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Phylum Cnidaria (Medusae, Sea Anemone, Coral, etc.): Is a Phylum of Low Structuration?

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Summary

The phylum Cnidaria is a great zoological group considered like a low metazoo for their low level organization, but their organization is compound by ectoderm, mesoderm (mesoglea) and endoderm; haven muscle system like retractors muscles, parieto-basilar muscles, sphincter muscle, cells called endoblasts and this last one origin cnidocytes like basitrichs, micro basic p-mastigophore, micro basic b-mastigophore, sporocysts, etc. and this cells types are used by catching prey and defense too. The sphincter muscle is used by open and close oral disc because when it is contracted or not there are contraction or elongation of mesenteries.

Some cnidarians can catch ions Ca+ from CO2Ca of water and this ions to deposit under aragonite form for a skeletal building; this last one is knowing like coral reef. Other cnidarians have a life cycle under two different forms like stage polyp and stage medusae; both are simultaneously in one life cycle, meanwhile stage polyps are a benthic form, the stage medusae is a planktonic form. There are medusae more complex too like known Scyphomedusae and these has in general a direct life cycles such medusae-medusae and this type of cycle is holoplanktonic, meanwhile the life cycle polyp-medusae is a meroplanktonic cycle. So, the question can one ask about this zoological group: is the Cnidaria phylum of low structure?

Keywords:Phylum Cnidaria; Low Metazoan; Organization level

Introduction

The Phylum Cnidaria is one phylum considered like a low metazoan organization, but this zoological group has complex characteristic like some mentioned in Summary, so main of them will be development.

Results

The cnidarians are compound by three layer called ectoderm, mesoderm (mesoglea) and endoderm. The first one has muscles, endoblasts, can get ions Ca+ and form a sequel et al; the second one has muscles fibers and endoblasts, and the last one has muscles fibers and endoblasts too. During a long time, Phylum Cnidaria was considered a diploblastic phylum because mesoglea is not considered a layer and some authors hold this position.

Muscular system

- The parieto-basilar muscle that joined the wall of collum or scapus with the basilar muscle. Both can see when it is a cross section of the body. Both are holding the mesenteries.
- The retractor muscle builds the face of each mesentery and when the retractor of each mesentery is put face to face, these mesenteries belong to the same cycle.
- The sphincter muscle is formed by concentration of mesoglea fibers or endodermic fibers, so it is called mesoglea sphincter, or endodermic sphincter or both. This muscle controls the open or close of the oral disc.

Some species of sea anemones have a filament joined to mesenteries called aconitum or acontia; this acontia is expulsed to coelenteron cavity when sea anemone is agreed because it have some cnidocytes like micro basic p-mastigophore for catching prey in gastric cavity or coelenteric cavity. The acontia is confirmed by a mesoglea axis and surrounded by endoderm; in this last one are the cnidocytes.

Nematocysts

The mother cell called endoblast through a process called cnidogenesis can form different types of nematocysts such sporocysts, micro basic p-mastigophore, micro basic b-mastigophore, holarchies, etc. This nematocyst has a capsule and in the same it can get the filament; it can be too long, and it can be coiled. This filament has enzymes that can be used when the animal catches prey. Based on filaments in some types of nematocysts can be seen as a dart or bundle. The nematocysts are used when the planulae larvae are looking for a suitable substratum and when it is found, the different nematocysts are discharged and fixed the larvae to substratum, and it begins to develop. (Figure 1&2)

