

## **Comparative functional structure of the olfactory mucosa in the domestic dog and sheep.**

### **Abstract:**

Olfactory acuity differs among animal species depending on age and dependence on smell. However, the attendant functional anatomy has not been elucidated. We sought to determine the functional structure of the olfactory mucosa in suckling and adult dog and sheep. Mucosal samples harvested from ethmoturbinates were analyzed qualitatively and quantitatively. In both species, the olfactory mucosa comprised olfactory, supporting and basal cells, and a lamina propria containing bundles of olfactory cell axons, Bowman's glands and vascular elements. The olfactory cells terminated apically with an expanded knob, from which cilia projected in a radial fashion from its base and in form of a tuft from its apex in the dog and the sheep respectively. Olfactory cilia per knob were more numerous in the dog ( $19 \pm 3$ ) compared to the sheep ( $7 \pm 2$ ) ( $p < 0.05$ ). In the dog, axonal bundles exhibited one to two centrally located capillaries and the bundles were of greater diameters ( $73.3 \pm 10.3 \mu\text{m}$ ) than those of the sheep ( $50.6 \pm 6.8 \mu\text{m}$ ), which had no capillaries. From suckling to adulthood in the dog, the packing density of the olfactory and supporting cells increased by 22.5% and 12.6% respectively. Surprisingly in the sheep, the density of the olfactory cells decreased by 26.2% while that of the supportive cells showed no change. Overall epithelial thickness reached  $72.5 \pm 2.9 \mu\text{m}$  in the dog and  $56.8 \pm 3.1 \mu\text{m}$  in the sheep. These observations suggest that the mucosa is better structurally refined during maturation in the dog than in the sheep.