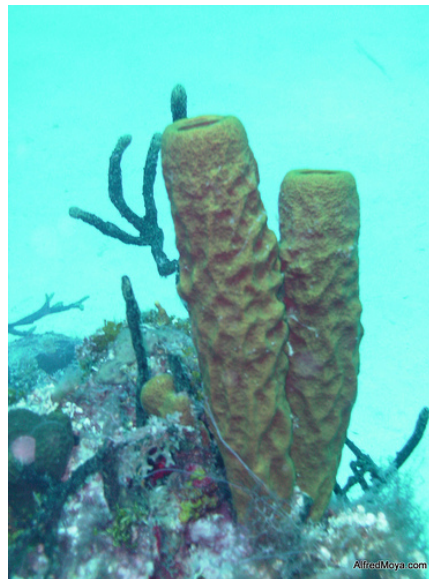


26-2: Sponges

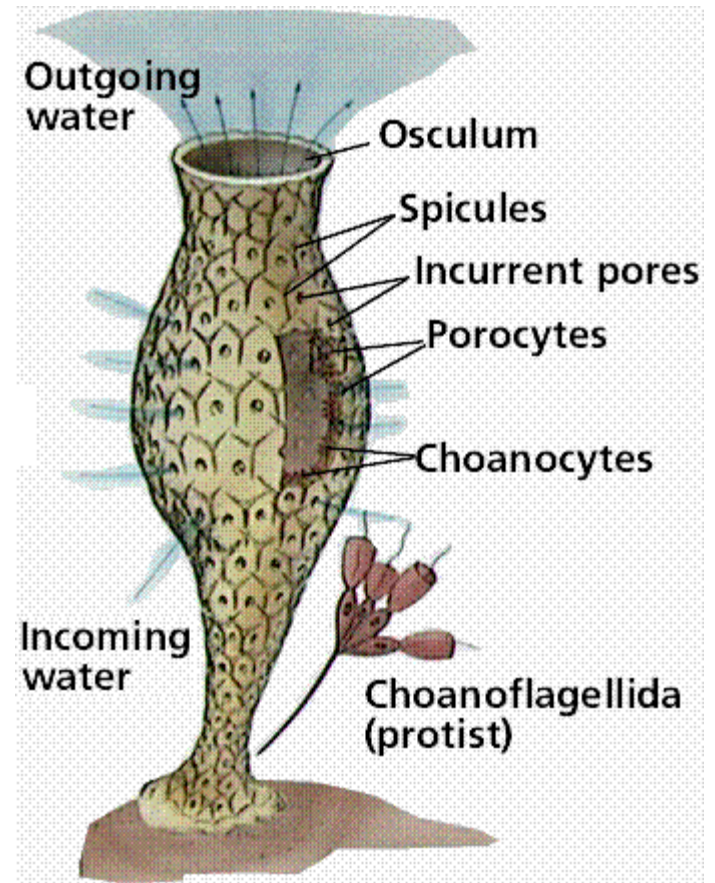
I. Sponges

A. An ancient life form; sponges date back to the beginning of the Cambrian period



B. Habitat: *live in the sea, although a few live in freshwater lakes and streams*

C. Phylum name Porifera means: pore-bearers because sponges have tiny openings all over their body



D: 3 characteristics of Phylum Porifera like most animals:

1. multicellular
2. heterotrophic
3. no cell walls
4. contain several specialized cell types that live together

