

## Background, Motivation, and Goals

Alcohol is a widely used psychoactive substance with dose-dependent effects on brain function and behavior. Given its widespread use and addictive potential, there has been increased interest in examining the real-time effects of alcohol on brain activity. This study examined site-specific ethanol-induced changes on brain activity in awake rats through the use of pharmacologic-fMRI (phMRI).

## Experimental Design

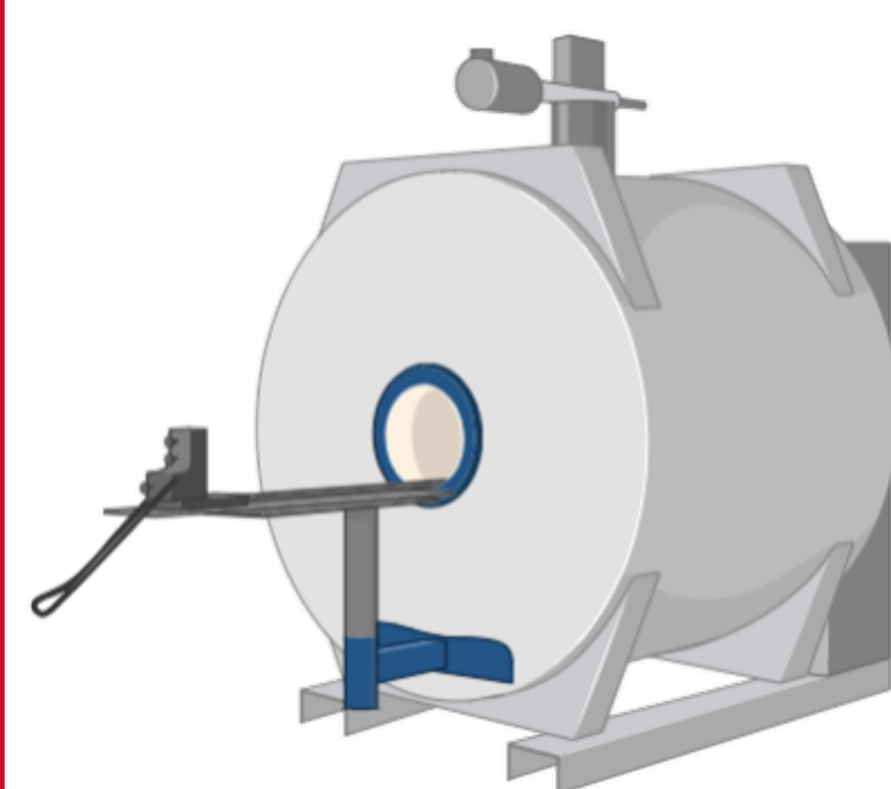
### Alcohol Exposure

- Three experimental groups (1, 2, and 3 g/kg) and one vehicle control group (n = 12/group, equal sex split) received intraperitoneal injections 5 minutes into the fMRI scan.
- Within-subjects Latin square design utilized for each rat over four scans to randomize dose orders.
- Doses reflect mild, moderate, and high blood alcohol contents (0.08%, 0.15%, and 0.25%).



### Neuroimaging

- Carried out pharmacologic-fMRI and functional connectivity scans.
- Data were registered to a rat 3D MRI atlas with 173 brain regions to identify site-specific changes in brain activity.



