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Nervous System and Asterina Gibbosa Axial Organ: A Sea Star Lymphoïd Organ

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Abstract

In the sea star Axial organ (AO), synaptic-type vesicles of 500 A in diameter are found, next to the sea star lymphocytes: they constitute a primitive nervous system and belongs to the « epithelio-neural » Echinodermata one.

Introduction

Since a long time the sea star nervous system has been described as an epithelio- neural type.

We try to study it again, in T.E.M , this time, at the level of the axial organ which is implicated in Immune system of sea star

Materials and Methods

Animals

Sea stars Asterina gibbosa (Pennant) were purchased from the laboratory od Roscoff (France):they came from the Channel sea

T.E.M Methods

Asterina gibbosa were sacrified at time t=0
Axial organ (AO) were excised from sea stars.
AO were fixed in glutaraldehyd (1,5 % in cacodylate buffer) then rinsed in buffer alone.
A post -fixation **in Osmium tetroxyd** ($Os O_4$) at 2 % in distilled water was realized.
Then Dehydratation was performed (from alcohol 70° to 100 °) followed by a « Pre-Inclusion ».
At last Inclusion in Epon was done.
Cuts with a LKB ultrotome and finally observations with a Hitachi Microscope were realized at room temperature.

Results:

The Figure 24 shows clearly the presence of vesicles with an « electron opaque content ». These vesicles of 500A in diameter and are associated to mitochondriea (M).They are called synaptic-type vesicles (V). To note also the existence of muscular fibers (F m) « surrounding » these last ones.

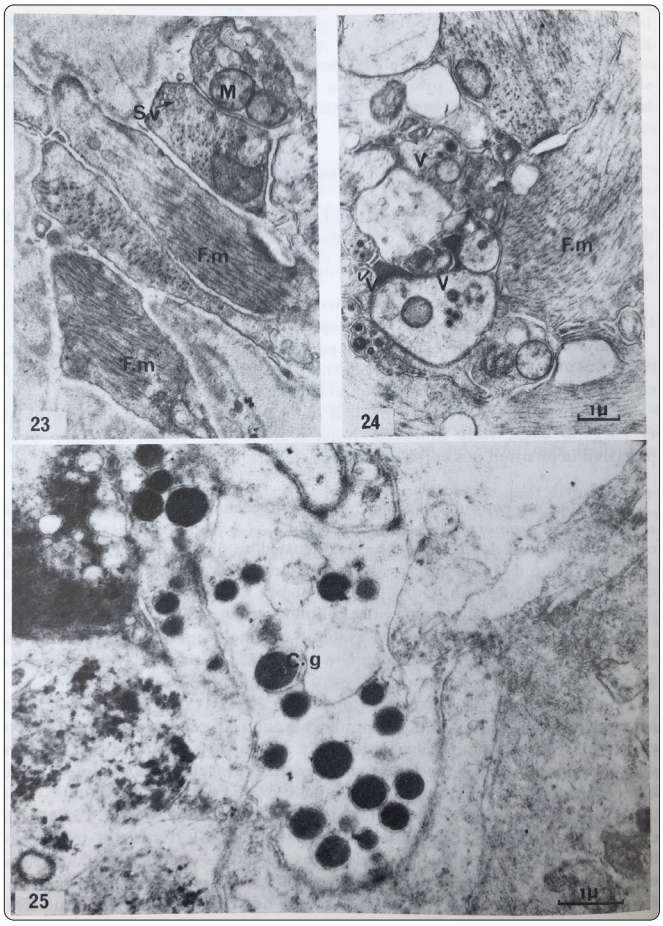
The Figure 25 shows vesicles of o higher diameter , more than 1000 A , with also opaque content.

They have according Nicaise (Ref. 1) a rôle in neurosecretion and are mainly characteristics of

Invertebrate nervous system.

This last author studied them in Molluscs and compared these vesicles to a particular « Glio-interstitial system (C g)

The Figure 23 presents what we call « varicore-type synapsis » vesicles.



Discussion and Conclusion

In precedent works (Leclerc 1970, Leclerc and Delavault 1971) we have described some synaptic vesicles in the coelomic membran and in the same manner at the level of the various sinus [2,3].

We find such vesicles next to the AO and we conclude the immune axial organ is innervated.

Furthermore the presence of a glio-interstitial system seems also obvious: a neuro-secretion rôle may be envisaged in the AO besides humoral immune functions [4].

References

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4. Vincent N 2013 Meta Gene, 2:320-322.