Crossing of alimentary canal and central nervous system may not occur in a separate monster embryos of a horseshoe crab, *Tachypleus tridentatus* (Chelicerata: Xiphosura)

Tomio ITOW, Shingo IZUMI and Tatsuya MASUDA

Department of Biology, Faculty of Education
Shizuoka University
Shizuoka, 422 Japan

Alimentary canal in the horseshoe crab (*T. tridentatus*) may be seen to pass through the central nervous system (CNS). Crossing of the alimentary canal and CNS, one of the common characters observed in many prostomian animals, may thus be formed. However, this crossing of alimentary canal and CNS may not always be formed in experimentally induced monsters of this horseshoe crab embryos. In this paper I report formation of the crossing of alimentary canal and CNS observed in two types of separate monsters (Type A separate monsters and Type B separate monsters), the embryonic area of which is separated into anterior and posterior parts.

Type A separate monsters in which separation has occurred either at the third or 4th prosomal segment may be induced when the eggs between stages 7 and 10 were cultured in Ca^{2+}-free sea water (SW) for 24 h. Type B separate monsters in which separation occurred in the second prosomal segment, on the other hand, may be obtained either by; (1) culture of the eggs between stages 10 and 12 in Ca^{2+}-free SW for 24 h, or (2) application of DNA-synthesis inhibitors such as hydroxyurea, azaserine or mitomycin C to the eggs between stages 7 and 10 (see also Itow, 1979, 1982).

In all of these separate monster embryos the CNS is also separated, however, the alimentary canal may not always be separated. In some of the Type B separate monsters the anterior part of which is consist of one or two incompletely developed prosomal segments, the crossing of alimentary canal and CNS was not observed. In other Type B separate monsters as well as in all of Type A separate monster embryos, however, the crossing of alimentary canal and CNS was observed.

Histological observation of the normal embryos has revealed that the mouth primordium in horseshoe crab embryo first appears at the position anterior to the first prosomal segment, but it later moves posteriad and invaginating stomodaeum takes the course which runs behind the brain; this should be the reason why the crossing of alimentary canal and CNS may occur. In some of the Type B separate monster embryos, however, posteriad movement of the mouth primordium may not occur because the embryonic area in these separate monsters is separated at the second prosomal segment and invagination of the stomodaeum takes place at the very position where the mouth primordium first appeared. Invaginating stomodaeum may perhaps take the course which runs in front of the brain, and the crossing of alimentary canal and CNS may thus never takes place in these separate monster embryos.

These experimental results seem to indicate that; 1. Crossing of alimentary canal and CNS may be formed in due course of embryogenesis. (2) Brain may not be the decisive factor to determine the course taken by the invaginating stomodaeum. (3) Horseshoe crab embryos may continue to develop even if the crossing of alimentary canal and CNS was not formed.

References

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