

# *In utero* Optical Coherence Tomography to Evaluate Vasculature Changes in the Murine Embryonic Brain Due to Prenatal Alcohol and Nicotine exposure

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**Abstract**—This study uses speckle variance optical coherence tomography to evaluate vasculature changes in the murine embryonic brain caused due to prenatal exposure to alcohol and nicotine. In this talk, I will present acute changes in vasculature seen within 45 minutes after maternal alcohol consumption. Finally, preliminary results on the acute effects of maternal nicotine exposure on the fetal brain vasculature will also be presented.

**Keywords**—Optical Coherence Tomography, vasculature, brain

## I. INTRODUCTION (*HEADING 1*)

Prenatal alcohol exposure (PAE) is known to cause a spectrum of abnormalities commonly referred to as fetal alcohol spectrum disorders (FASD). The amount of alcohol consumed and the period of gestation during which alcohol was consumed play a major role in determining the severity of

the effect. Several women consume alcohol well into their second trimester of pregnancy, which is considered the peak period of fetal neurogenesis and angiogenesis. Although several studies have documented changes in blood flow caused by PAE, not a lot has been done in evaluating acute vasculature changes caused due to PAE. In this study, speckle variance optical coherence tomography (SVOCT) is used to evaluate changes in murine fetal brain vasculature, *in utero*, minutes after maternal alcohol consumption. Results showed a significant decrease in vessel diameter as compared to vessels in the sham group, suggesting that maternal alcohol exposure results in immediate vasoconstriction in the fetal brain vessels, leading to a loss of blood flow to the developing brain.

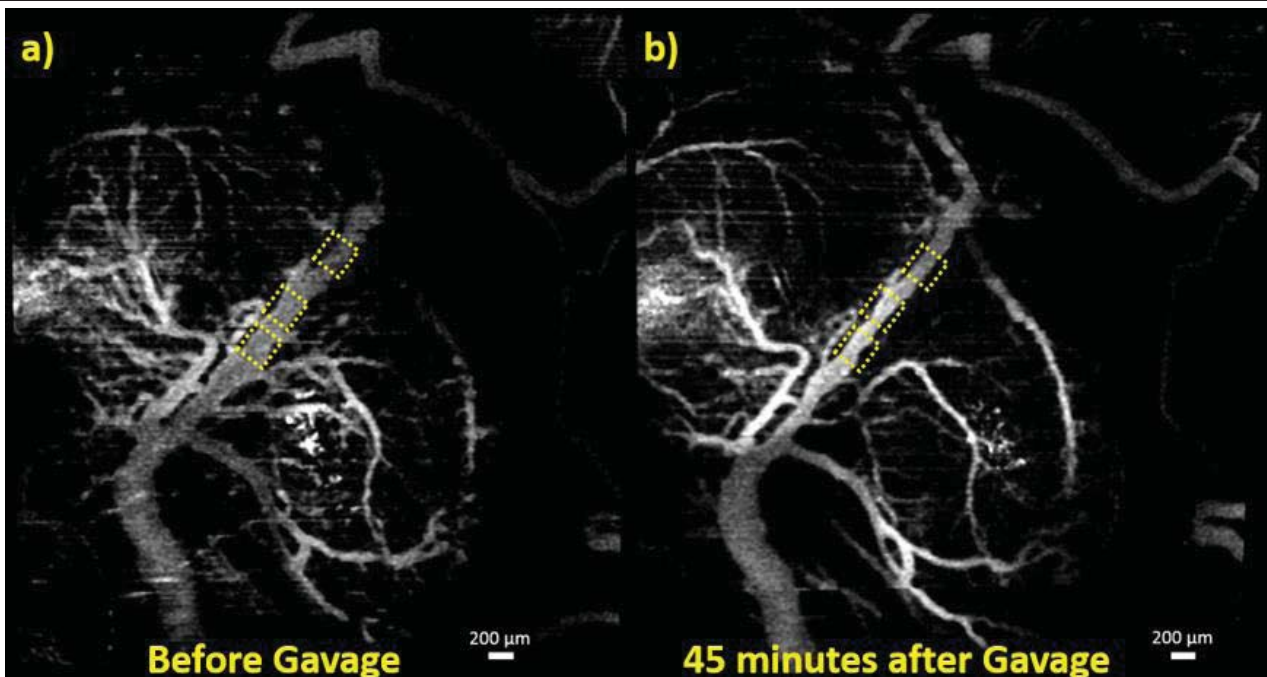


Fig. 1 SVOCT images of one sample from the alcohol group. (a) Maximum intensity projection (MIP) of the SVOCT image before maternal alcohol consumption. (b) MIP of the SVOCT image 45 minutes after maternal alcohol consumption.