May 18th, 4:00 PM - 4:30 PM

Olfactory Bulb Processing of Ortho Versus Retronasal Odors

Michelle F. Craft
Virginia Commonwealth University, craftm@vcu.edu

Andrea Barreiro
Southern Methodist University, abarreiro@mail.smu.edu

Shree Gautam
University of Arkansas, shgautam@uark.edu

See next page for additional authors

Presenter Information

Michelle F. Craft, Andrea Barreiro, Shree Gautam, Woodrow Shew, and Cheng Ly

BAMM Conference 2022

Title: Olfactory Bulb Processing of Ortho Versus Retronasal Odors

Abstract:

Olfaction is a key sense for many cognitive and behavioral tasks and is particularly unique because odors can naturally enter the nasal cavity from the front or rear, i.e., ortho- and retro-nasal, respectively. Prior imaging studies have shown the brain responds differently to these two modes of stimulation even with identical odors. Yet little is known about the differences in how olfactory bulb (OB) cells process and subsequently transfer this odor information to higher brain. Based on our multi-electrode array recordings of mitral cells in rat OB, we find significant differences between ortho and retro stimulus in trail-averaged population spiking statistics. It is believed that these differences have large implications for how the OB and successive higher brain regions code these modes of stimulation, but our preliminary findings indicate that using trial-averaged population spiking statistics alone to understand coding may be misleading. Using GABA_A agonists and antagonists, we find too little or too much inhibition can reduce average coding accuracy of ortho vs retro odors in OB. Specifically, excess inhibition is found to increase the difference in ortho versus retro firing rate while also reducing coding accuracy. We are currently developing a computational rate model based on our MC data to better understand the inhibitory effects on coding accuracy.