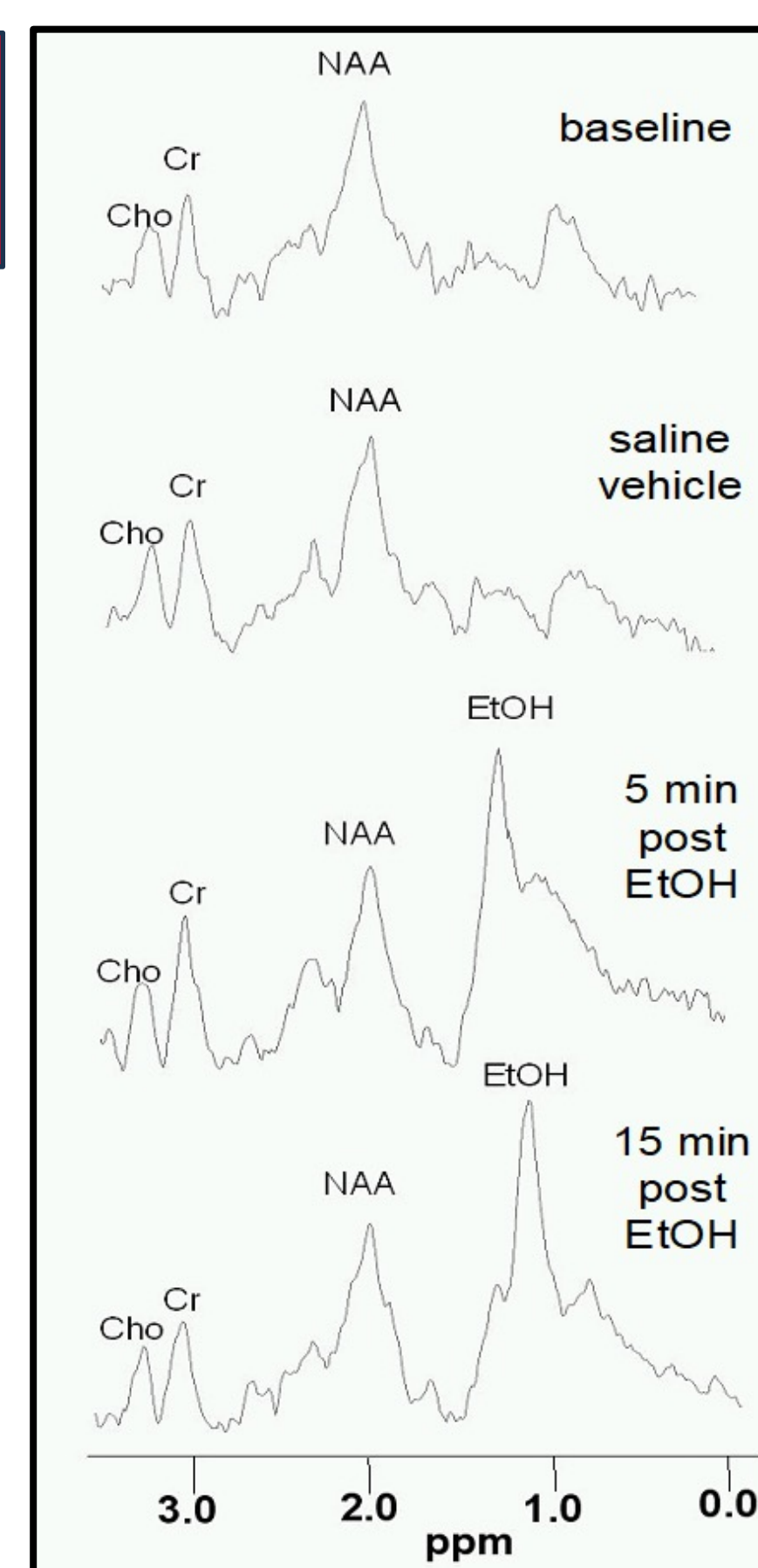
## Future Steps

- Quantitate ethanol levels in the brain through magnetic resonance spectroscopy (MRS)
- Attain BAC levels
- Analyze resting-state functional connectivity (rsFC) data

