

Arnav Cherian

Mentor: Hongxiang Liu, PhD

Class of 2018/Undergraduate/Poster Presentation



UNIVERSITY OF
GEORGIA

Regenerative Bioscience Center

Lingual Plp1CreER-labeled Schwann Cells: a Dynamic Population?

Arnav Cherian (a), Naomi Kramer (a), Brett Marshall (a), Hongxiang Liu (a)

(a)Regenerative Bioscience Center, Department of Animal and Dairy Science, College of Agricultural and Environmental Sciences, University of Georgia, Athens, GA, United States

Taste buds (TBs) are sensory organs for taste that arise and mature in mammals at early postnatal stages, after which they undergo continuous turnover for the life of the organism. The origin of these sensory organs, as well as the progenitors responsible for their maintenance, is currently disputed. Despite the long-standing notion that TBs are derived from local epithelium, we have used multiple lines of transgenic mice for lineage tracing analysis of neural crest (NC) cells, and found that a proportion of taste cells are potentially NC-derived. We hypothesize that Schwann cells (SCs), which come into close contact with TB cells, are a viable candidate for this. To examine whether SCs contribute to TBs, we used a cocktail of antibodies to identify SC in the tongue and taste papillae. We found that pan-SC marker S100 consistently associated with betaIII-tubulin positive nerves, as did p75, and to a lesser extent myelin basic protein (MBP) and Protein Zero (P0), each of which are often found in myelinating SCs. We used the tamoxifen inducible CreER system driven by the promoter of SC-specific gene Plp1 crossed with RFP to identify SCs and SC-derived lineages. Plp1CreER labeled prospect SCs could be found as early as E18.5, and with postnatal adult tamoxifen administration, we found that Cre-labeled cells were absent in the TBs of adult mice. To examine the possibility of an early prenatal contribution of SCs to TBs, tamoxifen was also provided prenatally to determine whether the putative Schwann cell contribution occurred before birth; however, Cre-labeled cells remained absent from TBs. Many RFP+ cells could be found clustering around taste buds at both E18.5 and 4 weeks of age, particularly the foliate and circumvallate papillae. RFP+ cells associate primarily with nerves – they possess the long, undulate projections characteristic thereof, and are dispersed throughout the tongue's lamina propria and muscle. The cells are not apparently Vimentin or K8+, but almost always express S100. Some RFP+ cells are also MBP+, indicating myelination; however many are MBP-, implying that some Schwann cells are capable of differentiating to other cell types within the tongue.