

Phylum Cnidaria / Ctenophora

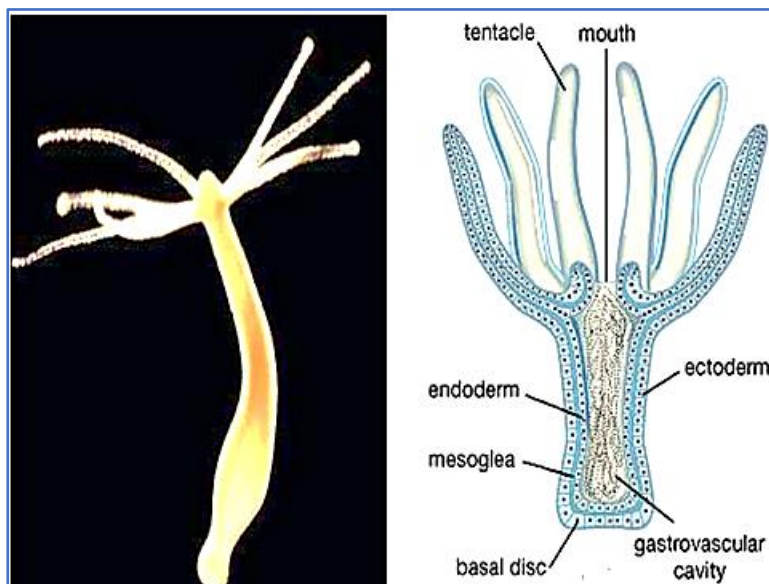
Cnidarians/Ctenophora are considered acoelomates (without true body cavity), diploblastic, and radially symmetrical. Phylum Ctenophora broke off from the Cnidarians recently, their morphology is essentially the same as Phylum Cnidaria with slight differences discussed later on.

Phylum Cnidaria

Cnidaria comes from the Greek word "*cnidos*" which means stinging (nettle). Formerly known as coelenterata (Gr. *Koilos* = hollow, *enteron* = gut) take its name from the large cavity in the body that serves as the intestine. Coelenterates are the simplest of *metazoans* includes about 9000 species, some are found in fresh water, but the greater number are marine.

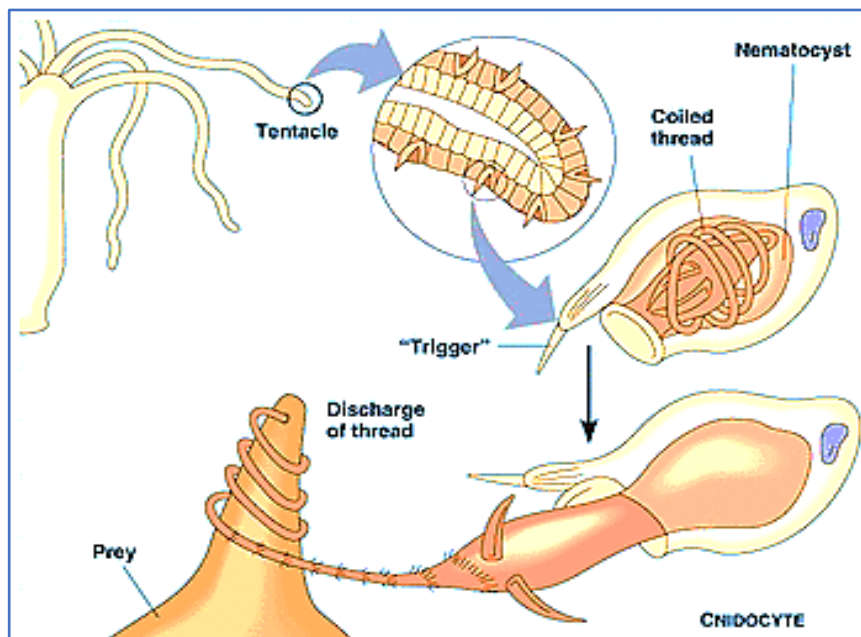
Body structure

Body is formed of two layers; outer layer (**ectoderm**), inner layer (**endoderm**), and a jelly-like non-cellular layer called **mesoglea**. Body of cnidarians has oral and aboral ends but without definite head. Cnidarians have a hollow central cavity with one opening called **gastrovascular cavity** that acts as both the mouth and the anus, because anus is absent. Around the mouth, there are several elongate, flexible, and tactile processes called **Tentacles** armed with stinging cells called **cnidocytes**.



