

# Gut development in cephalopods: a correction

by

S. v. BOLETZKY

In a recent review, ARNOLD and WILLIAMS-ARNOLD (1976) state that in the development of the cephalopod gut, in addition to the stomodaeal invagination, the anal papilla "has a similar invagination, the hind gut primordium. As development proceeds, the two ends of the gut meet via the midgut which appears to have an independent origin (BOLETZKY, 1967, 1970)."

No proctodaeal invagination is known in cephalopods, as correctly stated by ARNOLD (1971). No independent origin for "hind-gut" and "mid-gut" has been postulated by BOLETZKY.

The alimentary canal of the cephalopods has a complex embryonic development which is so far only partly elucidated. It has been established, however, that

- the stomodaeum (or mouth invagination) forms the buccal mass with its glandular appendages, and the anterior part of the oesophagus
- the "mesendodermic" mid-gut rudiment (or mid- and hind-gut rudiment or anlage) forms the posterior part of the oesophagus in decapods (Sepioidea and Teuthoidea) and the corresponding part (crop) of the octopods; in all cephalopods it forms the entire complex of the stomach, caecum and the digestive gland with the digestive duct appendages<sup>1</sup>; the intestine and the ink sac and gland
- the medio-ventral area (hind-gut zone) of the mid-gut rudiment remains separate from the ectoderm of the anal area in early organogenesis
- the anus opens late in embryonic development at the ventral surface where the mid-gut rudiment has made contact with the ectoderm in the course of organogenesis; there is no anal invagination or proctodaeum.

Most of these facts have already been summarized by KORSCHULT (1892). This author did not realize, however, the large extent of the early mid-gut rudiment nor the fact that it contributed to formation of the oesophagus. Later workers have observed that it is a large transversal band rather than a small ventral cell plate, and that it encircles the yolk mass by the time that its connection with the stomodaeal complex can be

<sup>1</sup> For discussion of nomenclature see BIDDER (1976).



observed on the dorsal side, close to the anterior mantle border of the embryo (NAEF, 1928; BOLETZKY, 1967, 1970; BOLETZKY and BOLETZKY, 1973; MEISTER and FIORONI, 1976). What is not yet clear is the origin of the whole mid-gut rudiment in relation to the yolk syncytium on which it lies, and to the surrounding mesoderm (MARTHY, 1976).

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*Adresse de l'auteur :*

C.N.R.S., Laboratoire Arago  
66650 Banyuls-sur-Mer  
France



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