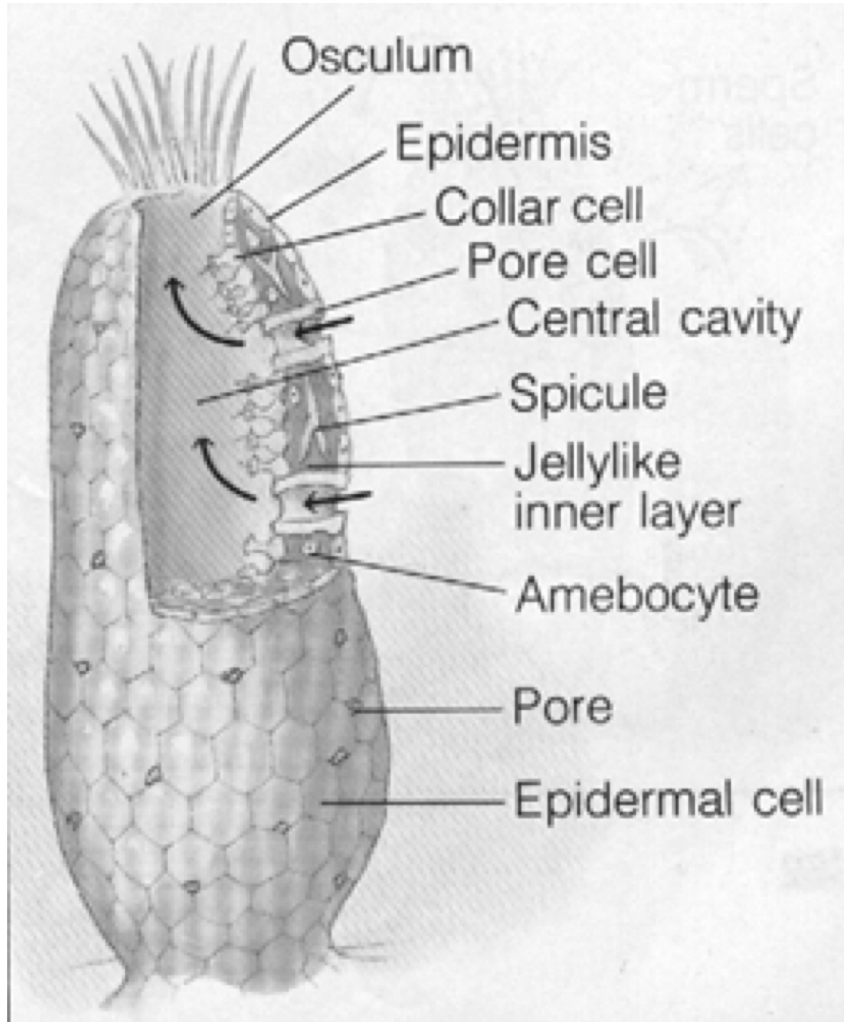
E. 2 characteristics of Phylum Porifera

unlike most animals:

1. *have no mouth or gut*
2. *no specialized tissues or organ systems*

F. Sponges probably evolved from *single-cell ancestors separately from other multicellular animals*

II. Form and Function in Sponges



B. The body of a sponge forms a wall around a central cavity

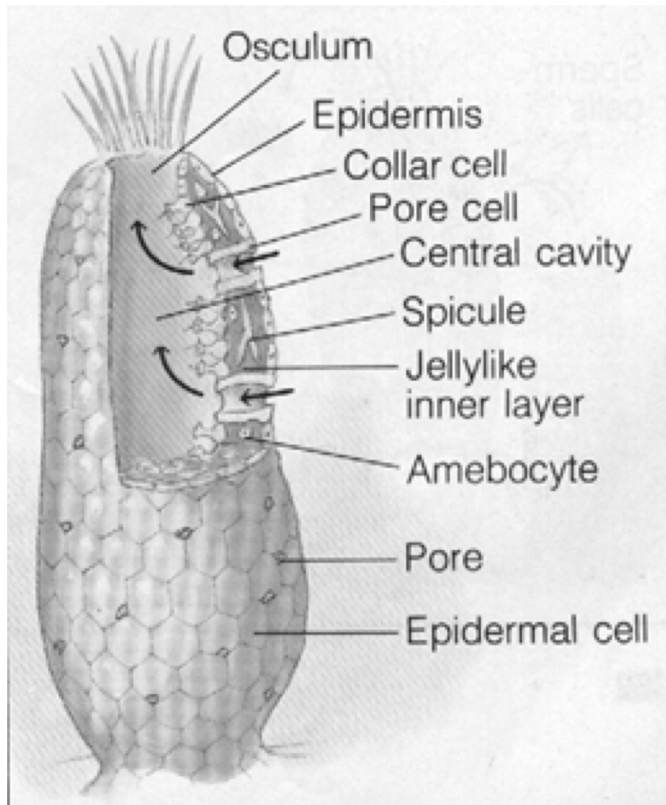
C. The wall has thousands of pores

D. Collar cells: *one of the cells forming the wall of a sponge's central cavity*

E. Osculum: *large hole through which water exits the central cavity of a sponge*

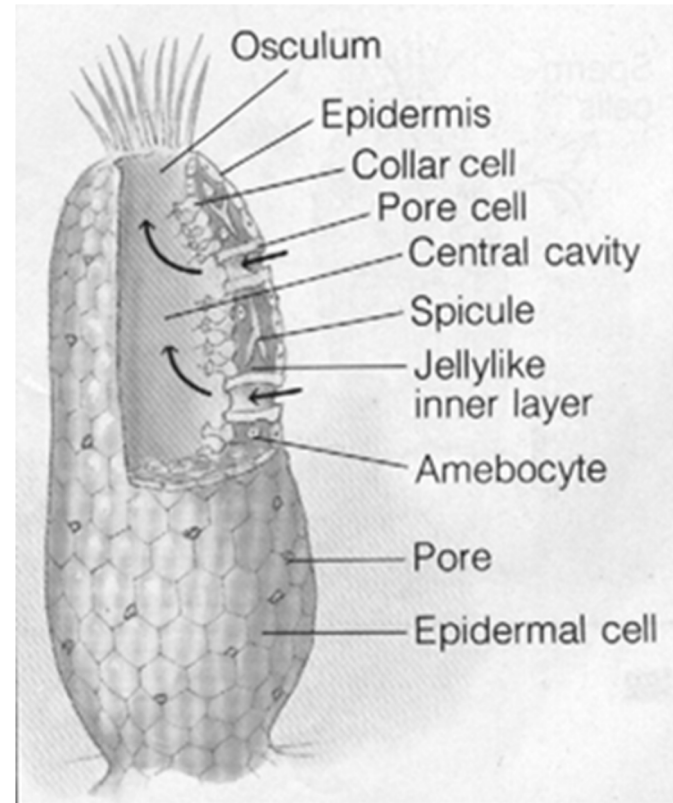
1. Functions of current of water that flows through the body of a sponge:

