

“Opportunity is missed by most people because it is dressed in overalls and looks like work”
– Thomas A. Edison

Deuterostomes and Circulation

Chapters 33, 34, and 42

Phylum: Echinodermata

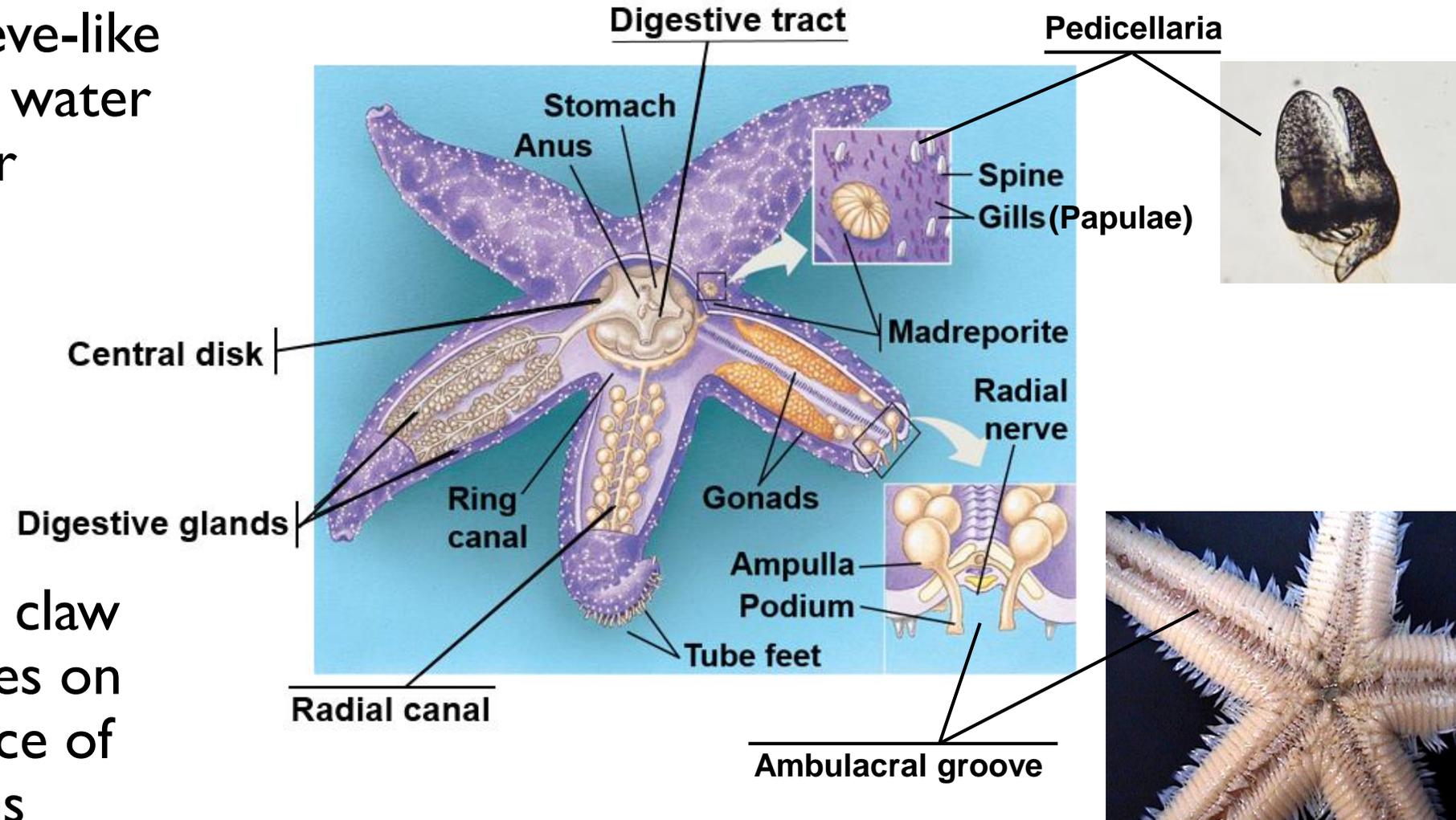
- ▶ Sea stars, brittle stars, sea cucumbers
- ▶ Secondary radial symmetry
 - ▶ Larval form has bilateral symmetry
 - ▶ Pentaradial symmetry
- ▶ **Water vascular system**: network of hydraulic canals branching into extensions called **tube feet** that function in locomotion and feeding
- ▶ All marine
- ▶ Regeneration
- ▶ Calcareous endoskeleton