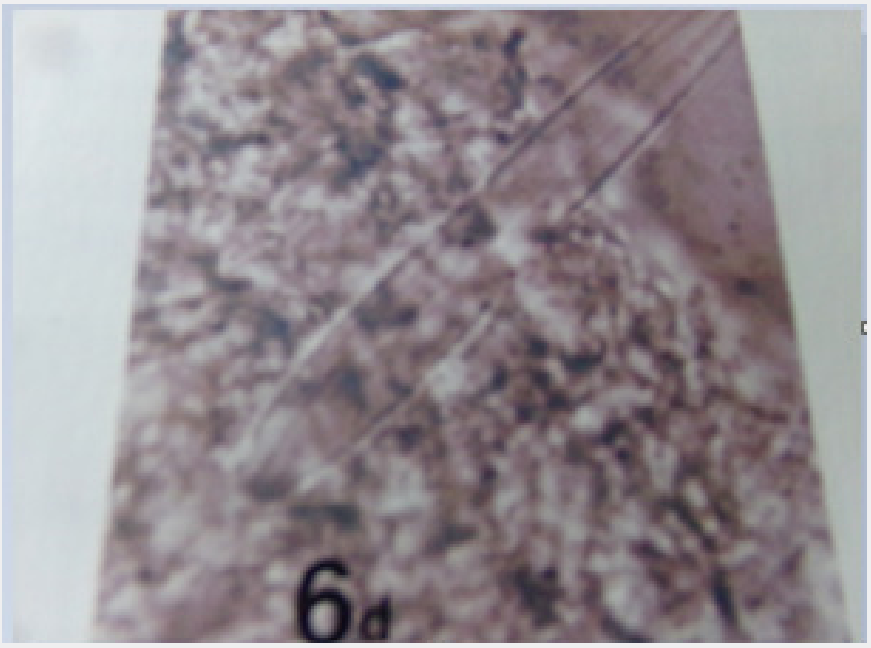

Figure 1

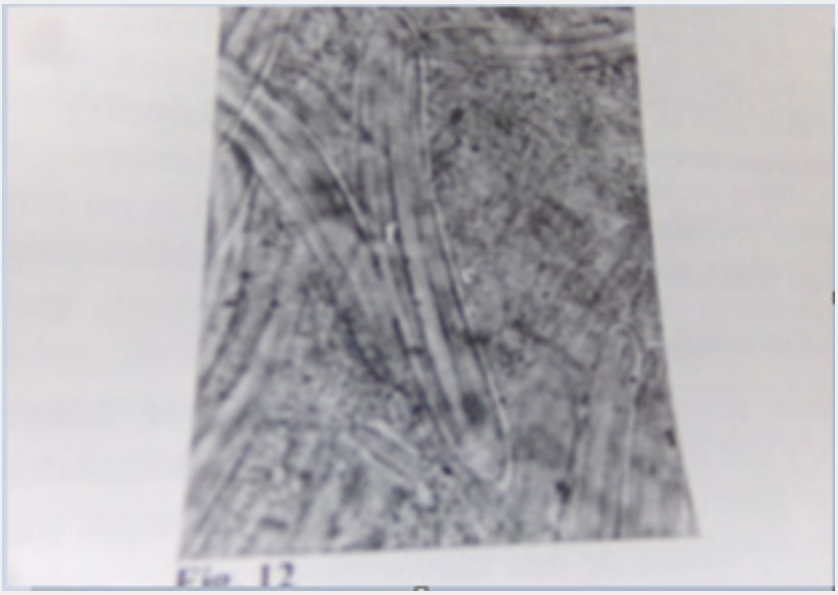

Figure 2

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Catching the prey

The different species of cnidarians used the same or similar strategies for catching prey. This strategy is based such the species is one sea anemone, a medusa, a hydrozoan polyp, or a coral.

- in sea anemone: the sea anemone open their oral disk and it is full of nematocysts because they are in each tentacle and when the prey touch one tentacle this contact to do a discharge of nematocysts and they penetrate to prey and then it is ingulf by sea anemone. (Figure 3&4)
- In hydrozoan polyps: the strategies are similar.
- in medusa: the crown of tentacles around the umbrella are like a filament of fisheries establishing a predation cylinder (Cp) and all species are swimming around it can get it and carry it to the mouth. (Figure 5)
- coral is like sea anemone because the coral is a sea anemone with squel et al.