- a. *Delivers food to the cells*
- b. *Delivers oxygen to the cells*
- c. *Remove cellular waste products*
- d. *Transports gametes or larvae out of the sponge's body*



F. Spicules: *one of the thin, spiny structures that form the skeleton of a sponge*

1. Built by amebocyte cells
2. 2 kinds:
 - a. *Calcium carbonate (chalklike)*
 - b. *Silica (glasslike)*
3. Soft(bath) sponges are composed of a protein called spongin



G. Describe how a sponge feeds:

Filter Feed [ANIMATION](#)

As the water moves through the sponge, tiny food particles stick to the collar cells. The trapped particles are then engulfed by the collar cells where they may be digested. If the collar cells do not digest the food, they pass it on to the amebocytes. When the amebocytes are finished digesting the food particles, they wander around, delivering digested food to other parts of the sponge. Digestion is intracellular (takes place inside cells).

H. How are the following accomplished in Sponges (respiration, excretion and internal transport)?

-water flowing through a sponge will accomplish respiration, excretion, and internal transport

I. Reproduction

1. Sexual

a. Sperm is released into water flowing through the sponge and carried to the open water

b. Amebocytes pick up sperm and carries it to the sponge's eggs where fertilization occurs

c. Zygote develops into a larva that swims ; it is carried by currents before it settles down and grows into a new sponge

2. Asexual

a. Can produce structures called gemmules

b. These are sphere-shaped collections of amebocytes surrounded by a tough layer of spicules



c. Can survive long periods of

i. *Freezing*

ii. *Drought*

d. Can also reproduce by budding in which part of a sponge simply falls off the parent and grows into a new sponge

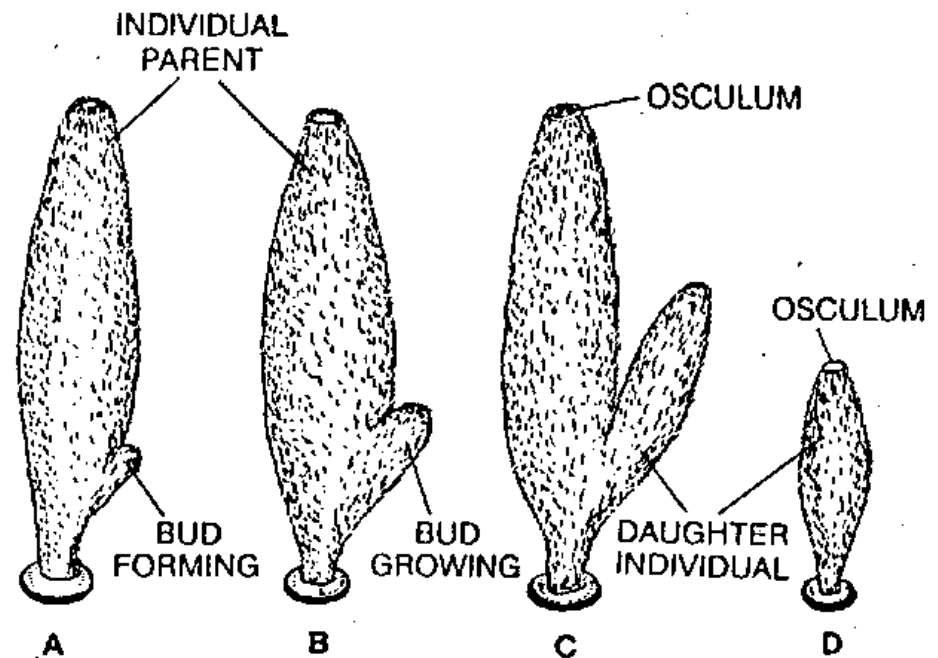


Fig. 8 : *Leucosolenia*. Stages showing budding.

3. Regeneration

a. The ability to regrow a lost or damaged part

b. Separated sponge cells will clump together and grow into several new sponges

III. How Sponges Fit into the World

- A.** 6 things that sponges contribute:
1. Often live in dark places
 2. Act as “homes” for: *other marine animals*
 3. Live in symbiosis with: *bacteria and protists*
 4. Boring sponges are important in “*cleaning up*”
the ocean floor
 5. Human uses:
 - a. *Sponges in bathing*
 - b. Protective chemicals may be
powerful toxins or act against predators

[Shape of Life VIDEO](#)

26-3 Cnidarians



[Shape of Life VIDEO](#)

I. What is a Cnidarian?

A. Characteristics of Phylum Cnidaria:

1. *Soft-bodied*
2. *Stinging tentacles arranged in circles around their mouth*
3. Live as single individuals or as a group connected into a colony

