A Histomorphological Study on the Tongue of Musk Deer (*Moschus moschiferus*)

A. R. Choudhury1,*, Massarat Khan2 and M. A. Baba3

Division of Veterinary Anatomy and Histology, Faculty of Veterinary Sciences and Animal Husbandry
SKUAST-K, Shuhama, Alusteng, Srinagar-190 006 (Jammu and Kashmir)
Received: 26 July 2013; Accepted: 23 September 2013

ABSTRACT

Tongue of four adult musk deer were processed for routine histomorphological observations. The study revealed that dorsal surface of the tongue was lined by stratified squamous keratinized epithelium. The tunica mucosa was studded with lingual papillae viz. filiform, lenticular, conical, fungiform and vallate papillae. Only a few taste buds were observed in fungiform and vallate papillae. Tunica muscularis made of skeletal muscle was arranged in three layers.

Key words: Histomorphology, Musk deer, Tongue

Tongue has very important role in the process of prehension, mastication and grooming of the animal. The structure of tongue has been studied in Bactrian camel (Yamamoto et al., 2001), buffalo (Prakash and Rao, 1980) and goat (Kumar et al., 1998) and revealed variations in morphology and distribution of papillae on dorsal lingual surface. The lack of literature led to conduct present study to investigate the histological features of the tongue of musk deer.

MATERIALS AND METHODS

The study was conducted on tongue of four adult musk deer of either sex collected from the Department of Forest and Wildlife, Srinagar. Samples collected were fixed in 10% formalin and dehydrated in a graded series of alcohol, cleared in acetone-benzene and embedded in paraffin. The sections (6 μ) were deparaffinized and stained by hematoxylin and eosin (Luna, 1968) for histomorphological observations.

RESULTS AND DISCUSSION

The tongue primarily composed of muscle fibres also presented blood vessels, nerves, adipose tissues and glands as reported earlier (Korake et al., 2002) in buffalo. The outer covering of the tongue was formed by stratified squamous epithelium. The epithelium of the dorsal surface was thickest with thickest stratum corneum as reported by Hemran and Roy (2008). Lamina propria mucosae and tunica submucosa were blended with connective tissue. The taste buds were observed on the dorsal wall of the epithelium in case of fungiform and lateral walls in case of vallate papillae. Number of taste buds was very less both in fungiform and vallate papillae of musk deer. The taste buds of the musk deer were large and irregularly ellipsoid.

Five different forms of lingual papillae were identified, viz., filiform, conical, lenticular, fungiform and vallate. The morphology of the tongue of musk deer was similar to goats (Khan et al., 2006 and Kumar et al., 1998). The numerous filiform papillae were distributed on the dorsal surface of the apex and the body of the tongue. The conical shape papillae with sharp tips were directed caudally (Fig. 1). The lining epithelium of filiform papillae was keratinized stratified squamous. The connective tissue core gave rise to several secondary papillae. The conical papillae on torus linguae were elongated with a broad round base and a blunt tip. These papillae differed from filiform papillae in terms of their large height. The lenticular papillae were limited to the torus linguae. Lenticular papillae were biconvex projections and elevated beyond the surface of tongue and were lined by keratinized stratified squamous epithelium (Fig. 2). The lenticular papillae in goat (Kumar et al., 1998) and Bactrian camel (Yamamoto et al., 2001) were on the surface of torus linguae that could served as a complementary protection of the tongue surface.

The fungiform papillae in musk deer in the sections were as a mound with a connective tissue core containing papillary body (Fig. 3) as reported by Hemran and Roy (2008) in sheep and goat. The mushroom shaped fungiform papillae of musk deer being separated from the filiform
papillae by groove was similarly reported in the goat (Kumar et al., 1998) and Bactrian camel (Yamamoto et al., 2001).

The vallate papillae were found on lateral and caudal parts of torus linguae and contained many taste buds on the lateral walls (Fig. 4). They were round to oval in shape with minute elevation from the tongue surface bearing a prominent moat or cleft. The majority of the taste pores were positioned along the lateral surface of central papilla opening into the papillary groove as in goat (Kumar et al., 1998) and bovines (Davies et al., 1979). Beneath the papillae, there were abundant seromucous Von Ebner’s glands as reported in sheep and goat (Hemran and Roy, 2008).

Lingual glands (Fig. 5) were observed partly in the lamina propria submucosa and partly in the intermuscular tissue. These glands were abundant in the root of the tongue. Von Ebner’s glands were seromucous in nature. Tunica muscularis made of skeletal muscle was arranged in three layers. Abundant seromucous compound tubuloalveolar glands were embedded within the deeply oriented skeletal muscles. Abundant adipose tissue was present in between muscle bundles towards deeper aspect of the tongue specially towards root of tongue.

**ACKNOWLEDGEMENTS**

The authors are highly thankful to the Department of Wildlife and Forest, Government of Jammu and Kashmir for providing the sample. This study is the part of our Research Project which is fully sponsored by S.K. University of Agricultural Sciences and Technology, Kashmir, Srinagar.

**REFERENCES**