These cnidocytes are nettle venomous cells unique to the phylum Cnidaria, found in ectoderm of tentacles to catch prey and defend against predators. Each cnidocyte contains a bulb-shape capsule called **nematocyst**, which is filled with neurotoxins and containing a coiled hollow thread-like structure which has a hair-like trigger called a **cnidocil**. When trigger is activated, hollow thread penetrates

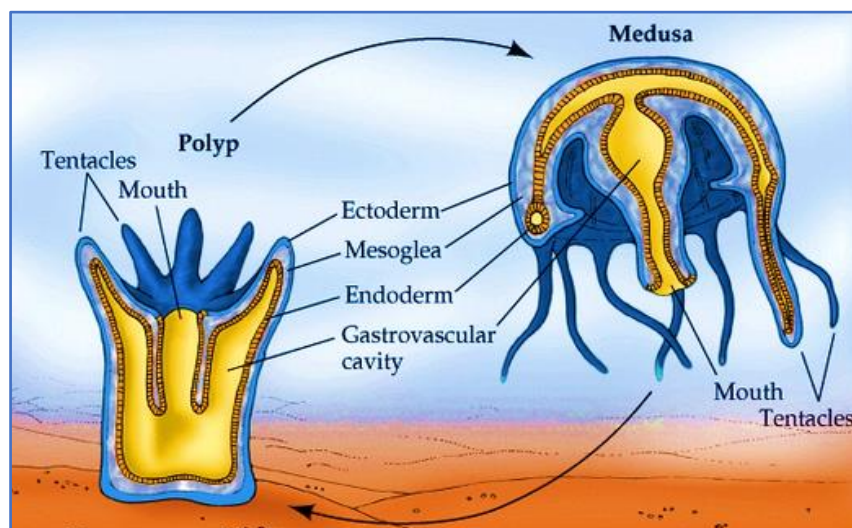
target organism, and toxic content of nematocyst is injected into target organism. The injected neurotoxins paralyze the mobile prey, so cnidarian can devour it.



Polymorphism of Cnidarians

Polymorphism is the occurrence of structurally and functionally more than two different types of individuals within the same organism. Cnidarians can exist in two different body forms:

1. **Polyp:** It is a cylindrical shape of cnidarians that is usually fixed and remain in one place and its mouth open upward. Polyp shape represents asexual stage of animal.
2. **Medusa:** It is umbrella like shape (jellies) that is usually free swimming and its mouth open downward. Medusa shape represents sexual stage of cnidarian.

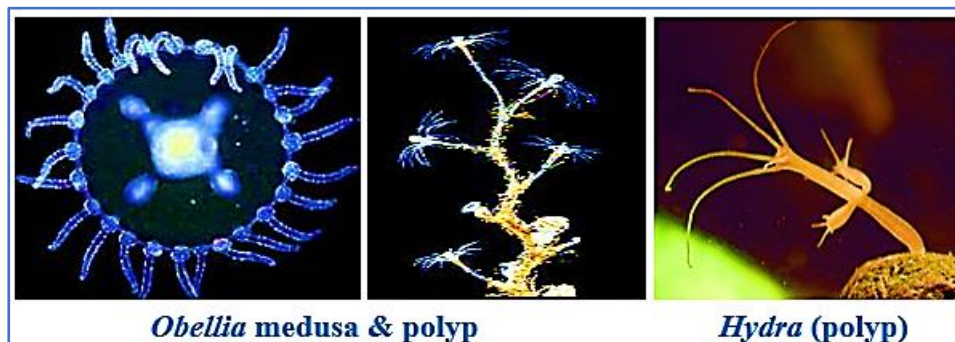


Classification of Cnidarians

Phylum cnidaria is divided into 4 Classes: Hydrozoa, Anthozoa, Scyphozoa, and Cubozoa:

1. Hydrozoa (water-animals):

They attached to bottom of freshwater & marine, their tentacles & mouth pointing up. Some live alone (solitary), some live in groups (colonial). Most hydrozoans alternate between a polyp and a medusa stage such as *Obellia*, while few of them live as a polyp alone such as *Hydra*.



2. Anthozoa (flower animals):

They are usually live at the bottom of ocean in a polyp form only and include:

- a) **Anemones** are very colorful with hundreds of tentacles & their body remains attached to a surface. They are pretty to look at, but deadly to fish swim too close.
- b) **Coral reefs** are smaller and live in colonies (hundreds or thousands of polyps) live together, sharing living tissue and food resources.