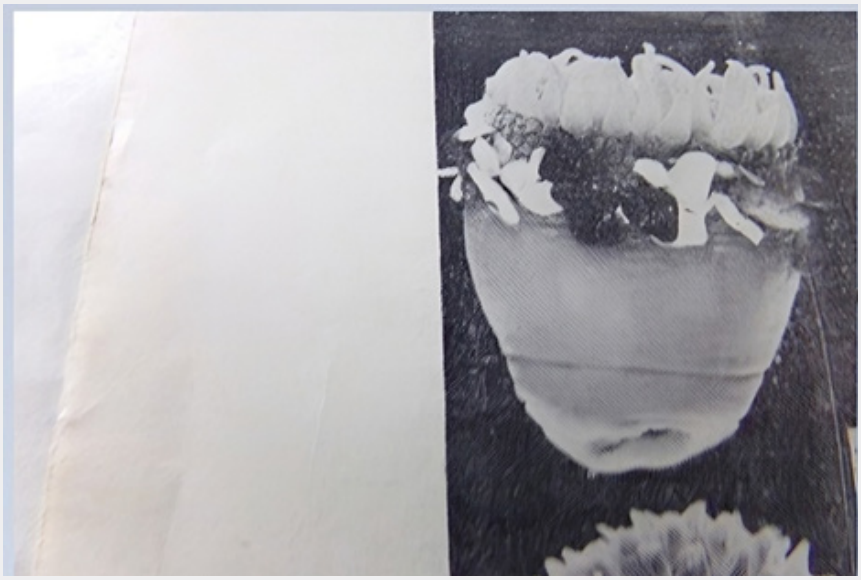

Figure 3

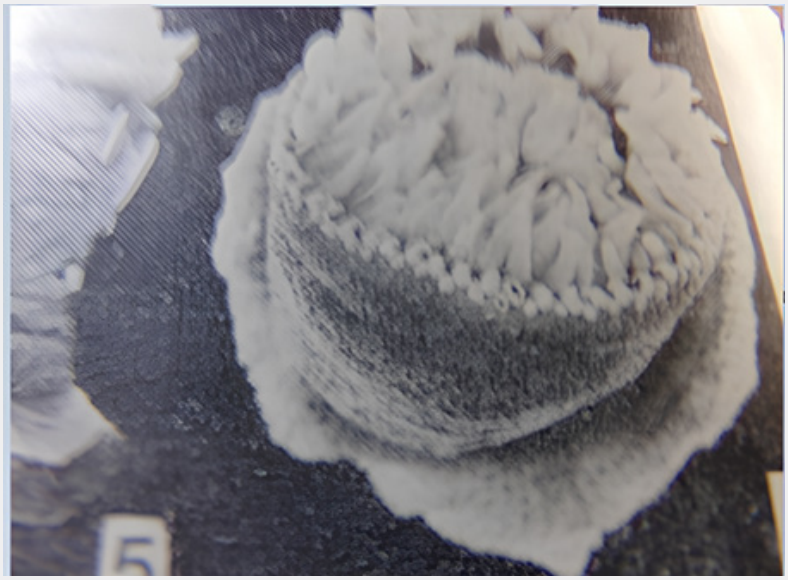

Figure 4

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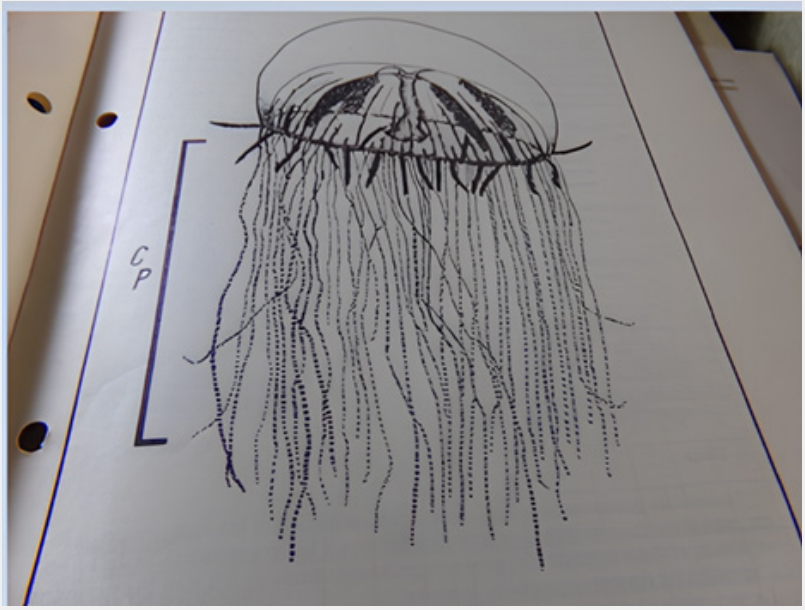

Figure 5

Corals

Coral is a sea anemone with ions Ca+ deposited under the morphological form called aragonite. The question is how this aragonite is deposited? The ions Ca+ form the molecule of CO_3Ca and it is in the sea water, so the ectoderm cells of polyps catch the ions Ca+ from CO_3Ca and this ion is deposited into the cytoplasm of ectoderms cells under aragonite form. Once the aragonite is into cytoplasm migrate to both cell pole and begin to form the skeletal building.

This building under aragonite form is strong and lets to different corals species have a long life, but the ions Ca+ is deposited under calcite form so the skeletal is not strong so the building is weak, and he life period is short because the skeletal broken and the into organism do contact with the exterior and the species died.

Types of Symmetry

Phylum Cnidaria has two types of symmetry like bilateral symmetry, and radio-bilateral symmetry. The first one is indicated by an axis from mouth to pedal disk in sea anemone. The second one is indicated by mesenteries, and it is indicated by radio-bilateral in sea anemone and on medusa it is indicated by radials canals from margin bell to center of umbrella.

Position of Cnidaria in traffic web

The cnidarians species are voracious predators so in general they have a few predators such as fishes, but in general they are finals of trophic web.

Why they are the finals of trophic web?

They are the final of trophic web because they have ponderous arms like nematocysts and about this theme some to say in before paragraphs. With this arm, generally there are not invertebrate's species can eat some cnidarian.

Dispersion larval through time

Zamponi and Chilliguay [1] had compared distribution through times between two taxa: Actiniaria (sea anemone) and Rugosa (= Tetracorallia+). This analysis can see distribution larval is unlucky when planulae larvae is swimming to find out a substratum and this distribution disappeared when juvenile settled to substratum.