General Echinoderm Anatomy

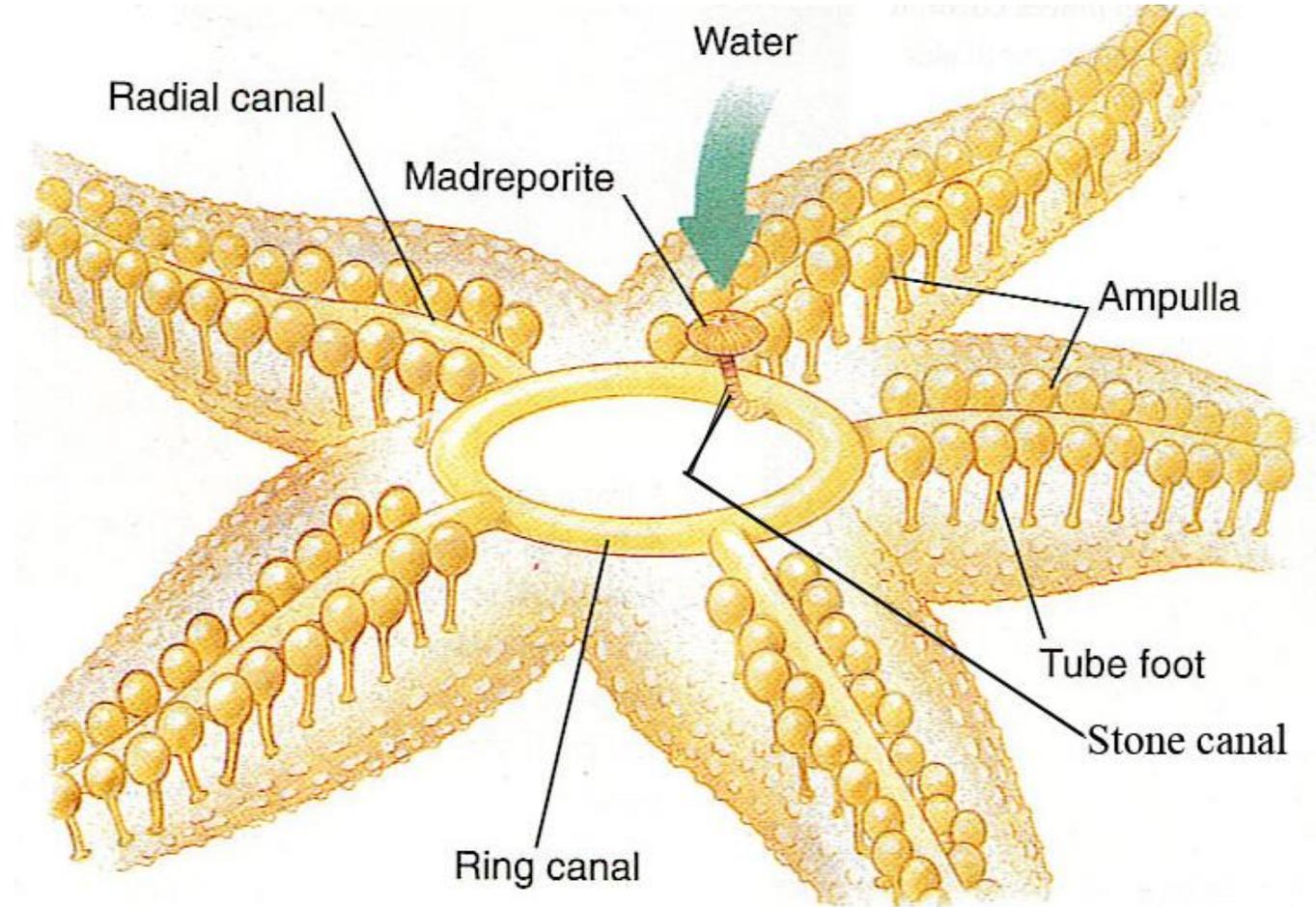
- ▶ **Madreporite:** Sieve-like plate which filters water entering the water vascular system