## Acknowledgement

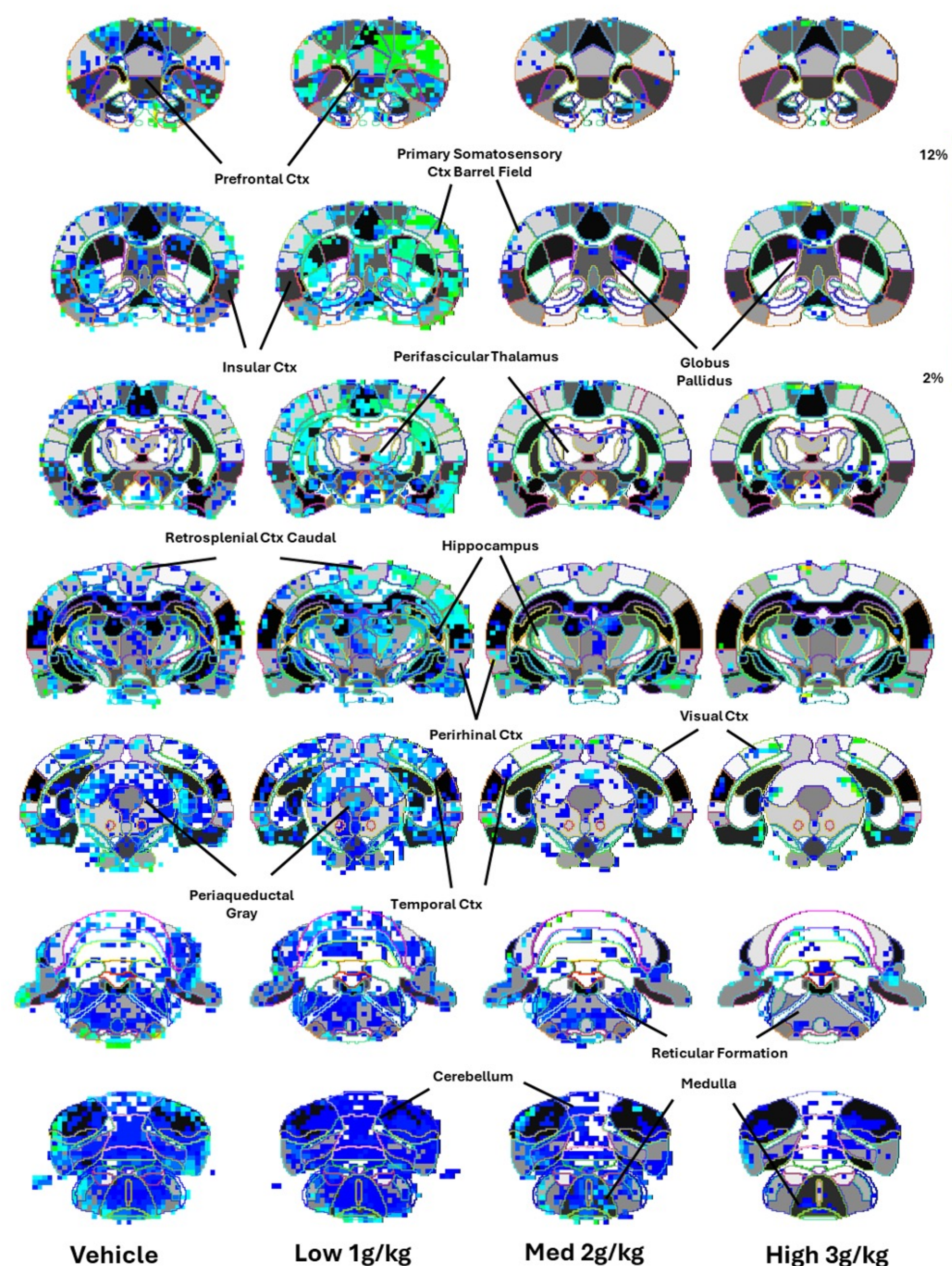


We thank Ekam Imaging for supporting this study. Please scan for more from Ekam Imaging!

