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Light microscopic study of parathyroid and ultimobranchial glands of the freshwater turtle *Lessemys punctata granusa*

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SUMMARY

The fresh-water turtle *Lessemys punctata granusa*, possess two pairs of parathyroid glands. The anterior or rostral parathyroid are generally embedded in the thymus tissue. The posterior parathyroids lie between the aortic arches. Each parathyroid gland is surrounded by a connective tissue capsule and is composed of elongated cell cords and follicles. This turtle possesses a single pair of ultimobranchial glands located bilaterally, which are closely associated with the posterior pair of parathyroid glands. The ultimobranchial glands possess cells arranged in the form of follicles around a central lumen of varied sizes.

Key-words: Fresh-water turtle, parathyroid gland, ultimobranchial gland

Introduction

There are only very few histomorphological studies on the parathyroid and ultimobranchial glands of reptiles. Of all the groups of reptiles, Chelonia is the least studied. The turtle possesses two pairs of parathyroid glands (PTGs), a posterior pair located near the aorta and an anterior pair embedded in the thymus. However, some workers reported only one pair of parathyroid in the turtles (Doyon and Kareff, 1904; Thompson 1910).

The histology of the parathyroid gland varies from one group of reptiles to another. The parathyroid of almost all reptiles so far studied show the presence of cell cords. However, presence of a few a follicles has been noticed in the young ones of two species of fresh-water turtles and this cannot be dismissed as due to aging (Clark, 1965) since follicles were observed in the parathyroid of aged mammals.

Similarly, very few studies have been made on the ultimobranchial glands (UBGs) of reptiles. Franceson (1929) reported the presence of only the left UBGs. A survey of literature indicates many discrepancies regarding the ultimobranchial glands in reptiles. All these facts indicate that, for a generalization, additional investigation on turtle is needed. Hence, the present work was undertaken in the in fresh-water turtle *Lessemys punctata granusa*.

Materials and Methods

Turtles of both the sexes were collected from the suburbs of Mumbai (India). The animals were dissected under sodium pentobarbital anesthesia. The PTGs, UBGs and thymuses were located with the help of a dissecting microscope. The organs along with the surrounding tissues were removed surgically and fixed in Bouin's fluid, embedded in paraffin wax and sectioned serially at 5 µm thickness. The sections were stained with hematoxylin and phloxin.

Observations

Parathyroid gland

The fresh-water turtle *Lessemys punctata granusa* possesses two pairs of parathyroid glands. The anterior or rostral parathyroid gland (rPTG) is embedded in the thymus tissue (Figs. 1, 2) and is difficult to locate it with the naked eye. The posterior or caudal parathyroid (cPTG) lies between the aortic arches, in close association with the ultimobranchial body (Fig. 1, 3). It is a pinkish body, which is visible to a naked eye. In a stained section it shows to possess a connective tissue capsule, conspicuously arranged parenchyma-like cellular cords and a few follicles (Fig. 4). The cells are of single type, with oval nuclei and faintly staining granular cytoplasm. Oxyphil cells and accessory tissue were absent.

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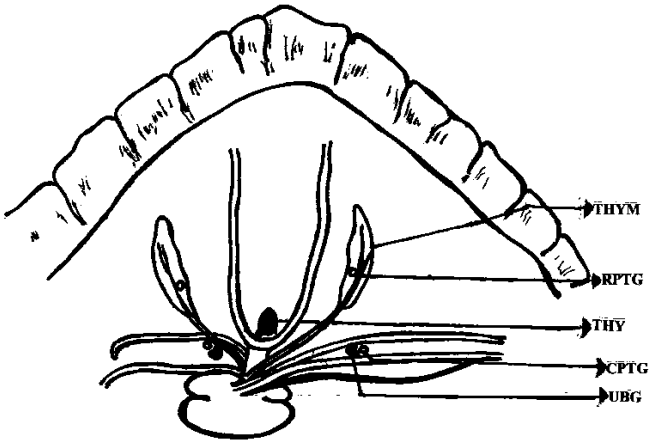

Fig1: Diagram showing the anatomical position of the endocrine gland of the fresh water turtle *Lessemys punctata granusa*. THYM- Thymus; RPTG-Rostral parathyroid gland; CPTG-Caudal parathyroid gland; THY - Thyroid; UBG -Ultimobranchial gland

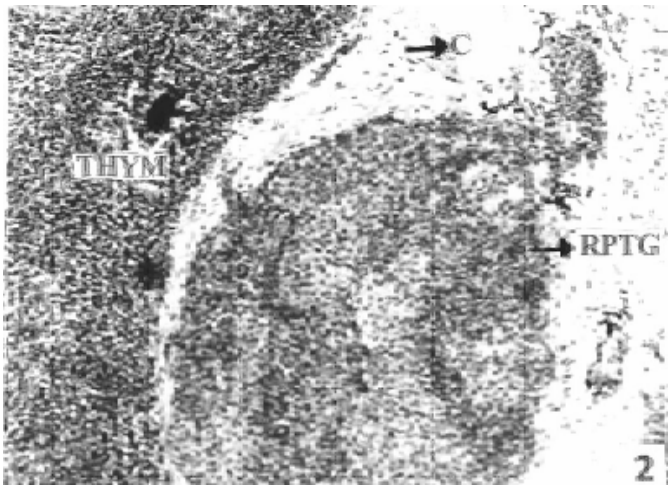

Fig 2: Photomicrograph of the (anterior) rostral parathyroid gland in the fresh-water turtle *Lessemys punctata granusa*. (X 125). C- Capsule; THYM - Thymus ; RPTG- Rostral parathyroid gland

