

Ultrastructural studies on the ultimobranchial bodies of freshwater turtle *Lissemys punctata granulosa*

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Summary

In the background that there is scanty literature on the ultrastructure of ultimobranchial bodies of the fresh-water turtles, this paper describes the ultrastructure of the gland of freshwater turtle *Lissemys punctata granulosa*. The gland was dissected out and subjected to transmission electron microscopic analysis to examine the structure of the gland. The gland is composed of a single type of cells with a few secretory granules of similar size, large cytoplasmic bodies, Golgi region, and fewer mitochondria.

Key words: Fresh-water turtle, ultimobranchial bodies, electron microscopy

Introduction

The ultimobranchial body is implicated as an endocrine gland since it is considered to have homology with thyroid parafollicular 'C'-cells of mammals. The function of the ultimobranchial body of non-mammalian vertebrates is only incompletely understood. There are reports on the ultrastructural organization of ultimobranchial body of chicken (Malmqvist et al., 1968; Stoeckel and Porte, 1969; Chan et al., 1969), pigeon, dove (Stoeckel and Porte, 1969), toad, frog (Robertson and Bell, 1965; Robertson, 1968; Coleman, 1970) and trout (Robertson, 1969). Pearson and Welsch (1968) reported the presence of ultimobranchial body in the hedgehog. Ultimobranchial tissues are present in the freshwater turtle *Chrysemys picta* and *Pseudemys scripta* (Khairallah and Clark, 1971; Grandi, 1982). As there are only very few reports on the ultrastructural organization of the reptilian ultimobranchial bodies, this study was undertaken to describe the cellular features of the ultimobranchial gland of the fresh-water turtle *Lissemys punctata granulosa*.

Materials and Methods

The animals were collected from the suburbs of Mumbai (India). Five adult male animals, weighing 400 to 500g, were dissected during March to May under sodium pentobarbital anesthesia to expose the ultimobranchial bodies. The gland was separated from the surrounding tissue and fixed in 3% glutaraldehyde and 1% osmium tetroxide. Ultrathin sections were cut in an ultramicrotome (LKB-Bromma, Stockholm, Sweden) and examined in a Joel 100S transmission electron microscope.

Observations

The ultimobranchial body of the turtle *Lissemys punctata granulosa* was found to consist of only one

epithelial cell. The nucleus of this cell is generally euchromatic with a thin patch of heterochromatin underlying the nuclear envelope and varying amounts of clumps of heterochromatin throughout the nucleoplasm. There is a single nucleolus (Fig. 1). The cytoplasm contains small electron-dense secretory granules. There are some empty vesicles also, closer to the plasma membrane. A few large dense vesicles were also observed (Fig. 2). Mitochondria, randomly distributed throughout the cytoplasm, are spherical to rod-shaped, with lamellar cristae, but in a few mitochondria the cristae are collapsed (Fig. 2). The Golgi complex is less characteristic, and occurs as stacks of straight cisternae with dilated ends (Fig. 3).

Discussion

The ultrastructure of ultimobranchial body of the turtle *Lissemys punctata granulosa* is similar in many respects to those of other animals. Though Stoeckel and Porte (1969) and Chan et al. (1969) found two cell types in the ultimobranchial body of chicken, in this study on turtle only one cell type was present. The presence of a single ultimobranchial cell in the turtle *Lissemys punctata granulosa* is in agreement with the observation made by Khairallah and Clark (1971) in the turtles, *C. picta* and *P. scripta*, and Jadhav and Padgaonkar (2009) in *Lissemys punctata*. The presence of empty vesicles suggests the remains of the discharged secretory granules. The large cytoplasmic vesicles close to basal lamina have been reported in frog ultimobranchial cells (Robertson, 1965; Chan et al., 1969). The observations made in freshwater turtle *Lissemys punctata* ultimobranchial gland are in agreement with those made in the freshwater turtle *P. scripta* (Khairallah and Clark, 1971; Grandi, 1982).

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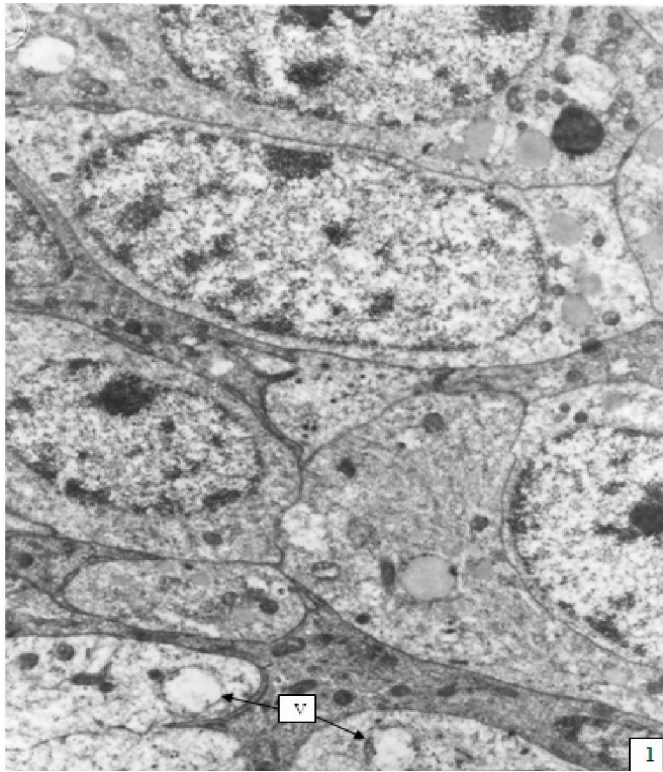


