Preliminary Notes on the Ultrastructure of the Ovary in *Cilunculus armatus* (Pycnogonida, Ammotheidae)

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Structure of the pycnogonid ovaries has been studied mostly with light microscope (Helfer and Schlottke, 1935; Sanchez, 1959; Miyazaki and Makioka, 1988, 1989, 1990, 1991, 1992). Although there are some electron microscopic studies on the pycnogonid vitellogenesis (King and Jarvis, 1970; Jarvis and King, 1972, 1975, 1978; King, 1973, 1975), these studies pay attention only to the oocytes, but not to the other structures in the ovary. Some structural details such as existence of the basement membrane around the protruded oocytes and of the ovarian epithelium around the oogonial cluster in the trunk ovary, have been left obscure. In the present study, we attempted to observe these ultrastructural details of the adult ovary in a pycnogonid, *Cilunculus armatus*.

Specimens of *C. armatus* were collected by dredge off the coast of Shimoda, Izu, Central Japan. For electron microscopy, adult females were fixed in 2% paraformaldehyde and 2.5% glutalardehyde (Glauert, 1975), and were postfixed in 2% OsO_4. They were embedded in an epoxy resin, Quetol 653-ERL 4206 (Kushida, 1980), through the usual procedures. After stained with uranyl acetate and lead citrate, the ultrathin sections were observed under Hitachi HS-9 TEM.

The ovary localized in the cephalothorax is composed of two parts: a U-shaped trunk ovary containing oogonia and young somatic cells, and pedal branches containing oocytes at various growing stages.

Under the light microscope, the trunk ovary looks like a cluster of oogonia (Fig. 1), and the ovarian epithelium is hardly detectable around the oogonial cluster. The present electron microscopic observation reveals that a thin epithelium covers the oogonial cluster (Fig. 2). In the pedal branches of the ovary, the

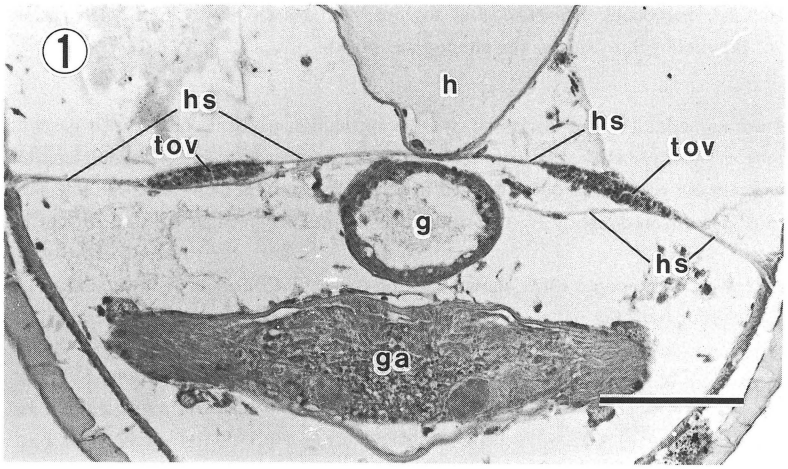

Fig. 1 Cross section of trunk ovary. Hematoxylin and eosin. Scale=100μm. g: gut, ga: ganglion, h: heart, hs: horizontal septum, tov: trunk ovary.

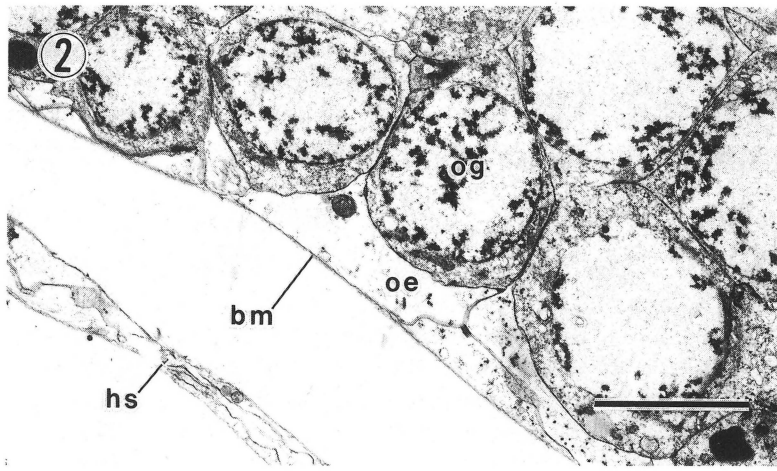

Fig. 2 Ultrastructure of the surface region of trunk ovary. Scale=5μm. bm: basement membrane, hs: horizontal septum, oe: ovarian epithelial cell, og: oogonium.