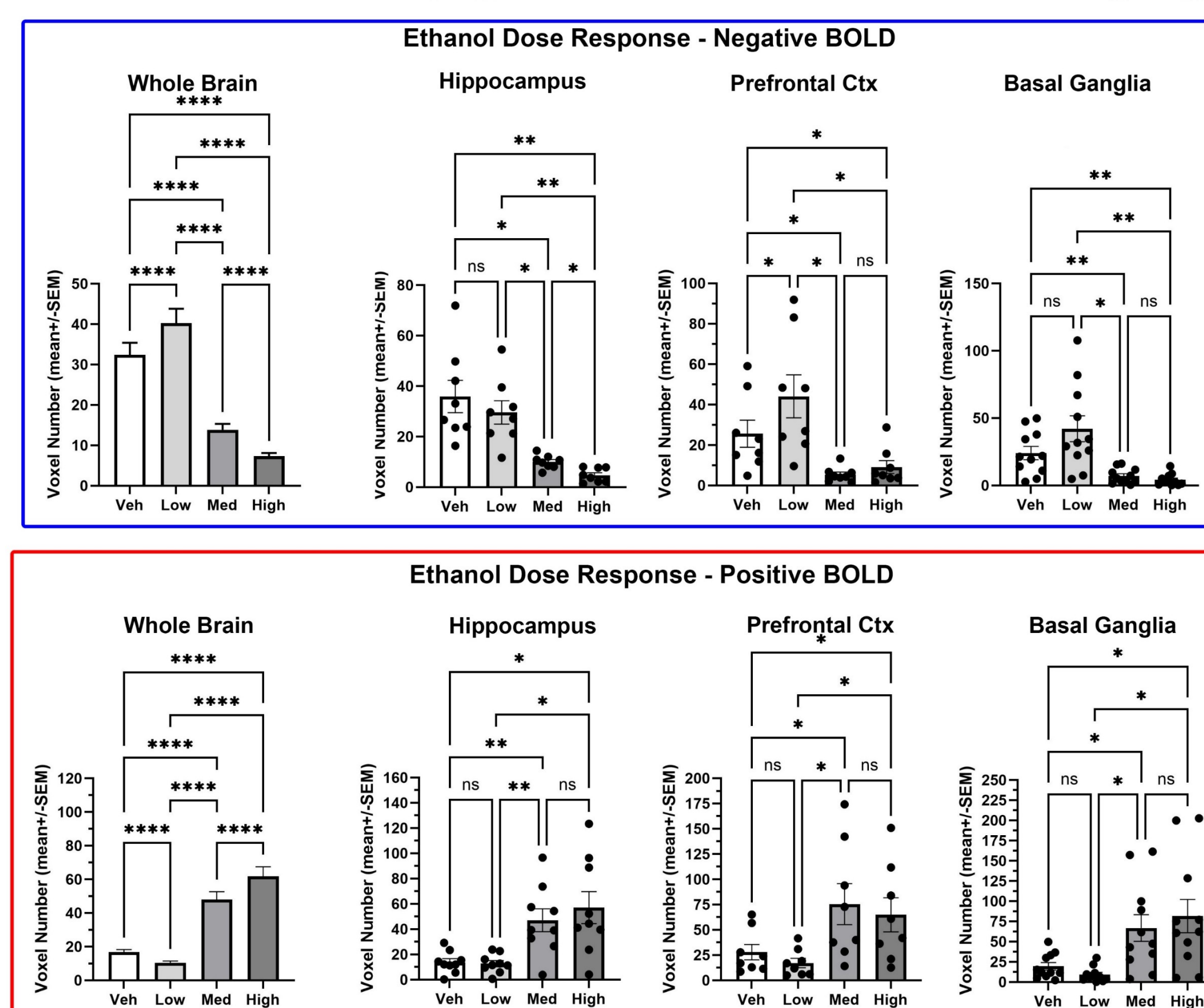
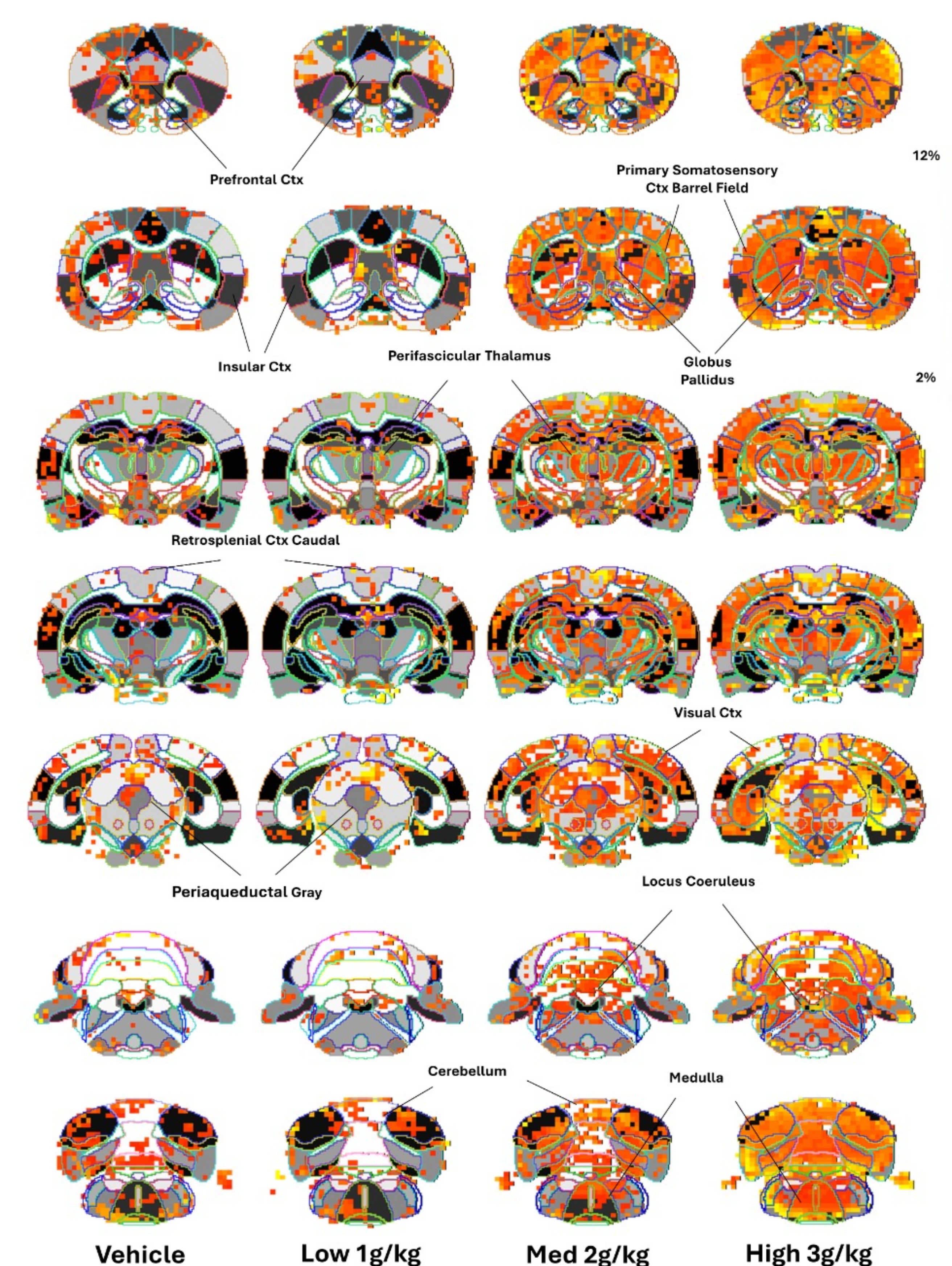


## Results

### 2D Negative BOLD Activation Map



### 2D Positive BOLD Activation Map



## Conclusions

- Positive and Negative Blood Oxygenation Level-Dependent (BOLD) signals varied between the dosage groups.
- Unexpectedly, there was an increase in Positive BOLD activity and decrease in Negative BOLD activity at higher doses.
- We previously anticipated that there would be a decrease in Positive BOLD activity at higher doses due to the depressing effects of alcohol.
- May be due to the vasodilator effect of alcohol, which increases cerebral blood flow.