

Cniderians/ Ctenophores

- 1) Phylum **Cnidaria**
 - a) More than 9000 species
- 2) Structure of Cnidaria
 - a) **Cnidocytes** presents
 - i) these typically contain **nematocysts**
 - ii) found on tentacles of most species
 - b) Most have **radial symmetry** and arranges around an oral opening
 - c) They come in two types **polyps** and **medusas**
 - d) A two-way gut called **gastrovascular cavity**
 - e) Have both a sessile life style and free floating life style
 - f) Four classes of Cnidaria
 - g) Size
 - i) Wide range in size from microscopic levels to over 1 meter in diameter
 - ii) Use **mesoglea** (a jelly like substance) to form a hydrostatic skeleton.
- 3) Feeding
 - a) Cnidocytes
 - i) Specialized cells which secrete and house **Cnidae**
 - (1) **Cnidae** are like little harpoons attached to a strong thread
 - (2) They are produced by the golgi body and the most complex secreted substance known
 - (3) Cnidae usually are filled with a fluid which contains toxins to stun, paralyze, or kill its prey.
 - (4) In order to trigger the Cnidae, which is stored inside the cell, there will be a sensory Cnidocil (little hair modified from a flagellum) sticking out
 - (5) Once a prey is captured and brought to the mouth the Cnidocytes are shed off before the prey can be ingested.
 - (a) This also works well for defensive purposes because it can irritate its potential predator and then release it.
 - b) Almost exclusively carnivorous, very few are filter feeders and even fewer have formed a symbiotic relationship with algae.
 - c) Polyps
 - i) These are sessile and food must come to them
 - ii) They use their tentacles full of cnidocytes to stun or kill prey and draw them into their mouths where digestive enzymes are secreted to digest the food before it is absorbed.
 - iii)
 - d) Medusas
 - i) These are mobile and can hunt prey down
 - ii) They use their tentacles full of cnidocytes to stun or kill prey and draw them into their mouths where digestive enzymes are secreted to digest the food before it is absorbed.
- 4) Respiration
 - a) Cnidarian do not have gills or lungs, they exchange gases across all of their surfaces.

- b) This can be an issue for an organism that has a low surface area to volume ratio (like jellyfishes)
 - i) The mesogloea is metabolically inactive and can make getting oxygen across the body difficult.
 - ii) The gastrovascular cavity is a great way to get oxygen inside and get carbon dioxide out.
- 5) Locomotion
- a) Many polyps are sessile however, others can move slowly by “crawling”
 - i) They can “step” or “looping” which they use their tentacles to attach to the substratum and then alternate tentacles to move themselves forward.
 - ii) Swimming is also a method polyps can utilize, sea anemones for example use their tentacles to row themselves to another place.
 - b) Medusas are free floating or free swimming
 - i) They use their dome shape to push water from underneath propelling them forward
 - c) Both of these forms of movements require muscle contractions.
 - i) Cnidarians are the simplest animals to have muscle fibers
 - ii) These muscle fibers act upon the hydrostatic skeleton to constrict the body.
- 6) Sense organs
- a) Simple and sessile Cnidarians have no sense organs, but they do have cells that can detect various chemical or mechanical stimuli.
 - b) More complex and mobile Cnidarians have cells that detect light,
 - i) This allows them to determine up from down, day from night... all are important for feeding behavior
 - c) All Cnidarians have a simple nervous system to help aid in detection of the stimuli and response to those stimuli (muscle contractions).
- 7) Reproduction
- a) Polyps may reproduce by asexual budding, fission, and laceration of pedal disc
 - i) Budding is when a knob of tissue forms on the side of the of an existing polyp then detaches and develops into a clone
 - ii) Fission is when half the polyp pulls away from the other
 - iii) Laceration of the pedal disc is when a part of the polyp is torn away it can spontaneously develop into a new polyp
 - b) For many of the classes sexual reproduction is the main method for reproduction and have a pretty complex life cycle
 - i) An adult medusa releases eggs and sperm, when fertilized the zygote develops into a **Planula** (a free swimming larvae)
 - ii) This larvae travels to an ideal area where it settles down and mesomorphs into a polyp
 - iii) The polyp either makes more of itself in one of the previously listed methods or it starts producing medusas and releasing them.
- 8) Classes of Cnidarians
- a) **Hydrozoa**
 - i) Marine and freshwater
 - ii) Form colonies
 - iii) Example: Portuguese man-of-war, and hydra’s

(1) These are what you observed in lab

b) **Scyphozoa**

- i) Marine
- ii) Includes most large jellies (greater than 2 meters in diameter with tentacles 60-70 meters long)
- iii) Example: giant jellyfish (sea bubble)

c) **Cubozoa**

- i) Medusa predominant form (polyp stage is unknown in many cases)
- ii) Have a cube shape
- iii) Effective predators with image forming eyes
- iv) Example: box jellyfish

d) **Anthozoa**

- i) Includes corals, polyps, sea anemones
- ii) Many supported by hardened skeletons

9) **Ctenophora**

- a) About 150 species
- b) All are marine
- c) They look like jelly fish but they do not make nematocysts
- d) Free swimming
- e) Specialized cells called **colloblasts** are used to capture prey, they secrete a stick glue like substance to collect particles for feeding.
- f) Almost all other aspects of Ctenophora are the same as Cnidaria.