possible about the effects of alcohol on fetal health, including neural development. Microglia (MG) are the immune cells of the CNS. In uninjured brain tissues, basal MG motility is thought to enable neuroprotective surveillance functions, and following traumatic injury MG rapidly extend branches, migrate, and accumulate near injured neurons where they help remove cell debris and minimize secondary damage. This MG activation also occurs following alcohol-induced neuronal injury. However, little is known about the effect of alcohol exposure on MG during, and after exposure. We hypothesized that there will be cell morphology changes in MG at differential levels of alcohol concentration.

Experimental Design *	To explore this question, we exposed cultured BV-2 cells, from a murine-MG cell line, to alcohol concentrations of 0%, 0.25%, 0.5%, and 1%. We measured morphological parameters of the cells (Feret's diameter, perimeter, area, circularity) after staining with IB4 conjugated to Alexa Flour-488 and DAPI nuclear stain. The fluorescence images were analyzed using ImageJ. The cell morphology data in all ethanol concentration categories were compared to each other using Chi-Square tests.
Results *	We found that exposure to media with 1% ethanol concentration for one hour resulted in significant morphological changes compared to 0% ethanol. The 0.5% and 0.25% ethanol exposure for one hour did not result in significant morphology change when compared to the 0% ethanol.

Conclusions *

There is a significant change in BV-2 cell morphology at 1% EtOH concentration. Thus far, the data do not show a significant change in BV-2 cell morphology at 0.25% and 0.5% ethanol concentration. However, data from a larger study done by Kate Ahlers showed significant changes in morphology at 0.5% EtOH concentrations for all morphological parameters, and significant changes in cell area at 0.25% EtOH concentration. This contradiction is probably due to needing a larger number of cells in order to gain greater statistical power. Further study needs to be done on primary microglial cells to

confirm that these effects translate to true microglia. Other cell behaviors could also be affected, such as phagocytosis ability, or expression of inflammatory factors. These findings suggest that the microglia may be directly affected by alcohol, and this could hinder the response of microglia to neuronal damage due to FAS.

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