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Mucosa and taste buds of the human epiglottis

The position of taste buds around the human mouth, pharynx and larynx is outlined in many texts. While their distribution, histological differences and taste sensitivity on the dorsum of the tongue are well described, extralingual taste buds are described in far less detail both in adults (Bannister, 1995) and neonates (Lalonde & Eglitis, 1961). Studies on a variety of grazing mammals (e.g. Bradley et al. 1980 in sheep; Shrestha et al. 1993 in buffalo), omnivores (Andrew & Oliver, 1951 in rat) and carnivores (Palmieri et al. 1983 in cat and dog) have shown abundant taste buds on the laryngeal surface of the epiglottis. Some authors have suggested that these taste buds may be important in initiating reflexes protecting the airway (Bradley et al. 1980) and in this context it is surprising that literature on their distribution on the human epiglottis is not available.

We examined 6 µm serial haematoxylin and eosin-stained sections of 5 paraformaldehyde fixed human epiglottides (3 other, grossly damaged tissues were discarded) obtained from bodies undergoing postmortem examination at the Royal Hallamshire Hospital, Sheffield. The donors ranged in age from 70 to 83 y and all had died of noninfectious condition such as ischaemic heart disease or cerebrovascular accidents. No information was available on the lifetime medical history of the donors.

All samples exhibited regions of epithelial delamination and other postmortem degeneration. In all samples the anterior (oral) surface and the rostral third and lateral margins of the laryngeal surface continuous with the aryepiglottic folds were covered with stratified squamous nonkeratinised epithelium, as described previously (Bannister, 1995). The central region of the laryngeal surface varied between samples. In only 1 case was classical respiratory epithelium found (Bannister, 1995). In the other samples an atypical, thickened type of respiratory epithelium (stratified columnar-like epithelium without goblet cells) was observed (Fig. panel a), which in one sample contained patches of stratified squamous epithelium.

Taste buds were found in only 3 of the 5 samples where they were restricted to the rostral third of the laryngeal aspect and thus embedded within stratified squamous epithelium (Fig. panel b). The taste buds were easily recognisable as has been described previously (Bradley et al. 1980; Lalonde & Eglitis, 1961; Shin et al. 1995) but in all cases they were squatter than typical lingual taste buds and it was rare to find a pore. The taste buds were not associated with papillae. Furthermore, in each case, they were in 3 clusters, 1 on the midline and 2 slightly laterally. In 2 of these cases we only detected a few taste buds whereas the third possessed around 25 taste buds in each cluster. This sample was the one with classical respiratory epithelium on the caudal laryngeal surface.

Only a small number of taste buds were found in our samples, in contrast to animals where they are plentiful. Again, in contrast to humans, in animals taste bud numbers increase caudally so that they are most plentiful at the base of the epiglottis (Shrestha et al. 1995).

The number of taste buds on the laryngeal surface of the epiglottis has been correlated with the feeding habit of the species. For example, many taste buds were observed in herbivorous mammals (cows, buffalo, goats, sheep), fewer in omnivores (rat, monkey) and exceptionally few in insectivorous mammals (house shrew: Shrestha et al. 1995). As herbivorous mammals ingest large bulky food materials there is an increased possibility of food entering into the laryngeal cavity. Cattle also regurgitate food which must present a high risk of food entering into the airway and it is possible that a great number of taste buds provide a sensitive afferent input to close the laryngeal cavity when food comes into contact with the posterior surface of epiglottis (Shrestha et al. 1995). As humans are omnivorous the finding of few taste buds on the laryngeal surface may be as predicted if the number of taste buds can be regarded as a functional adaptation. It could be speculated that human epiglottal taste buds may play some role in vomiting and cough reflexes.

Some workers have reported that the numbers of taste buds on the tongue diminish with increasing age (Moses et al. 1967). It was impossible to obtain samples from a spectrum of ages and so we are unable to comment on whether the low numbers of epiglottal taste buds found in this study reflect the aged sample (Weiffenbach et al. 1988). It is also possible that pathological epithelial dysplasia was present, but again we have no insight into the lifelong medical and social history of the donors.

The presence and number of human epiglottal taste buds on the posterior (laryngeal) surface of the epiglottis is exceptionally variable. By comparison with the epiglottis of other mammals, the aged human epiglottis carries few taste buds in a different pattern which suggests that they may have a less significant role in protecting the airway.

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Fig. 1. H&E stained sections of postmortem human epiglottis. (a) Atypical thickened stratified columnar epithelium from the caudal posterior epiglottal mucosa. (b) A squat epiglottal taste bud embedded in stratified squamous epithelium of the rostral posterior surface of the epiglottal mucosa.


