

Short Communication

Embryogenesis of an Invertebrate Lymphoid Organ: The *Asterina Gibbosa* Axial Organ (Asterids, Echinodermata)

Michel Leclerc*

Department of Cell Biology, Developmental Biology, Immunology, University of Orléans, Orléans, France

Abstract

The metamerization of the coelom leads to the axial complex genesis. Mesodermic cells appear besides the stone canal (larva 12 days old): they constitute the Axial Organ (AO) which develop, in the ventral side, the oral part (PO). This last part corresponds (sensu stricto) to the ancestral lymphoid organ.

Keywords: Echinodermata; Asterids; Axial organ; Mesodermic cells

Introduction

In 1896, Mac Bride described the development of the Asterid: *Asterina Gibbosa* [1], and particularly the development of the Axial Organ (AO): an ancestral lymphoid organ [2]. We recall in this work, the different steps of the embryogenesis of *Asterina gibbosa*.

Material and Methods

Sea star larva were obtained in our laboratory, in aquarium, in running sea water, at 11°C, in June of each year, after spawning. Just before this last one we used the "1 methyladenin" which facilitates it (injection at low concentration: 10 µl of 1 methyladenin at a concentration of 1 mg/ml, in the coelomic cavity of the adult *Asterina gibbosa*).

Young sea stars (1 month old) were kept in another aquarium and used for our experiments.

Histologic studies

Larva and young sea stars, were fixed in Carnoy, dehydrated from alcohol 30° to alcohol 100°. Before embedding in Paraffin, animals were placed in a solution of Xylen for 30 min. Cuts of 4µ were realized with a classical microtome. Coloration of slides were performed with either Hemalun or Toluidine-Blue Eosin. Observations were done with a light microscope.

Results

The Figure 1 shows the "birth" of the axial organ. Many mesodermic cells surround the Stone Canal (CS). A primordial gonocyte (Gp) can be observed next to the mesenchymatous cells [3]. It seems that the

aboral part (Pa) appears before the oral part (Po) of the axial organ during embryogenesis in larva 12 days old [3]. At 15-16 days old the larva becomes a young sea star.

The Figure 2 shows clearly the stone canal and the oral part (Po) which corresponds to the main lymphoid organ "sensu stricto". We observe in this young sea star (1 month old), nucleus of cells which will become the future lymphocytes.

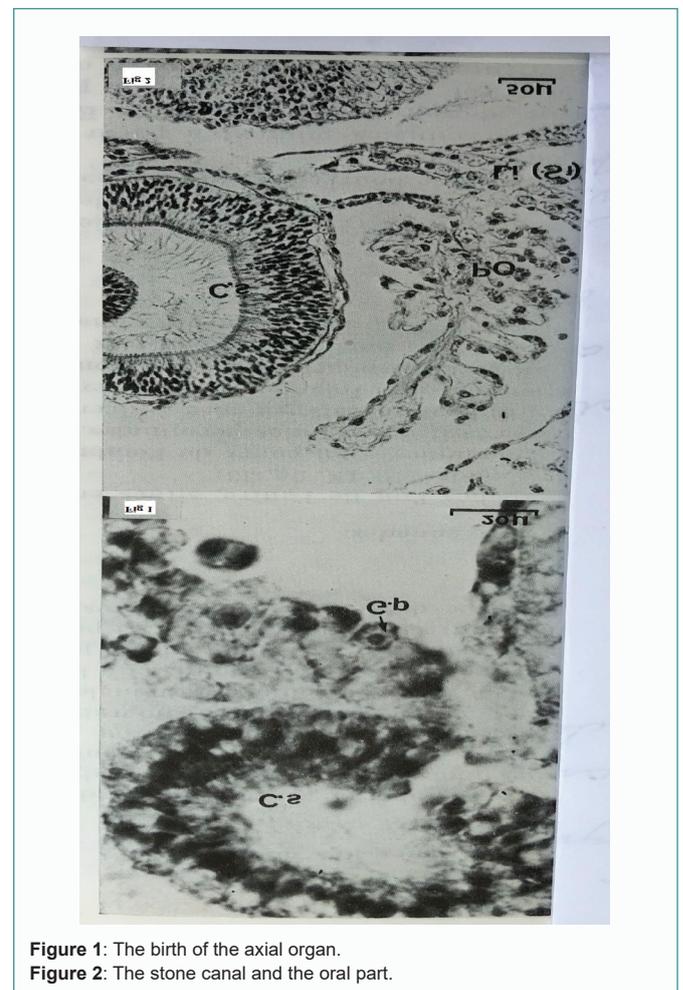


Figure 1: The birth of the axial organ.
Figure 2: The stone canal and the oral part.

Citation: Leclerc M. Embryogenesis of an Invertebrate Lymphoid Organ: The *Asterina Gibbosa* Axial Organ (Asterids, Echinodermata). *Clin Med.* 2020; 2(2): 1023.

Copyright: © 2020 Michel Leclerc

Publisher Name: Medtext Publications LLC

Manuscript compiled: Aug 20th, 2020

***Corresponding author:** Michel Leclerc, Department of Cell Biology, Developmental Biology, Immunology, University of Orléans, Orléans, 556 rue Isabelle Romée, Sandillon, France, E-mail: mleclerc45@gmail.com

Discussion and Conclusion

The embryogenesis of the sea star *Asterina gibbosa* can be summarized as following:

1. Metamerization of the coelom which leads to the mesodermic formation of the axial organ besides the stone canal, at the beginning of the larva stages (From larva 10 days old to 15 days old).
2. Formation of the oral part of the axial organ in larva 15 days old. This part constitutes the future lymphoid organ with its humoral potentialities which are found in adult animals [4].

References

1. Macbride EW. Memoirs: The development of *Asterina gibbosa*. *Quart J Micr Sci.* 1896;38:339-411.
2. Leclerc M, Brillouet C, Luquet G. The starfish axial organ: An ancestral lymphoid organ. *Dev Comp Immunol.* 1980;4:605-15.
3. Leclerc M. L'organe axial et ses relations avec la sexualité et l'immunité Chez les Astérides. Thèse de Doctorat ès Sciences. 1974;16(3):285-359.
4. Vincent N, Osteras M, Otten P, Leclerc M. A new gene in *A. rubens*: A sea star Ig kappa gene. *Meta Gene.* 2014;2:320-2.