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Basal Epithelial Cells Contribute to Distinct Aspects of Taste Bud Formation, Maturation and Maintenance

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Taste buds, located primarily in the mammalian tongue, are necessary for distinction of taste. These organs arise at early embryonic stages, mature postnatal, then undergo continuous maintenance. Basic information pertaining to their precursors and progenitors remains contested, however. To investigate the contribution of surrounding epithelial cells to taste buds (TBs) for TB formation, maturation, and maintenance, K14-Cre was used to trace basal epithelial cell lineage. Different stages of K14-Cre mice crossed with a nuclear tdTomato to eGFP switch Cre-reporter (nTnG) were used to map labeled cells in lingual TBs. In K14-Cre/nTnG mice, labeled cells were not observed at E18.5 when early TBs emerge, despite the complete labeling of the surrounding epithelium, but were frequently seen in the TBs at birth. By 1 week, the number of labeled cells had increased significantly, and at 2w labeling was extensive. After 4w when TBs are mature and undergo continuous turnover, TBs were almost fully labeled. Our data indicate that K14+ epithelial cells contribute to the maturation and maintenance, but not initial formation, of TBs. These results suggest that initial taste bud cells are specified early in development, and are not derived from the surrounding epithelium.