

Histochemical studies on the cervix of buffalo (*Bubalus bubalis*) during post natal development

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ABSTRACT

Histochemical studies were conducted on the cervix of 24 Indian buffaloes of 4 age groups of 6 animals each viz. neonatal, prepubertal, cyclic and pregnant. The study revealed that among various groups the distribution of neutral mucopolysaccharides (NMPS), acid mucopolysaccharides (AMPS), basic protein, glycogen and lipid was comparatively better localized in the cervix of neonates. This better localization may be related with their growth and physiological requirement. However, increased NMPS during pregnancy may be due to increased concentration of mucoproteins in cervical mucosa required to form the mucous plug of pregnancy.

Key words : Buffalo, Cervix development, Histochemistry of cervix

The present study was conducted to elucidate the detailed age correlated histochemical changes that occur in different components of cervix of Indian buffalo (*Bubalus bubalis*).

MATERIALS AND METHODS

Cervix of 24 Murrah buffaloes which were divided into 4 groups of 6 animals each, viz. neonatal (up to 1 month), prepubertal (below 2 years), cyclic (in dioestrus phase) and pregnant (in early pregnancy). The genitalia were collected from Ludhiana dairy complex and Saharanpur abattoir after proper examination. Tissues were fixed in 10% neutral-buffered formalin and bouin's solution and processed by Luna (1968) method. Paraffin sections 5-7 μ m thick were stained by Periodic-acid Schiff to demonstrate neutral mucopolysaccharides (Sheehan and Hrapchak 1973), Alcian blue at pH 2.5 for acid-mucopolysaccharides (Luna 1968), mercury bromophenol blue for basic proteins (Pearse 1968) and best carmine for glycogen (Luna 1968). To demonstrate lipids, tissues were collected in liquid nitrogen and cryostat sections 10 μ m thick prepared and stained by Sudan Black B and Oil Red O methods (Chayen *et al.* 1969).

RESULTS AND DISCUSSION

Neutral mucopolysaccharides (NMPS)

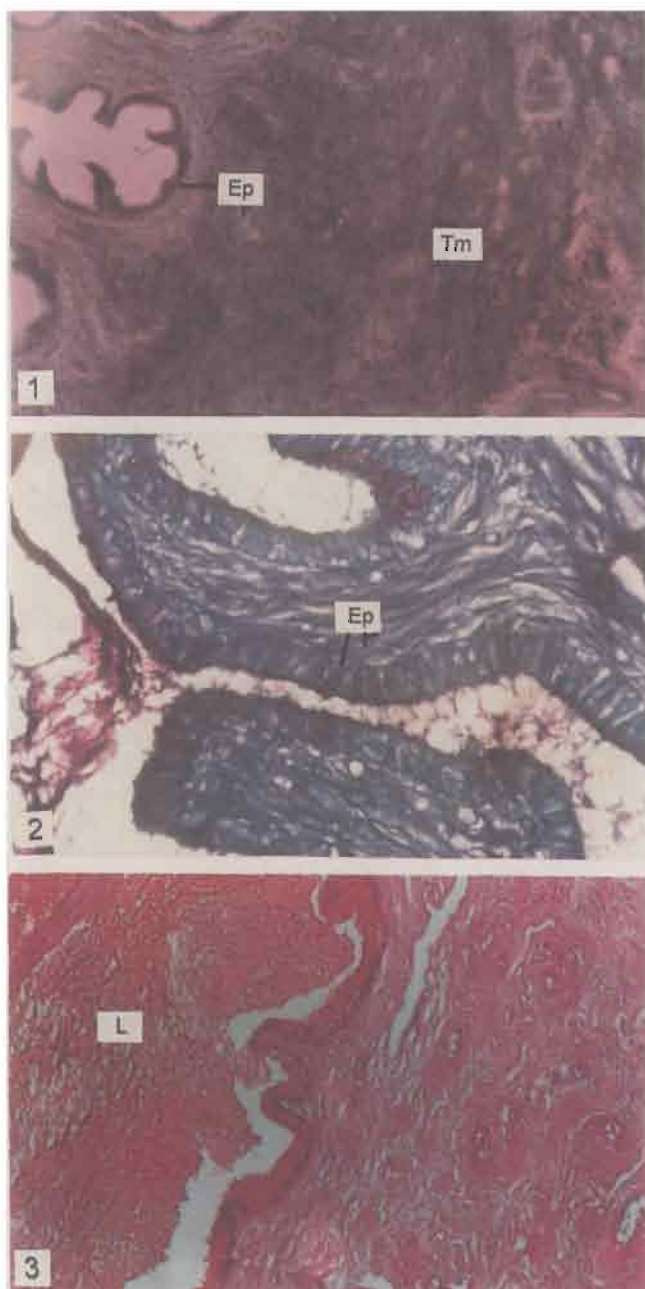
The comparative localization of NMPS was higher in the tunica mucosa of cervix of neonatal buffalo calves and prepubertal buffaloes. It decreased in cyclic buffaloes during

