



Contribution ID: 16

Type: **Talk**

A central contribution to individual differences in taste sensitivity

Friday, October 6, 2017 4:30 PM (30 minutes)

It is well established that there are individual differences in taste intensity perception resulting from genetic variation in taste receptors or other peripheral taste physiology (ref). Less explored, is the possible influence of central mechanisms. The strongest evidence for a central source of variation in gustatory sensitivity comes from a study of the relationship between chemical taste and thermal taste; those that are more sensitive to perceiving a sweet sensation after warming of the tongue also rate gustatory and olfactory stimuli as stronger (ref). We propose that modulation of the anterior insula by the amygdala is a neurobiological candidate for the mechanism. Here we test the hypothesis that a central mechanism plays a significant role in individual differences in taste perception. The goal is to develop a model for the neural mechanism responsible for central gain. We perform the following analyses: 1) an ensemble of seed-based connectivity analyses for which we used regions that showed a main effect of taste vs. tasteless, 2) a dynamic causal network model of modulation of anterior insula by amygdala, 3) whole-brain connectivity to identify a “fingerprint” of an ensemble of taste response. We will evaluate which method best predicts an individual’s intensity perception and discuss plans for future validation studies. Funded by NIDCD R01 DC006706 to Dana M. Small.

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Session Classification: Olfaction & friends