This phenomenon is equal to sea anemones and fossil corals, so the nearest between specimens make a local current of movement of sea water where the specimens can get food; the movement of water is made by tentacles. His tentacles have cnydocists and through it can catch different organisms from zooplankton and benthic too. This type of distribution is curious because it was noticed in two zoological groups with interval of times so great; meanwhile sea anemones is an actual group, coral fossil (Rugosa) had its distribution in Ordovician Period (500-600 MY). Moreover, this distribution is and was held through the time because is a strategy beneficious for both.

The phylum Cnidaria and their position in the Halobio and Limnobio

Benthos and Pleuston are two different communities from Halobio and different between them too, but they are linked. The

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difference can be found in external factors such as insulation, rain, evaporation of superficial water, meanwhile the linked is an amount of external and endogenous factors like wave, sedimentation, run of particle and currents. Front this complex of factors, both communities have different degrees of stability; benthos is a homoeostatic environment because it has small influence from external medium, while pleston is in direct contact to the external space and this last condition increment the environmental instability and vulnerability.

Homoeostasis and vulnerability limit the dispersion of cnidarians from both communities. The sessile condition is the limit of dispersion to benthic cnidarians, and the morphological complexity and functional specialization are the limit of dispersion to pleustonic cnidarians; the benthic cnidarians developed multiple reproductive strategies like adaptive responses to this condition and they can increment the distribution area. The degree of morphological complexity developed by different species o cnidarians is the key for getting full energy and the mode to survive in these communities.

Cnidarians are mostly marine animals but can be found in nearly all types of freshwaters (i.e., streams, rivers, ponds, and lakes), and occur mainly in mesotrophic to eutrophic habitats. The diversity of freshwater cnidarians is low. There are 40 species that are probably grouped in less than 15 genera [2]. Hydras are freshwater cnidarians polyps. They can be found on all the continents except Antarctica, and they are also found on continental islands but are apparently absent from oceanic islands [3]. Sometimes they can reach dense populations, which has been attributed to budding, morphological plasticity and regeneration capacity [4]. It is known that at high population densities, these organisms become significant predators of small invertebrates and occasionally tiny fish that manage to immobilize and catch by means of their nematocysts. The type and size of the prey potentially selected by hydras helps determine the structure of freshwater zooplankton communities (Schwartz et al.,1983.).

Discussion

At begin of this study was asked Is phylum Cnidaria a zoological group with low structuration degree? The above study points out phylum Cnidaria has types adaptive for different environments like ocean, river, lagoon or lake; so, this great wide explains because phylum Cnidaria is a success zoological group[4].

This success is based in morphological types like polyps or medusa because both are the basic plan of general organization. The polyps form is a cylinder tube [Figure 3&4], and this tube can support the height of water column because the wall of body can elongate and contraction, so this wall can not to break; when it is a contraction, the body pull water out the cavity and when it is elongate the water go to cavity through oral disc to mouth and from it go to coelenteric cavity. Can see the hydrostatic pressure depends on elastic of wall of body [5].

The contentle the change of form of medusa by hydrostatic pressure is not important because the inner content is water. The tissue of medusa has a few elastic fibrous and this fibrous are aqueous and they contain ions Ca+, Na+ and K+ and these ions are useful for contraction and elongation of tentacles when the medusa is expelling water through the mouth and when it is doing movement of swimming too. This characteristic let to polyps and medusa to be success in halobio like limnobio, but another characteristic help to this phylum to be success, and these are:

- specialisation
- hydrostatic pressure
- eskeletal form with ions Ca+
- specialized cells call cnydocists
- voraceous predator

Another hand phylum Cnidaria has symbiosis with some crustaceans and this association called epibiosy is useful for this last one. The sea anemone is fixed over shell and during movement of crab, the sea anemone can get some small prey, to eat it and the final digestion is useful like food for crustacean. So, the benefits for crab are to have sure food for a long time meanwhile this association (symbiosis) stay through time.

These types of association can be seen too between medusa and small fish; this last one is all together around tentacles because this last one haven cnidocytes and them this last one are useful like defense to another enemies. Another association between Cnidaria is that between coral and Zooxanthellae algae, and this association is very important because this association stablish limit of distribution for corals [6-7].

The Zooxanthellae algae done synthesis between radiant energy and epidermic cells of coral and from this synthesis the algae have a function like a kidney where it takes off toxic substance from coral and coral give to zooxanthellae algae certain green pigments for doing photosynthesis; so, this phenomena (photosynthesis) can to do possible if the coral are distributed at low depth for this way the solar energy (radiant energy) can to reach the coral reef. For all says here, is the phylum Cnidaria a low structuration? the author of this contribution considered that Phylum Cnidaria must be considered like a phylum complex and not as simple as today.

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