Fig. 1. Electron micrograph of ultimobranchial cells in *Lissemys punctata granulosa*, showing empty vacuoles (V). x10,000.

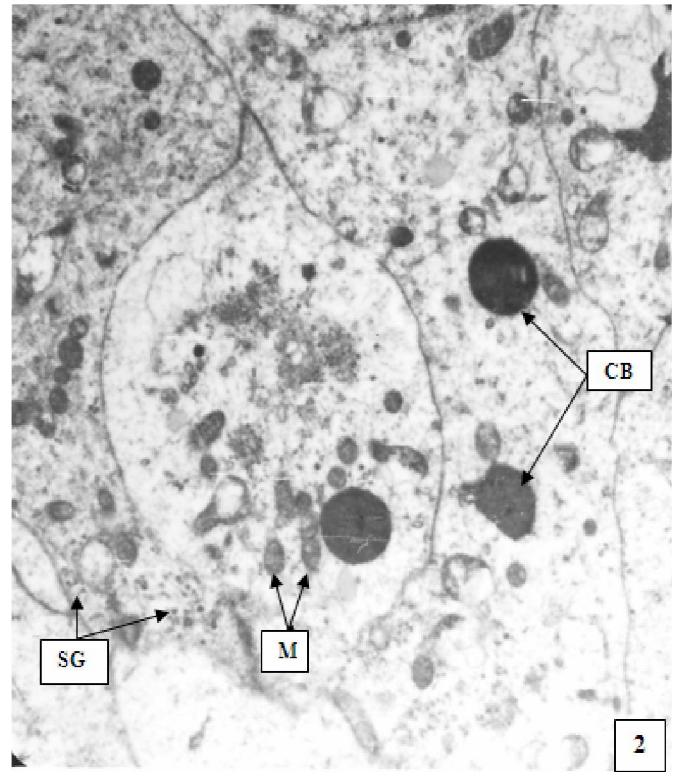


Fig. 2. Electron micrograph of ultimobranchial cells in *Lissemys punctata granulosa*, showing secretory granules (SG), mitochondria (M), and cytoplasmic bodies (CB). x10,000.

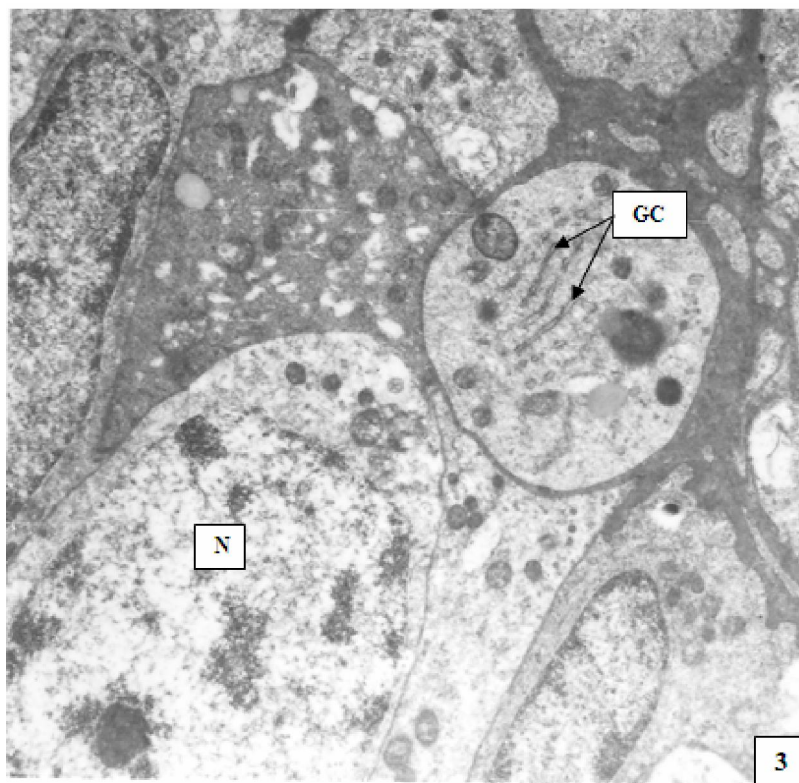


Fig. 3. Electron micrograph of ultimobranchial cells in *Lissemys punctata granulosa* showing Golgi complex (GC) and nucleus (N). x10,000.

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