dioestrus, but markedly increased during pregnancy (Fig. 3). The higher amount of mucopolysaccharides in neonatal, prepubertal and pregnant animals may be related with their growth and physiological requirement. Increased NMPS during pregnancy may be related with increased concentration of mucoprotein in cervical mucus required to form mucus plug of pregnancy. The distribution of NMPS appeared to be comparatively better in the tunica muscularis of prepubertal buffaloes and onwards. In tunica serosa, it was almost the same in all age groups. Marinov and Lovell (1967) reported in cattle, Fateh and EL-Naggar (1975) and Raizada *et al.* (1978) in buffalo, and Joshi *et al.* (1983) in goats that the PAS reactivity in the cervical epithelium varied in its distribution in the folds with the phases of reproductive cycle. Joshi *et al.* (1983) related the PAS positivity of cervical secretions with glycogen and mucoproteins.

Acid mucopolysaccharides (AMPS)

The overall reaction for AMPS was weak to moderate in various components of cervix, except in neonates in which the reaction was more in lamina propria and tunica muscularis layers (Fig. 2). Wordinger *et al.* (1972) also reported predominance of sulphated acid mucosubstances in non-ciliated cells of the bovine cervical epithelium. A moderate alciphilic reaction, more towards the apical border of epithelium, was observed particularly in pregnant buffaloes which supported the earlier finding of Joshi *et al.* (1983) who also observed AB positive reaction in the apical parts of the epithelial cells and in the luminal secretion of pregnant goat cervix. The AMPS content in the cervical mucus may be chondroitin sulphate.

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Figs 1-3 1. Cryostat section of cervix of neonatal buffalo calf showing Sudanophilic lipid droplets in epithelium (Ep) and tunica muscularis (Tm). Sudan black B \times 70. 2. Section of cervix of cyclic buffalo showing AB-PAS positive reaction in the epithelium (Ep). Alcian blue - Periodic Acid Schiff \times 140. 3. Section of cervix of pregnant buffalo showing PAS positive luminal contents (L). Periodic Acid Schiff \times 70.

Glycogen

In neonates, the reaction for glycogen was moderate to strong in lamina epithelialis, cervical glands and luminal contents of cervix. It was weak in the cyclic animals but increased to moderate in other groups. Joshi *et al.* (1983) observed best

carmine positive secretion during estrus and also during pregnancy in goat. High content of glycogen in cervical tissue of neonates may be related to energy requirement for tissue nutrition during cellular differentiation in the uterine tissue.

Basic protein

A moderate to strong reaction for basic protein was observed in tunica mucosa of neonates and cyclic buffaloes. The reaction decreased slightly in prepubertal and pregnant buffaloes. The tunica muscularis showed weak to moderate reaction for basic protein in all the animals except cyclic where the reaction was strong.

Lipid

The cervix of neonatal buffalo calf showed high amount of Sudanophilic and Oil Red O positive lipid droplets, though in other groups of buffaloes a general weak to moderate reaction was observed in all the components of cervix (Fig. 1). Fateh and El-Naggar (1975) reported maximum fat during luteal phase of estrous cycle in Egyptian buffaloes. High content of lipid in neonatal buffalo calves may be related to high energy requirement during cellular proliferation and differentiation of cervical tissue during neonatal development.

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