Light Micro and Ultrastructural Studies on the Coagulating Gland of Albino Rat
(Roscopic and rattus Norvegicus)

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ABSTRACT

The coagulating gland in the rat was compound tubular accessory sex gland. The parenchyma consisted of the secretory units and ducts lined by simple cuboidal or low columnar epithelium which formed folds inside the compartments. The secretory activity was merocrine and apocrine. Ultrastructural study revealed secretory cells of different electron density. These cells had oval nuclei with small nucleoli and the peripheral chromatin. In the cytoplasm, the endoplasmic reticulum was mostly located in the perinuclear area and was granular having studded with ribosomes. The mitochondria, smooth endoplasmic reticulum and the Golgi apparatus were also observed at various locations. The cytoplasm also contained the secretory granules and the vacuoles of different sizes towards the luminal side. The luminal surface had the surface microvilli.

Key words: Albino rat, Coagulating gland, Histomorphology, Ultrastructure

RESULTS AND DISCUSSION

The coagulating gland of either side was closely but asymmetrically located along the inner curvature of the seminal vesicle. It was compound tubular and surrounded by a dense irregular connective tissue capsule with variable amount of collagen and reticular fibres along with smooth muscle fibres. Trabeculae radiating from the capsule formed a network in the interior of the gland dividing it into compartments of different sizes. The parenchyma of the gland consisting of the secretory units and the ducts were lined by simple cuboidal or low columnar epithelium which projected into the lumen and formed folds inside the compartments. Some of the folds detached and were seen as isolated units within the lumen of the compartments amidst the secretory product (Fig. 1). Myoepithelial cells were observed interposed between the base of the secretory cells and the basement membrane. The loose connective tissue of the stroma was highly vascularized and was continuous with the dense connective tissue of the trabeculae. The stroma was consisted of reticular fibres and a few smooth muscle fibres. Smooth muscle cells were present in the internal sex organs and they indirectly influenced their sympathetic nerves in maintaining the density of innervation at normal levels (Wilson and French, 1980).

MATERIALS AND METHODS

The coagulating glands were collected from ten albino rats sacrificed from the control group of the experiments conducted with the approval of Institutional Animal Ethics Committee in the Department of Pharmacology and Toxicology, NTR College of Veterinary Science, Gannavaram. The tissue pieces were fixed in 10% neutral buffered formalin and Bouin’s fixatives for histological studies and were processed (Luna, 1968). For transmission electron microscopy, the freshly collected tissue pieces were fixed in 2.5% glutaraldehyde in 0.05 M phosphate buffer (pH 7.2) for 24 hours at 4°C and post-fixed in 2% aqueous osmium tetroxide in the same buffer for 2 hours. The specimen preparation, staining and the observations at various magnifications under the transmission electron microscope were done as per the methods described by Bozzola and Russell (1998).
A variation in the height of the epithelial cells observed was dependent on the secretory activity of the gland. The cells were normally cuboidal with a rounded to oval nucleus at the centre but with increased secretory activity they became low columnar in shape. Most of the columnar cells showed the discharged secretory product along the cell surface indicating a merocrine mode of secretion whereas, some of the columnar cells possessed apical blebble projections into the acinar lumen indicating an apocrine mode of secretion. The discharged secretory product was observed within the different compartments. While some compartments showed little or no secretions, others showed moderate to abundant secretions indicating that the secretory activity was variable in the different compartments of the gland.

Stephanie et al. (1999), however, described simultaneous apocrine and merocrine secretion in the rat coagulating gland. Wilhelma et al. (1999) also reported that the coagulating gland of the rat synthesized two prevalent secretory proteins that were discharged parallelly but via different extrusion mechanisms.

Ultrastructurally, secretory cell of different electron density were observed having the oval nucleus with the small nucleolus and the peripheral chromatin. The endoplasmic reticulum was mostly located in the perinuclear area and was granular and studded with ribosomes. The mitochondria, smooth endoplasmic reticulum and the Golgi apparatus were also observed at various locations. The secretory granules and the vacuoles of different sizes were observed towards the luminal side. The luminal surface showed the surface microvilli (Fig. 2).

Hawkins and Geuze (1977) described that ultrastructurally the coagulating gland had large cisternae of rough endoplasmic reticulum (RER) and few condensing vacuoles or secretory granules. The lumen showed fragmentation vesicles that were bounded by a unit membrane and appeared to arise from microvilli. The light cells were characterized by reduced RER cisternae, an electron lucent cytoplasm, and atrophic Golgi apparatus. Wilhelma et al. (1999) demonstrated that the secretory proteins were localised in the cytoplasm of coagulating gland epithelial cells.

REFERENCES