Wenxin Yu
Mentor: Hong-Xiang Liu, PhD
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UNIVERSITY OF GEORGIA
Regenerative Bioscience Center

SOX10+ Cells Are Progenitors of a Population of Special Taste Bud Cells That Are K8-Low

Wenxin Yu (a,b), Brett J. Marshall (a,b), Hong-Xiang Liu(a,b)

(a)Regenerative Bioscience Center, (b) Department of Animal and Dairy Science

In our recent studies using a mouse model, *SOX10-Cre*, to trace migrating neural crest lineages, labeled cells were found within mature taste buds (TBs) in adult mice. In the present study, we aimed to (1) define the time window when *SOX10-Cre*-labeled cells emerge in TBs, (2) characterize the properties of *SOX10-Cre*-labeled TB cells, and (3) explore the SOX10-expressing cell niches that contribute to TBs. The distribution of *SOX10-Cre*-labeled cells in neural crest and TBs was analyzed at different stages (E8.5, P1d, 2 wk, 4 wk, 8 wk, 16 wk) by crossing with a tdTomato (RFP) Cre reporter. We found that *SOX10-Cre*-labeled cells were abundant in the connective tissue at all postnatal stages. At P1d, *SOX10-Cre*-labeled cells were observed in fungiform taste buds but absent in circumvallate taste buds. By 2 wk, *SOX10-Cre*-labeled cells were frequently observed in TBs. In mature TBs at 4 wk and in adult mice (8 wk and 16 wk), *SOX10-Cre* labeling was abundant and consistent among TBs in all three types of lingual taste papillae, as well as the soft palate, and labeled cells co-localized with cell markers of Type I, II, and III TB cells. Intriguingly, *SOX10-Cre*-labeled cells within TBs were not apparently labeled by keratin 8, a widely used marker for differentiated TB cells. Cre immunosignals were specifically distributed in migrating neural crest cells in E8.5 embryos, and quantitative RT-PCR analysis showed low Cre expression in tongue epithelium and connective tissue at 2 wk, but was negligible in adult tongue tissues of *SOX10-Cre* mice. In an inducible Cre model, *SOX10-iCreER^{T2}*, labeled cells were found in circumvallate taste buds from mice receiving tamoxifen at 2 wk and being analyzed one day after injection and at 4 wk. Together, our data indicate that *SOX10*-expressing cells serve as precursors for TB maturation and homeostasis and contribute to a unique population of TB cells. Further studies are ongoing to define the *SOX10*-expressing cell population that contributes to TBs, likely from neural crest, TB, or TB-surrounding cells, or some combination of the three.