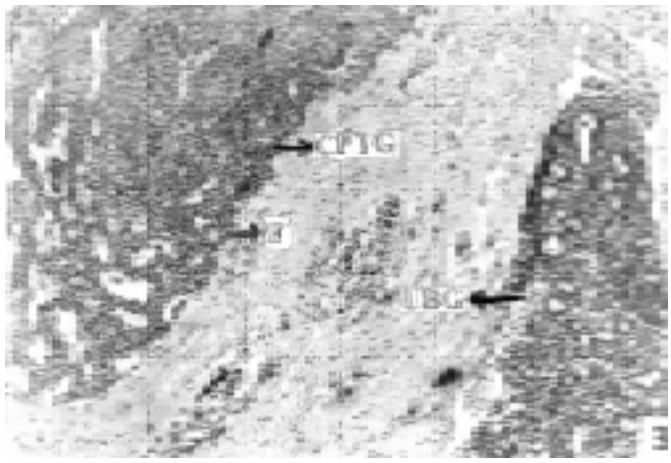

Fig 3: Photomicrograph of the (posterior) caudal parathyroid gland and ultimobranchial gland in close association with each other in the fresh-water turtle *Lessemys punctata granusa*. (X 125). F- Follicles. CPTG - Caudal parathyroid gland; UBG -Ultimobranchial gland

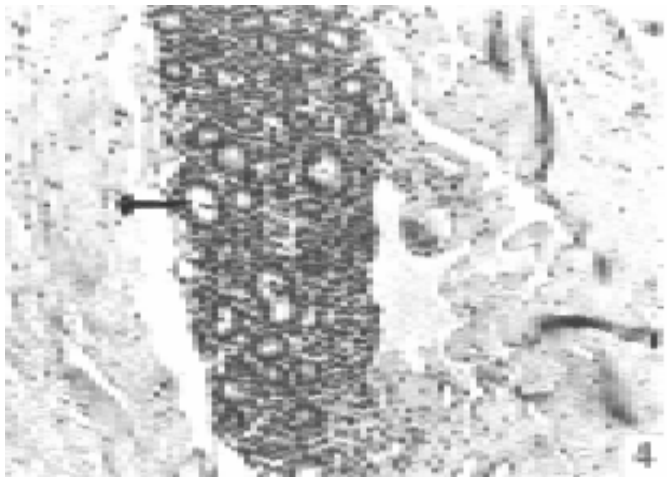

Fig 4: Photomicrograph of ultimobranchial gland showing follicles in the fresh-water turtle *Lessemys punctata granusa*. (X250). F- Follicles.

Ultimobranchial gland

The fresh-water turtle *Lessemys punctata granusa* possesses a single pair of UBGs. The UBGs are equal sized, bilaterally located, highly vascularized yellow bodies, closely associated with the posterior pair of PTGs (Fig. 1, 3). The gland is composed of cuboidal epithelial cells with rounded or oval nuclei, arranged in a follicular pattern, around central lumen (Fig. 5).

Discussion

The presence of two pairs of parathyroid in *Lessemys punctata granusa* matches with the observation made by Shaner (1921 a, b), Johnson (1922), Clark (1965, 1967, 1970) in different chelonians. As reported by Clark (1965, 1967), accessory parathyroid tissue was found to be absent in this fresh-water turtle. The presence of the connective tissue capsule in the fresh water turtle parathyroid is in accordance with the report in respect of ophidians (Singh and Kar, 1983 a, b, 1985; Padgaonkar and Warbhuwan, 1991; Padgaonkar et al., 1992; Jadhav and Padgaonkar, 2007). The glandular parenchyma with cord-like arrangement of a single type of cells around follicles compares favorably with those reported in the parathyroid of the turtle *Pseudemys scripta* (Thompson, 1910), *Graptemys pseudogeographica* and *Chrysemys picta* (Clark, 1965, 1970). Oxyphil cell, reported in some

species of fresh-water turtles (Clark and Khairallah, 1972), was found to be absent in *Lessemys p. granusa*.

Location and occurrence of single pair of ultimobranchial glands in *Lessemys punctata granusa* is in agreement with the observation made in other turtles (Johnson, 1922; Sehe, 1969; Clark, 1971). The follicular arrangement of cells around central lumina is similar to that reported in the other turtles (Clark, 1971). Ciliated and goblet cells found in the follicular epithelium of some lizards and snakes (Das and Swarup, 1975; Anderson and Capen, 1976; Singh and Kar, 1983 a, 1985; Padgaonkar and Warbhuwan, 1991; Warbhuwan and Padgaonkar, 1993; 2002a, b) were found to be absent in this turtle.

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