

ウナギの卵膜と卵門の微細構造

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Short Paper

Ultrastructure of the Chorion and the Micropyle of the Japanese Eel *Anguilla japonica*^{*1}

Ripe eggs of oviparous teleosts are covered with thick envelopes termed chorion. At the animal pole of the chorion, there is a micropyle through which a spermatozoon can reach the surface of ooplasm. Ultrastructural characteristics of the chorion and the micropyle of teleost eggs differ in different species of fishes, and have recently been considered as a criterion for the identification of eggs.¹⁾

During the course of studies on the artificial maturation of the Japanese eel *Anguilla japonica*, ultrastructural characteristics of the chorion and the micropyle of ripe eggs of the eel were observed electron microscopically.

Silver females of the Japanese eel were collected in October 1981 from rivers near Hiranuma, Aomori Prefecture. Fish were matured with repeated injections of saline suspension of chum salmon pituitaries as reported previously.²⁾ After 10 weekly injections, one of them showed partial ovulation. Ripe eggs stripped from the female were washed in RINGER's solution for eel (unpublished), and fixed in KARNOVSKY's fixative for 3 hours at room temperature. For scanning electron microscopy (SEM), eggs were dehydrated in a graded ethanol series, critical point-dried in CO₂, and coated with gold-palladium. For transmission electron microscopy (TEM), eggs were post-fixed in 1% osmium tetroxide for 2 hours, dehydrated and embedded in Epon.

Ripe eggs obtained measured about 1.0 mm in diameter. Cross sections of the chorion showed that coarse and amorphous material invested the whole surface of the egg. The chorion, about 3 μm in total thickness, consisted of three distinct layers. The outermost layer was homogeneous with low electron density, and possessed numerous protuberances which appeared at somewhat regular intervals on the surface of the layer. A shallow cup-like depression was observed in the apical surface of each protuberance. A thin, electron dense middle layer showed a slight elevation beneath the protuberance of the outermost layer. In this elevated part, a pit was often observed, which might be a remnant of the pore canal. The thickest innermost layer showed a pile of alternating light and dark lamellae. Six dark lamellae were arranged concentrically, and the distance between the lamellae decreased in an outward direction (Fig. 1).

The outer surface of the chorion examined with SEM showed numerous knobs with central depressions corresponding to the protuberances observed under TEM. These knobs, along with the ridges that joined adjacent knobs together, gave the egg surface a reticulate aspect (Fig. 2).

The micropyle of the eel egg had no pit or depression around the outer opening which measured about 3 μm in diameter, and consisted only of a canal. The wall of the canal had annular ridges which might reflect the stratified innermost layer of the chorion. Around the micropylar opening, the knobs appeared to decrease

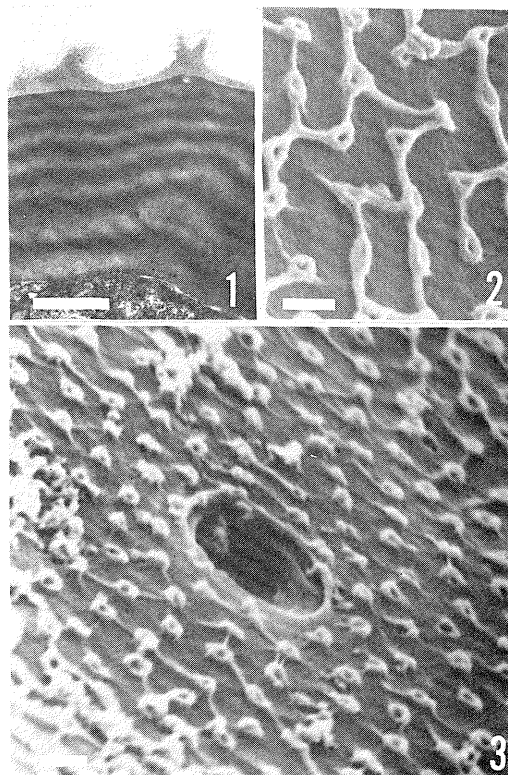


Fig. 1. TEM of a chorion of Japanese eel. Scale, 1 μm.

Fig. 2. SEM of the external surface of the chorion. Scale, 1 μm.

Fig. 3. SEM of animal pole of a ripe egg showing a micropyle. Scale, 1 μm.

in height (Fig. 3). Judging from the images under SEM, the micropyle of this species may belong to the type III which was distinguished by RIEHL and GÖTTING.³⁾

The present information may contribute to the identification of eggs of the Japanese eel among samples collected from the natural field.

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