C-19

Gill Ultrastructure of the Spiny Top Shell, *Batillus cornutus* (Gastropoda: Turbinidae)

***Gwi Gwon Jung, Jae Woo Lee, Jung Jun Park, Jung Sick Lee**
Department of Aqualife Medicine, Yosu National University, Yeosu 550-749, Korea

Introduction

Prosobranchs possess bipectinate gills (resembling a comb) for respiration. The mantle cavity of primitive archaegastropod contains two gills, but the right gill is lost. Water is drawn in and circulated across the gills and away from the body via slits or holes in the shell. The number and type of gill have been used to classify the prosobranchs by Fretter and Graham (1994). Frederick (1994) and Monteiro and Coelho (2002) have presented the function and the structures of the gill of the prosobranch. The purpose of this study was provides to knowledge the histology and ultrastructure of the gill in the spiny top shell, *Batillus cornutus* using the light and transmission electron microcopy.

Materials Methods

Samples were collected from the coast of Wando Jeollanam-do, Korea in early May 2003. Tissues were fixed Bouin's sol. For 1h then washed it for 24h. The gill extracted from 0.5~0.7 ㎠ with the conventional process of dehydration and inclusion into paraffin and section. For observation light microcopy, we performed H-E stain, AB-PAS (pH 2.5) reaction, PAS reaction, Masson's trichrome stain, AF-AB reaction. For TEM study, gill were fixed in 2.5% glutaraldehyde in phosphate buffer (pH 7.5), postfixed in 1% osmium tetroxide (OsO_4), dehydrated and embedded. Ultrathin-sectioned specimen was double-stained with uranylacetate and lead citrate and examined by transmission electron microscope (JEM-1200 EX II, JEOL).

Result

The gill of the shell have structure of the bipectinate type. The gill filament have several band of lateral and apical cilia. The epithelial layer surrounding the hemolymph sinus is simple and consists of epithelial cells, ciliated cells, mitochondria-rich cells and secretory cells. The epithelial cells are usually columnar and covered with microvilli. The ciliated cells are usually columnar and contains numerous mitochondria in the apical cytoplasm. Ultrastructure of the cilia showed that "9+2" microtubular structure of the axial filament in the cross section. The mitochondria-rich cells are usually rectangular and the nucleus are located in the basal plate and contains numerous tubular mitochondria in the cytoplasm. Secretory cells are mainly observed in the apical region of the filament and can be divided into four types of A, B, C and D with electron density and morphological features of the secretory granules.

References

Harrison, F.W. 1994. Microscopic anatomy of invertebrates. In: Gastropoda: Prosobranchia, Vol. V, Mollusca. Harrison F.W. and A.J. Kohn, eds. Wiley-Liss, New York, pp. 111-182.

Lindberg, D.R. 1988. The patellogastropoda. Malcol. Rev., 4, 35-63.

Luchtel, D.L., A.W. Martin, I. Deyrup-Olsen and H.H. Boer. 1997. Gastropoda. Integument and Shell. In: Microscopic anatomy of invertebrates. J. Harrison, F.W. and A.J. Kohn, eds. Wiley-liss, New York, pp. 461-495.

Lutfy, R. G. and E. S. Demian. 1965. The histology of the respiratory organs of *Marisa cornuarietis* (L.). Arkiv. Zool., 18(2), 51-71.

Monteiro, J.C. and A.C.S. Coelho. 2002. Comparative morphology of *Astraea latispina* (Philippi, 1884) and *Astraea olfersii* (Philippi, 1846) (Mollusca, Gastropoda, Turbinidae). J. Braz. Biol., 62(1), 135-150.