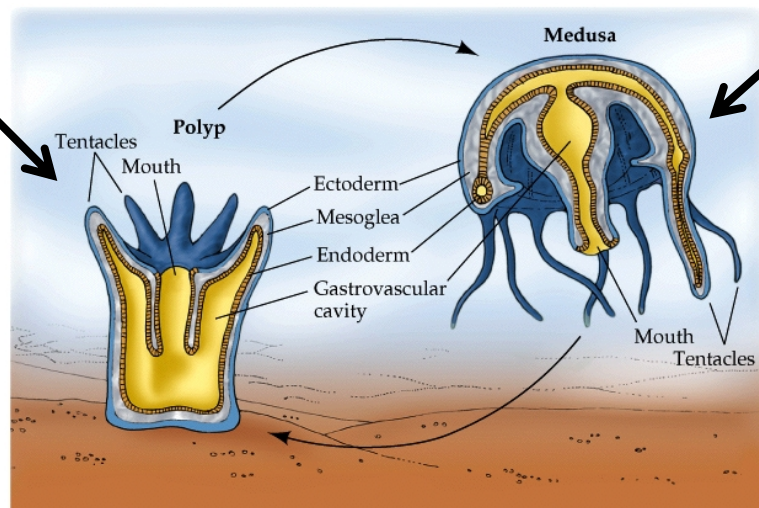
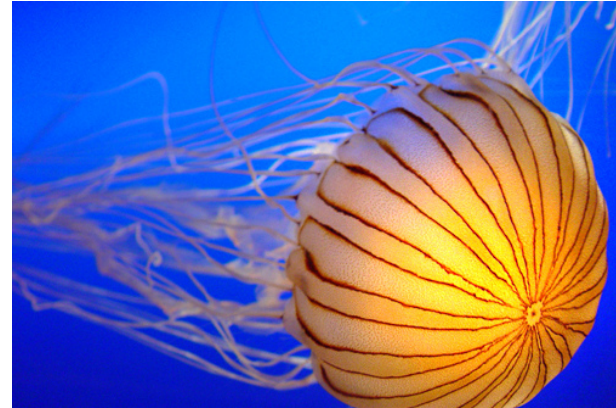