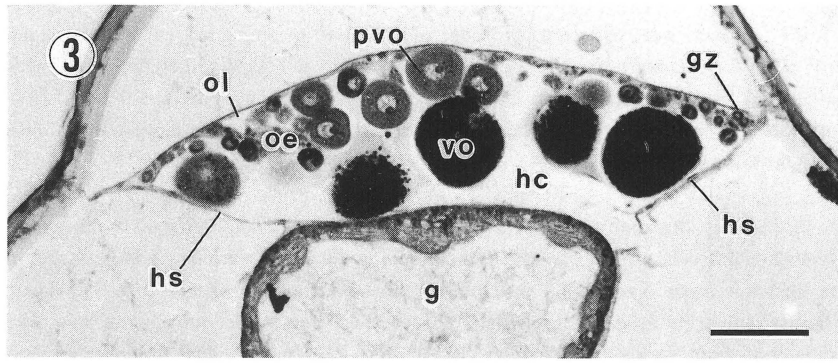

Fig. 3 Cross section of pedal ovary in femoral segment. Azan. Scale=100μm. g: gut, gz: germ zone, hc: hemocoel, hs: horizontal septum, oe: ovarian epithelium, ol: ovarian lumen, pvo: previtellogenic oocyte, vo: vitellogenic oocyte.

youngest oocytes are embedded in the thickened ovarian epithelium to form cord-shaped germ zones, but most of the growing oocytes protrude outwards from the ovarian surface, accompanied by their epithelial stalks (Fig. 3). A basement membrane covers the outer surface of the ovarian epithelium (Fig. 4). The protruded oocytes and their stalks are also covered tightly by the stretched basement membrane of the ovarian epithelium (Fig. 4).

The present electron microscopic study shows that the ovary in *C. armatus* is a sac-like organ with an ovarian epithelium throughout both the pedal and the trunk part, and that the basement membrane covers the outer surface of the ovarian epithelium and of the protruded oocytes and their stalks. These ovarian features are basically common to those in most chelicerates (see Makioka, 1988).

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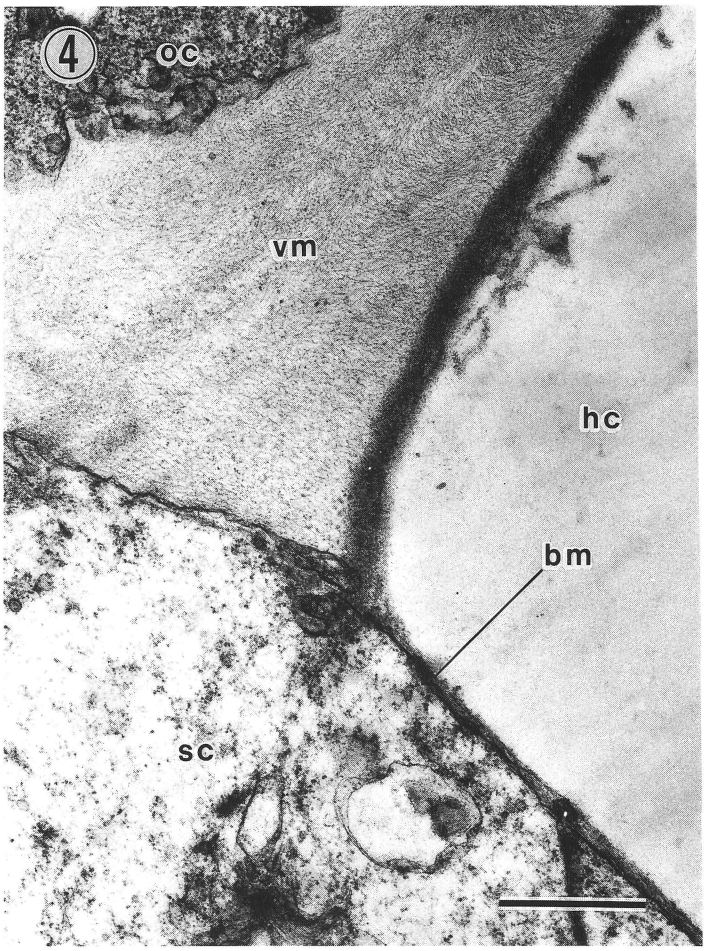

Fig. 4 Ultrastructure of basement membrane covering stalked oocyte in pedal ovary. Scale=1μm. bm: basement membrane, hc: hemocoel, oc: stalked oocyte, sc: stalk cell, vm: vitelline membrane.

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