3. Scyphozoa (bowl animals)

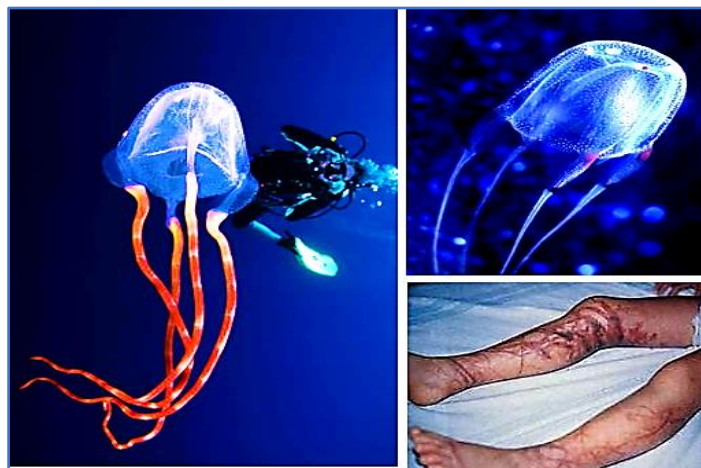
They are called *true jellyfish* with long tentacles reach over 40 meters. Their life cycle involves an alternation between sessile polyp phase and a free-swimming medusa stage that is usually predominates such as *Aurelia*. They

swim around ocean with their mouth & tentacles pointing down. They are graceful, but their stings may cause death.



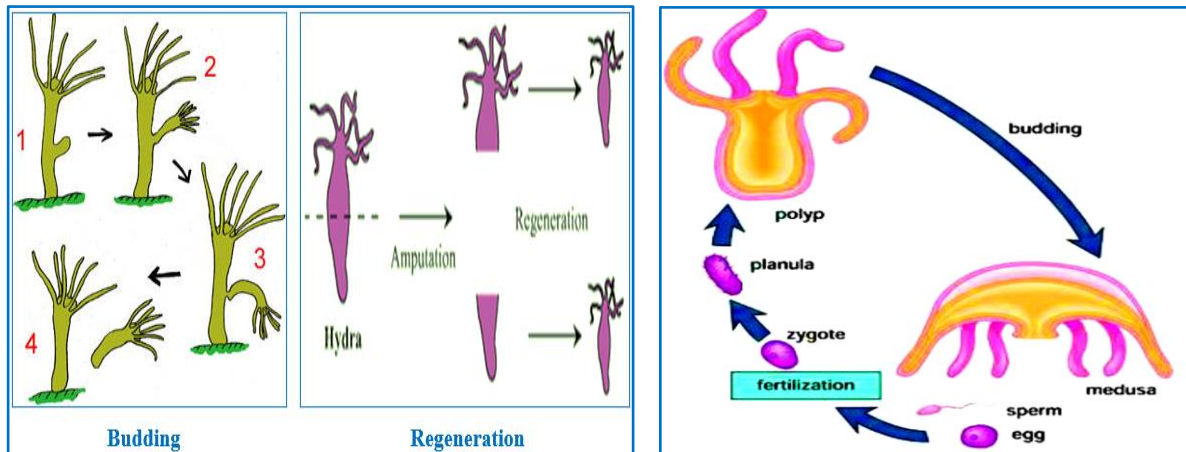
4. Cubozoa (Box jellyfish)

They are similar in form to the true jellyfish, but their bells are square shapes, possess four eye clusters (one set at each side of bell, and each set consisting of six eyes), have four sets tentacles, and can swim pretty fast. An example of these animals is *Chironex fleckeri* which is also known as the Australian sea wasp that is among the deadliest creatures in the world that caused human fatalities.



Reproduction of Cnidarians

Cnidarians with polyp shape reproduce asexually by **budding**, or **regeneration**. However, cnidarians with alternative medusa and polyp shapes can reproduce sexually by **fertilization** process when one medusa acts as female and release eggs into water and other medusa acts as male and releasing sperms. The fertilized egg grows to a larva called **planula** which swims until it finds a good site, and then becomes a polyp.



Phylum Ctenophora

Ctenophora are exclusively marine and are free-swimming animals. Although Ctenophora share several superficial similarities with phylum Cnidaria, they have several differences including:

1. Unlike cnidarians, they have plates of giant fused cilia, known as **ctenes** (meaning combs), which run in eight rows up and down their bodies and act like tiny oars, propelling the animal through the water. Therefore, they are also known as **comb-jellies**.
2. Cnidarians have cnidocytes, or stinging cells, which penetrate and inject toxins into their prey, whereas ctenophore tentacles have distinctly different sticky cells called **colloblasts** which produce a sticky secretion onto the tentacles that help in capturing prey by adhering to contact until they can bring them to their mouth and consume them.
3. Ctenophores have a complete digestive system, because they have an **anal pore** separate from the mouth.
4. Ctenophores can be radially or bilaterally symmetrical, while Cnidarians are only radially.