4. Symmetry: ***radial***

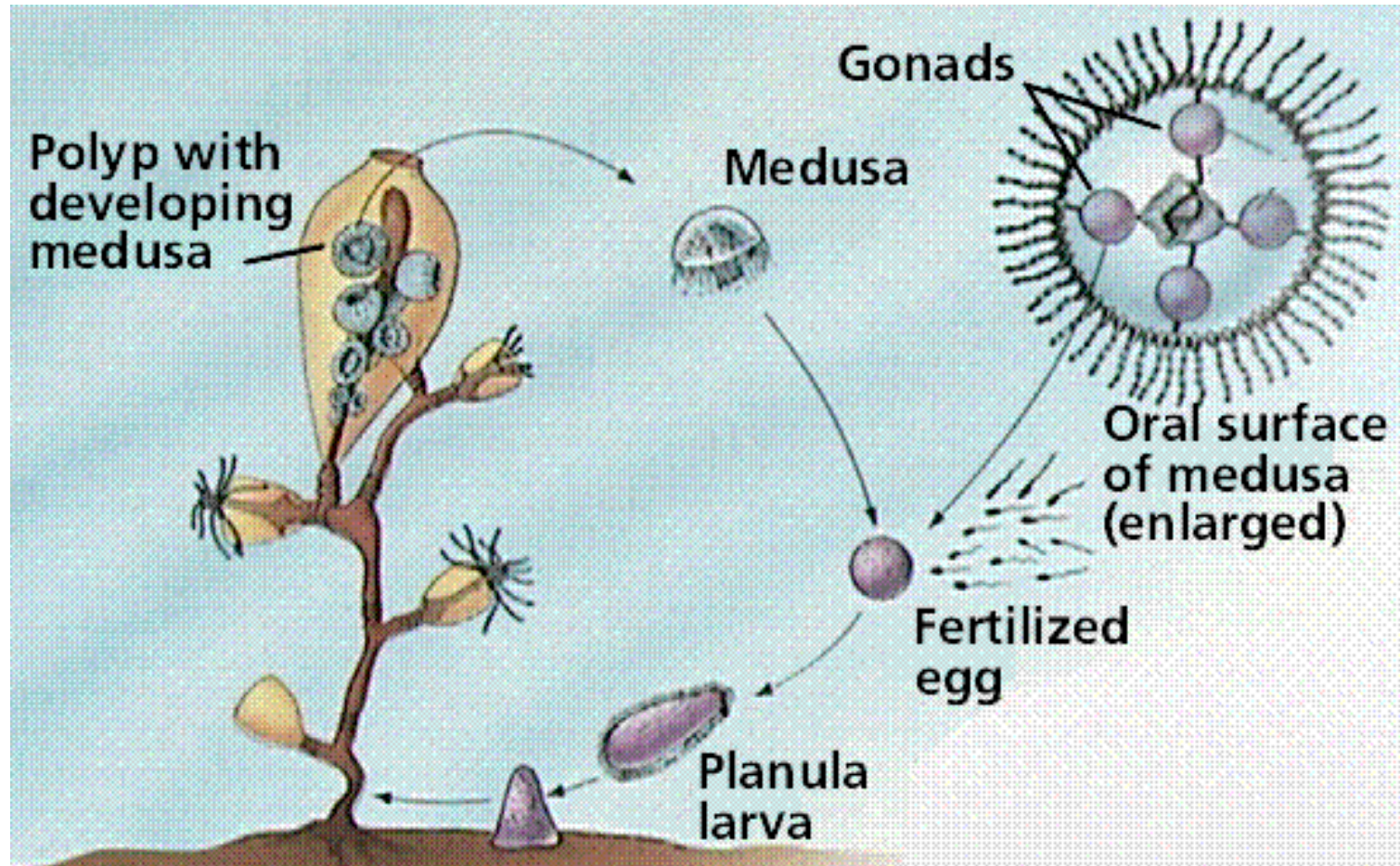
5. *Have specialized cells and tissues*

6. Life cycles with two stages: [animation](#)

a) *Sessile flowerlike polyp* b) *Motile bell-shaped medusa*



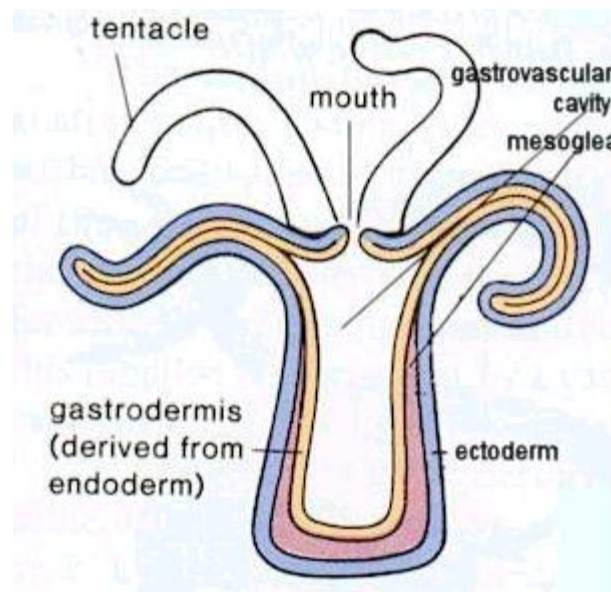
Cnidarian Life Cycle



B. Body Plan

1. Have a body wall that surround an internal space called the *gastrovascular* cavity

a) Function of cavity: *digestion*

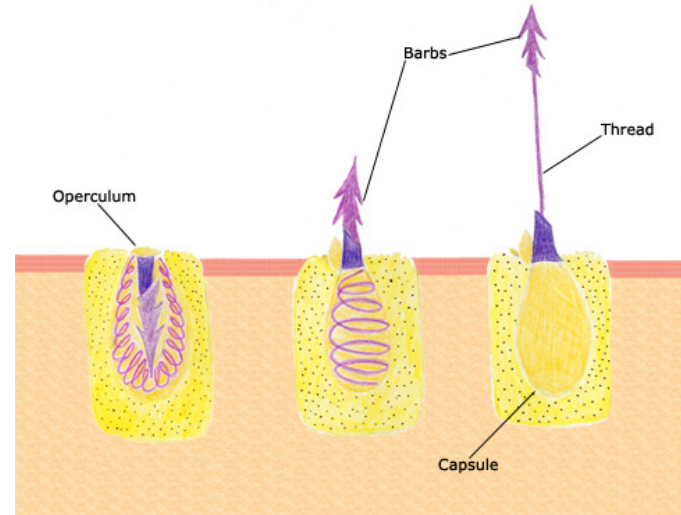


II. Form and Function in Cnidarians

A. **Nematocyst:** *stinging structure on the tentacles of cnidarians that is used to paralyze or kill prey*

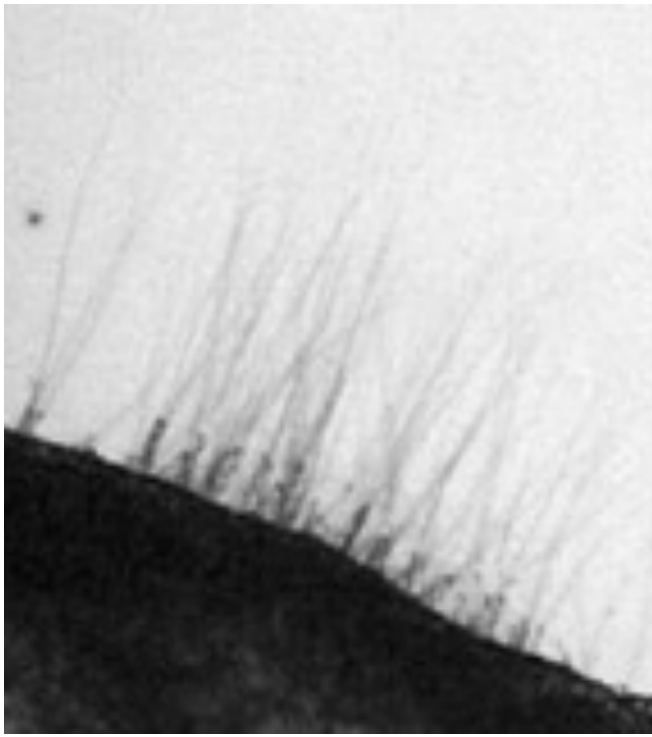
[TED-Ed How Jellyfish Sting](#)

1. Each nematocyst is a poison-filled sac containing a tightly coiled "spring-loaded" dart



[Nematocysts in action](#)

[Nematocysts explained](#)



