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Research Article

SCANNING ELECTRON-MICROSCOPIC STUDIES ON THE SUBCOMMISSURAL ORGAN, REISSNER'S FIBRE AND PINEAL GLAND OF THE BUFFALO CALVES

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ABSTRACT

The present study was conducted on five young male buffalo calves to explore ultrastructural surface features of the subcommissural organ, Reissner's fibre and pineal gland. The subcommissural organ was characterized by presence of apical spherical protrusions and tufts of cilia. Reissner's fibre as cord like structure was constituted by cilia, microvilli and heterogeneous material including the cell debris and extended cranio-caudally towards the ventral surface of the subcommissural organ. Its rough irregular surface and presence of longitudinal grooves reflected functional cleansing capacity in cerebrospinal fluid. The pineal gland showed round to oval pinealocytes with their processes, a few glia cells and fibrous network.

Key words: Subcommissural organ, Reissner's fibre, pineal gland, SEM, buffalo calves

Neurosecretions of the subcommissural organ (SCO) are similar to those of neurohypophysis and hypothalamus indicating glandular and secretory activity of this organ in domestic animals (Talanti, 1958). The secretory material of SCO in saline infused cats plays an important role in the homeostasis of diuresis and regulation of blood pressure (Murphy and Wood, 1966). Reissner's fibre (RF) was observed as a thin string like structure of regular shape resembling the axis cylinder with characteristic high refringence and lying free within the central canal of primates (Reissner, 1860). An organic and functional connection has been postulated between RF and SCO highlighting a supportive role of SCO to RF which was attributed by transmission of the optical reflexes from mid-brain roof to the body musculature (Sargent, 1904). RF was considered as a mechanoreceptor which served to indicate variations in CSF pressure through supraependymal nervous pathways to the choroid plexuses and to the circumventricular organs (Kolmer, 1921). Description on scanning electron-microscopy of these organs in buffalo is not available in the literature. Due to above significance of the SCO, the present study was envisaged to explore the surface features of the SCO, RF and pineal gland in the buffalo calves.

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MATERIALS AND METHODS

The present study was conducted on five young male buffalo calves (1-1½ years age). Brain tissues extending from mammillary body to rostral limit of corpora quadrigemina were collected immediately after death of buffalo calves in the slaughterhouse. After thorough washing in 0.1 M phosphate buffer (pH 7.4), the tissues were fixed for 8 h in 2 per cent glutaraldehyde. Mid sagittal section of the tissues were then cut and washed with the phosphate buffer to expose the SCO, RF and the internal structure of pineal gland. Dehydration, critical point drying, sputter coating and viewing in scanning electron-microscope (Leo-435 VP, Japan) were carried out at EM Laboratory, AIIMS, New Delhi.

RESULTS AND DISCUSSION

Subcommissural organ having a specialized ependyma was present beneath the posterior commissure and extended from recessus