

HISTOMORPHOLOGICAL AND HISTOCHEMICAL STUDIES ON THE VENTRAL BUCCAL GLAND OF SHEEP (OVIS ARIES)

A. D. SINGH, R. K. JAIN* and PAWAN KUMAR

Department of Veterinary Anatomy, College of Veterinary Sciences
Lala Lajpt Rai University of Veterinary & Animal Sciences, Hisar-125 004

ABSTRACT

The histomorphology and histochemistry of the ventral buccal gland were studied in ten healthy adult sheep of local mixed breed of either sex. Histologically, it was a compound tubulo-alveolar gland having sero-mucous nature with predominance of serous alveoli. Histochemically, the mucous as well as serous alveoli of this gland exhibited negative reaction to all histochemical staining techniques indicating the absence of mucopolysaccharides, mucin, glycogen and lipids on the ventral buccal gland of sheep.

Key words: Histomorphology, histochemistry, micrometry, ventral buccal gland, sheep

Saliva plays a great role in proper digestion in ruminants which is secreted from major and minor salivary glands. It helps in restoration of normal ruminal pH and microbial protein synthesis to be used as dietary proteins. The literature on ventral buccal gland is scanty and sparse particularly in sheep. Hence, histomorphological and histochemical studies on ventral buccal gland of sheep were undertaken.

MATERIALS AND METHODS

The present study was conducted on ten healthy adult sheep of local mixed breed of either sex. The tissues of ventral buccal gland from rostral, middle and caudal regions were collected and processed for paraffin and frozen sectioning techniques. The sections were stained with Harris' haematoxylin and eosin stain for histomorphological studies, Gomori's stain for reticular fibres, Weigert's method for elastic fibres, Alcian blue for mucosubstances (pH 2.5), PAS-Alcian blue method for mucosubstances (pH 2.5), Best's carmine method for glycogen, McManus' PAS method for glycogen, diastase digestion method, Mayer's mucicarmine method for mucin, Sudan black B method for fats, oil-red-o in propylene glycol method for fats (Luna, 1968), Crossman's trichrome stain for collagen

fibres (Crossman, 1937), Colloidal iron stain for acid mucopolysaccharide (Thompson and Hunt, 1966) and Nile blue method for neutral and acidic lipids (Drury and Wallington, 1967). Micrometry was done with the help of an ocular micrometer.

RESULTS AND DISCUSSION

Histologically, the ventral buccal gland was compound tubuloalveolar type as reported earlier (Stinson and Calhoun 1993; Gupta *et al.*, 2002). This gland was sero-mucous in nature with predominance of serous alveoli and was surrounded by a capsule having loose irregular connective tissue with varying distribution of collagen, reticular and elastic fibres and the striated muscle fibres. Dellmann (1971) reported that the ventral buccal glands in small ruminants were purely serous in nature. Contrary to these, Trautmann and Fiebiger (1957) reported that the dorsal division of ventral buccal glands in sheep and goat was purely mucous. The connective tissue septae divided the parenchyma into lobes and lobules. The mucous alveoli were large and of varying shape and dimensions measuring 57.70-74.12 μm (average 68.15 μm) in diameter. The pyramidal shaped cells had round to oval nuclei being placed close to the basement membrane. The epithelial height of the cells measured 12.83-22.70

*Corresponding author: rkvj2008@gmail.com



Figs 1-3. 1. Photomicrograph of ventral buccal gland of sheep showing the presence of serous alveoli (S) in the glandular parenchyma. Intralobular duct (D) can also be seen (H. & E. x 400). 2. Photomicrograph of ventral buccal gland showing strong PAS positive material in interlobular duct (D1) which was negative in intralobular duct (D2) and serous alveoli (S) (McManus' PAS method x 100). 3. Photomicrograph of ventral buccal gland showing strong positive reaction for colloidal iron in interlobular duct (D1) but negative in intralobular duct (D2) and serous alveoli (S) (Colloidal iron method x 400).

μm (average $17.91 \mu\text{m}$). The chromatin material was dense, homogenous and darkly basophilic masking the presence of nucleoli. The cytoplasm was finely granular and light eosinophilic with a foamy appearance because of washing of mucin during the processing. The lumen was small, narrow and ranged from $6.73\text{--}14.50 \mu\text{m}$ in diameter (average $10.13 \mu\text{m}$). At places the serous demilunes capping the mucous alveoli were observed. The serous alveoli were round to oval to elongated in shape with varying dimensions (Fig. 1). The alveolar diameter ranged from $16.29\text{--}27.75 \mu\text{m}$ with an average of $23.1 \mu\text{m}$. The epithelial height of the cells measured from $3.72\text{--}8.31 \mu\text{m}$ (average $5.83 \mu\text{m}$). The nuclei were round to oval and were localized towards the basal portion of the cell. The luminal diameter ranged from $2.69\text{--}9.58 \mu\text{m}$ (average $4.12 \mu\text{m}$). The cytoplasm was finely granular and eosinophilic and contained seromucogenic granules which increased the eosinophilia towards the apical portion (Fig. 1). Large nerve bundles and medium sized blood vessels were present in the connective tissue along with striated muscles. Collagen and reticular fibres along with a few elastic fibres were dispersed in between the alveoli forming interstitial connective tissue. The mucous as well as serous alveoli of ventral buccal gland exhibited negative reaction to all histochemical staining techniques carried out in this study indicating the absence of mucopolysaccharides,

mucin, glycogen and lipids. Small and large intralobular ducts were negative (-) but secretions presented in these ducts were strongly (+++) positive by McManus (Fig. 2), Alcian blue, colloidal iron (Fig. 3) and PAS-AB methods whereas mild (+) reaction by oil-red-o method. Serous ducts were positive and having high neutral mucopolysaccharides as compared to acidic mucopolysaccharides.

REFERENCES

- Crossman, G.A. (1937). A modification of Mallory's connective tissue stain with a discussion of principles involved. *Anat. Rec.* **69**: 33-38.
- Dellmann, H.D. (1971). *Veterinary Histology-An Outline Text Atlas*. Lea and Febiger, Philadelphia, USA.
- Drury, R.A.B. and Wallington, E.A. (1967). *Carlton's Histological Techniques*. (4th edn.), Oxford University Press, New York.
- Gupta, M.K., Gupta, A.N. and Jain, R.K. (2002). Histomorphology and histochemistry of adenomeres of ventral buccal gland in buffalo (*Bubalus bubalis*). Proceedings 17th Annual Convention of Indian Association of Veterinary Anatomists held on 14-16 November, 2002 at Mumbai.
- Luna, L.G. (1968). *Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology*. (3rd edn.), McGraw Hill Book Company, New York.
- Stinson, A.W. and Calhoun, M.L. (1993). *Text Book of Veterinary Histology*. (4th edn.), Lea and Febiger, Philadelphia, USA.
- Thompson, S.W. and Hunt, R.D. (1966). *Selected Histochemical and Histopathological Methods*. Charles C. Thomas, Springfield, Illinois, USA.
- Trautmann, A. and Fiebiger, J. (1957). *Fundamentals of the Histology of Domestic Animals*. Comstock Publishing Associates, Ithaca, New York, USA.