Stung by a box jellyfish



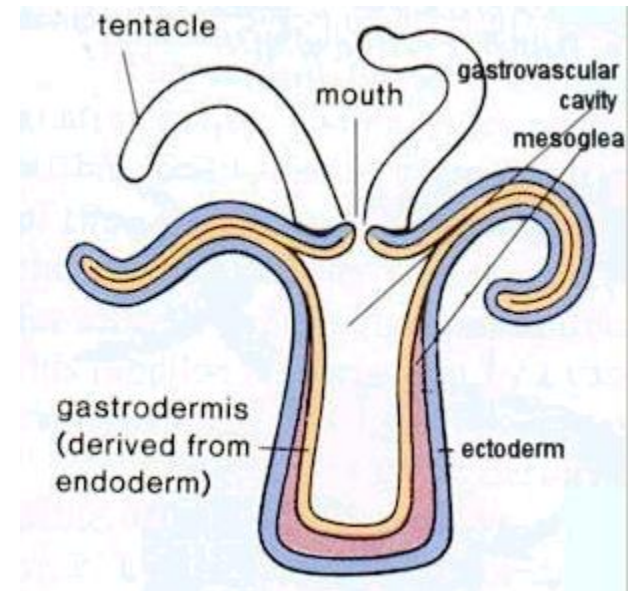
2. Feeding/Digestion:

- a) When another animal touches a nematocyst, the dart explodes and buries itself in the skin of the animal
- b) The dart carries enough poison to paralyze or kill the prey.



c) The cnidarian's tentacles push the food through the mouth and into the gastrovascular cavity.

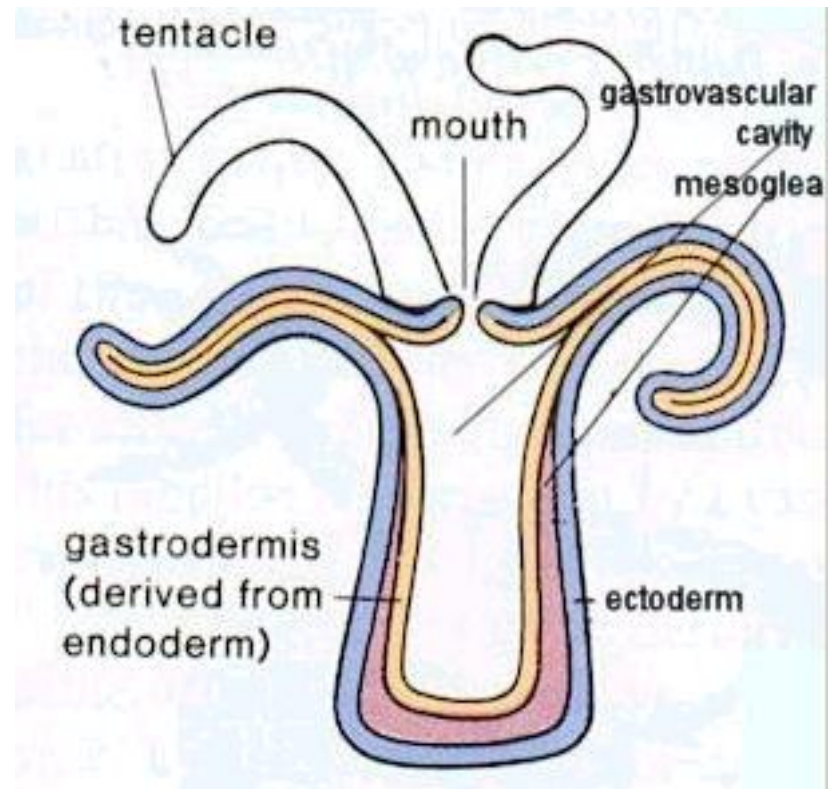
There the food is broken up into tiny pieces. These food fragments are taken up by cells in the gastroderm that digest them further



- [Video – Anemone Eating Dead Shrimp](#)

e) The nutrients are then transported throughout the body by diffusion

f) Undigested material passes out through the gastrovascular cavity.



Form and Function in Cnidarians Cont'd..

B. Respiration by diffusion

C. Excretion by diffusion

D. Nervous System

1. Composed of nerve nets concentrated around the mouth

2. Sensory cells are in the epidermis

a) Detect chemicals from food

b) Detect touch of foreign objects

3. **Medusae** may have simple sense organs:

