

Mast cell in the corpuscles of Stannius of an airbreathing fish (*Heteropneustes fossilis*)

The corpuscles of Stannius (CS) are small endocrine glands located in or around the kidneys of only teleostean and holostean fishes. These glands are unique, as they have not been identified in any other vertebrate group¹. Till now, the only function definitively shown to be regulated by its hormone, the Stanniocalcin, a homodimeric glycoprotein, has been gill calcium transport². Similarly very little is known about the mechanism of regulation of Stanniocalcin as no factors like other hormones, nervous system, the age, diet or seasons, etc. have been identified with certainty to influence the secretion^{3,4}. Here we report the presence of mast cell in the CS for the first time and its possible significance.

The mast cell amidst the cellular parenchyma of CS of *Heteropneustes fossilis*, an airbreathing teleost, was noticed during the cell population studies.

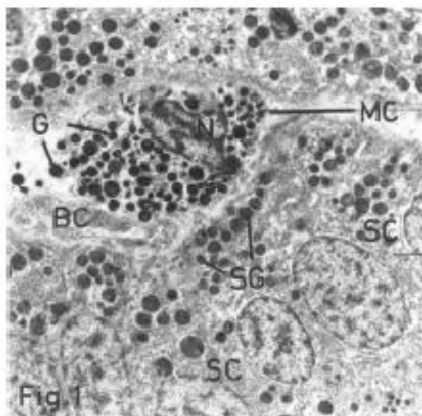


Figure 1. Electron micrograph of a portion of corpuscles of Stannius of *H. fossilis*, showing a mast cell (MC) near a blood capillary (BC). The mast cell is packed with electron dense granules (G) of various sizes and a large nucleus (N). Surrounding Stannius cells (SC) with secretory granules (SG) are also visible ($\times 14000$).

The CS of *H. fossilis* consists of closely packed cells arranged in whorls. These cells are rich in granular endoplasmic reticulum and electron dense large granules in the apical zone (Figure 1). The mast cell is located adjacent to the apical zones of the Stannius cells and closely associated with the blood capillary. The cytoplasm of the mast cell is packed with a large number of membrane bound electron dense bodies of variable size. The nucleus of the mast cell is large and irregular in shape.

It is generally accepted that CS is regulated by calcium ions present in the surrounding water. Recent observations^{4,5} also suggest that CS cells are extremely sensitive to changes in ionic calcium level as, other ions like magnesium, sodium, chloride, etc. do not evoke any response. Reports^{6,7} that cultured CS glands of European eel are nonresponsive to calcium are also available, thus contradicting the notion that Stanniocalcin is regulated by calcium only.

Mast cells are phenotypically and functionally versatile effector cells. It is also known that mast cells produce and release a diverse array of mediators like 5-hydroxytryptamine, heparin, serotonin, histamine, lipid mediators, etc. The presence of mast cells at strategically important locations, i.e. near the blood capillary and secretory cells is suggestive of a functionally important role. We suggest that the mast cell is acting as an intraglandular fine tuner for the secretion of Stanniocalcin in paracrine fashion. The linkage of mast cell in the secretory process may be as follows. Calcium of the blood stimulates mast cell to release mediator serotonin or other substances, which acts directly on the Stannius cells or alternatively causes vasodilation resulting in increased flow of blood, thus carrying

the secretory product at an enhanced rate. The location of mast cell gives it a unique opportunity to influence both release and transport of Stanniocalcin.

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M. FIROZ AHMAD[†]
A. ALIM
K. P. MISHRA
B. CHAKRABORTY
S. E. WENDELAAR BONGA*

*Department of Zoology,
Ranchi University,
Ranchi 834 008, India*

**Department of Animal Physiology,
University of Nijmegen,
The Netherlands*

*[†]For correspondence.
e-mail: firoz_runv@yahoo.com*