- a) Statocysts involved with balance
- b) Ocelli, or Eyespots, detect light



E. Movement

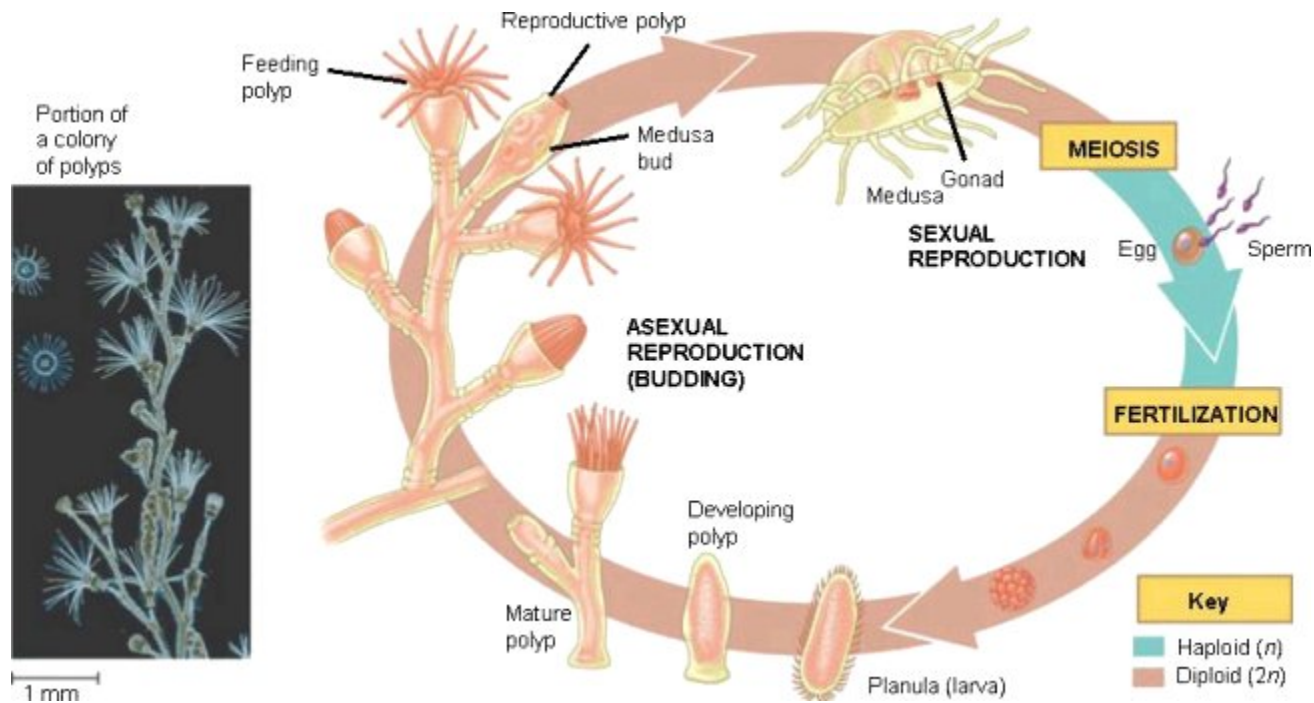
1. Cnidarians lack muscle cells.

2. Epidermal cells can change shape when stimulated by nerve • [Jellyfish Swimming](#)
net

3. Polyps can expand, shrink and move their tentacles by relaxing or contracting these cells

4. Medusae can move by jet propulsion by causing their bodies to "close" like a folding umbrella. This contraction of the body pushes water out of the bell

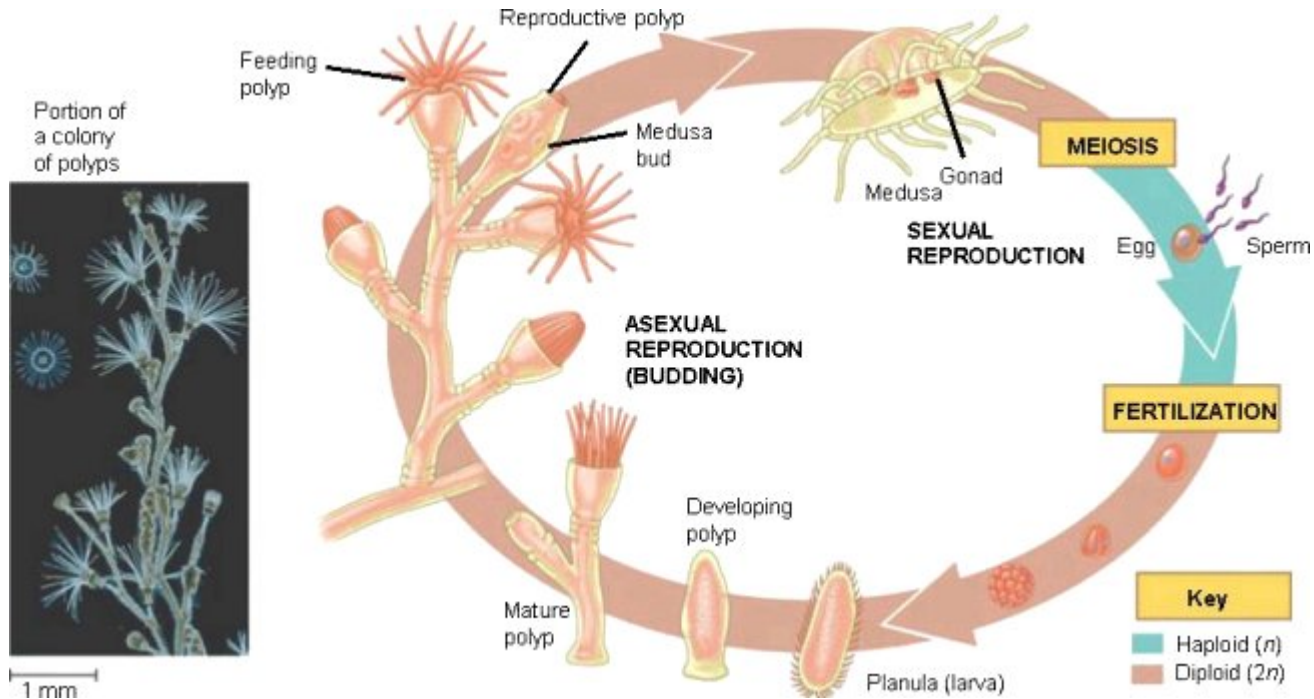
F. Reproduction



1. Describe asexual reproduction:

Budding - begins with a swelling on the side of an existing individual

2. Describe sexual reproduction: [Video](#)



When the medusae mature, they reproduce sexually by releasing gametes into the water.

Fertilization occurs either in open water or inside an egg-carrying medusa. The zygote grows into a ciliated larva that swims around and settles down, attaches to a surface, and changes into a polyp

III. Hydras and Their Relatives

A. Class: *Hydrozoa*

B. Spend most of life as *polyps*:

C. Grow in *branching, sessile* colonies

D. Hydras

1. Hydras are not typical Class Hydrozoa because they live as *solitary* polyps and lack the *medusa* stage in their life cycle.

2. Hydras can move by doing a *somersaulting movement*

3. Reproduction:

a) Asexual: *budding*

b) Sexual: *producing of eggs and sperm in their body walls*



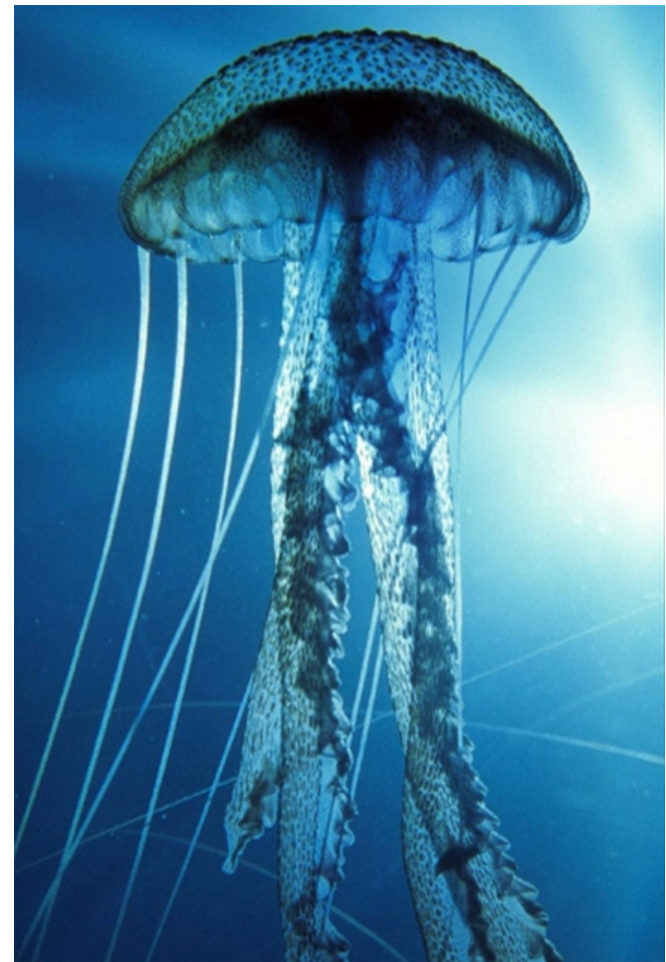
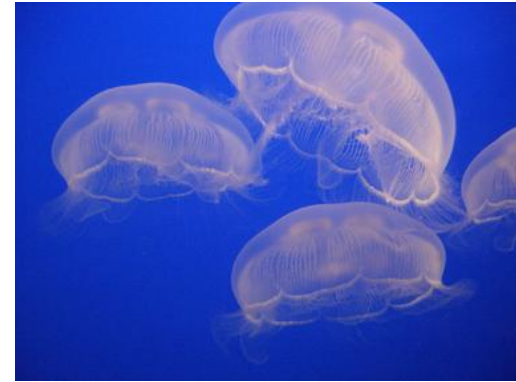
IV. Jellyfish

Ted-Ed Jellyfish

A. Class: Scyphozoa

B. The medusa is large & long-lived (dominant)

C. Nematocysts mostly harmless to humans; some can cause painful stings or death



V. Sea Anemones and Corals

A. Class: *Anthozoa*

B. Life Cycle: only the *polyp* stage

C. Sea anemones:

1. Habitat: *sea from the low-tide line to great depths*



D. Corals: [Video](#)



1. **Habitat:** *shallow tropical waters*

2. **Skeleton:** *made of calcium carbonate (limestone)*

3. **Colonies** produce coral reefs, which can contain more rock and *living tissue* than the largest human Cities

e.g.: *The Great Barrier Reef (Australia) is more than 2000 km long and 80 km wide*

VI. How Cnidarians Fit into the World

A. Coral Reefs: [TED-Ed Coral Reef](#)

- 1. Ecological importance:** *provide tunnels, caves and deep channels for other animals to live* [TED-Ed Coral Reef 2](#)
- 2. Benefits to Humans:**
 - a) *Provide a home for food organisms*
 - b) *Protect the land from the destructive action of waves*
 - c) *Aids in the location of oil deposits*

B. Chemicals:

1. Potential anti - cancer drugs

2. Nerve toxins reveal how nerve cells and systems work

[Strange Video](#)