- ▶ **Pedicellaria:** tiny claw or clamp structures on the external surface of some echinoderms



Water Vascular System

1. Madreporite
2. Stone Canal
3. Ring Canal
4. Radial Canal
5. Lateral Canal
6. Ampulla
7. Tube Feet

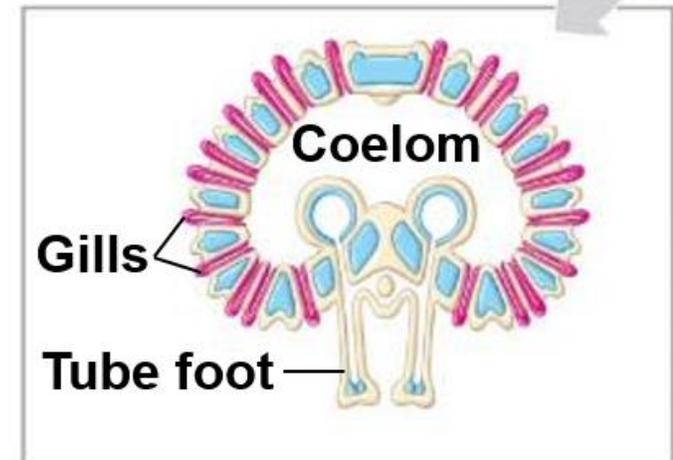
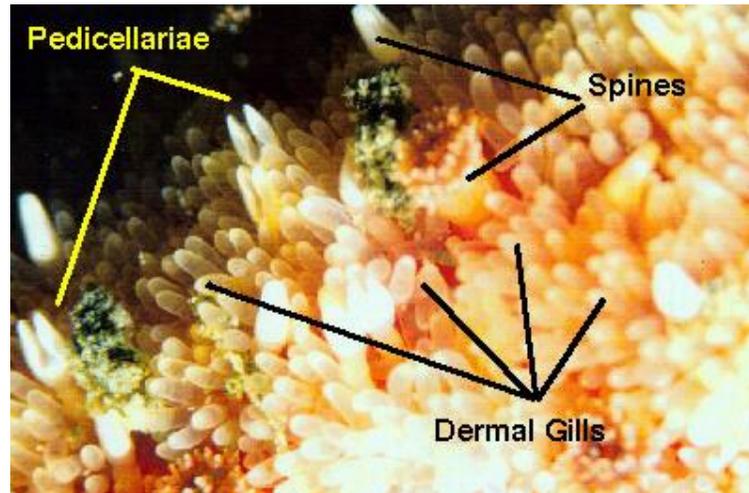


Respiratory System in Echinoderms

Dermal branchiae or papulae:

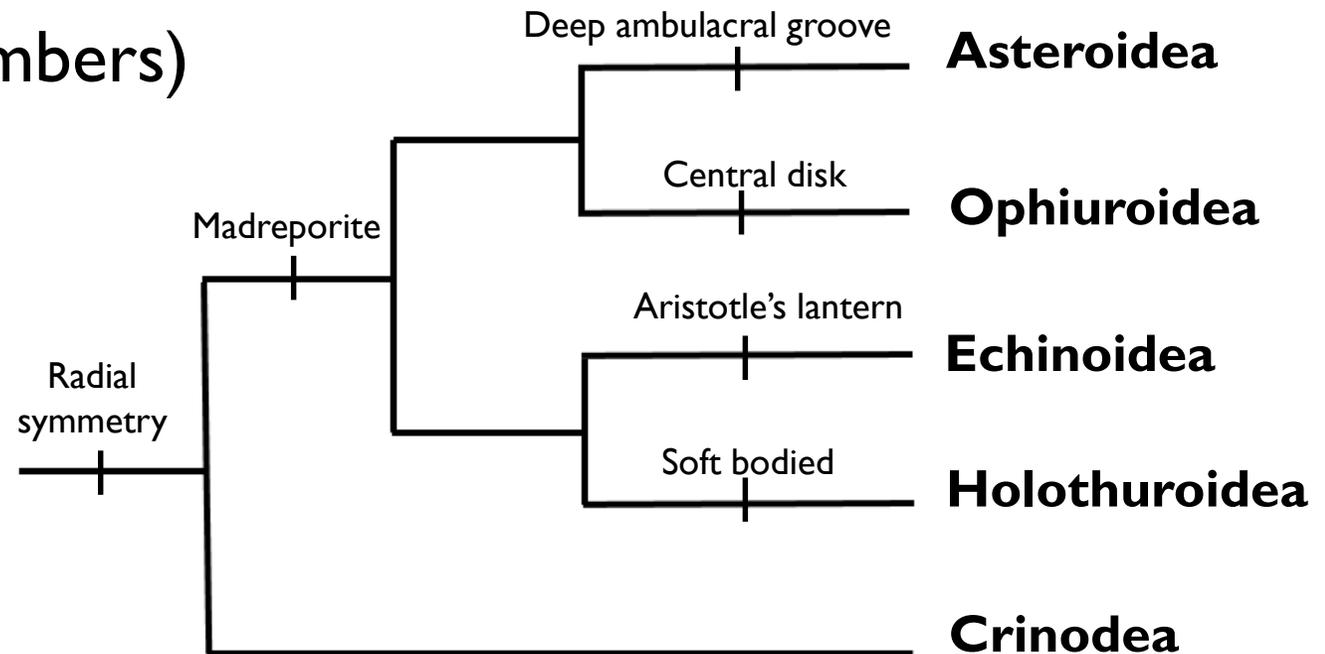
hollow projections within the skin that extend to the coelom.

- ▶ Respiration and excretion
- ▶ Diffusion across gill surface



Classification

- ▶ Class: Asterozoa (Sea stars)
- ▶ Class: Ophiurozoa (Brittle stars)
- ▶ Class: Echinozoa (Sea Urchins, Sand Dollars)
- ▶ Class: Holothurozoa (Sea Cucumbers)
- ▶ Class: Crinozoa (Sea Lilies)



Phylum: Echinodermata, Class: Crinoidea

- ▶ Sea lilies and feather stars
- ▶ Attached to substrate with many branched arms
- ▶ Suspension feeder
- ▶ Open ambulacral grooves
- ▶ No Madreporite
- ▶ No pedicellariae or papulae

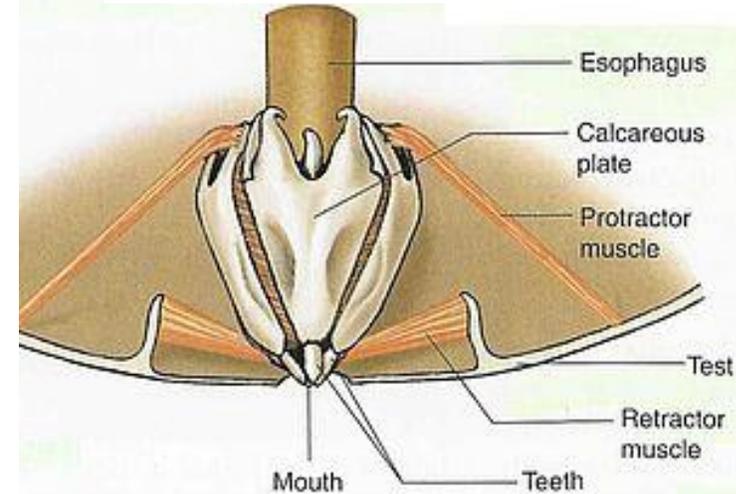


Phylum: Echinodermata, Class: Echinoidea

- ▶ Sea urchins
- ▶ No arms but have five rows of tube feet
- ▶ Spines
- ▶ Closed ambulacral grooves
- ▶ Madreporite on the aboral side
- ▶ Contain pedicellariae or papulae
- ▶ Aristotle's lantern: calcareous plates and muscles supporting teeth of a sea urchin



Aristotle's lantern



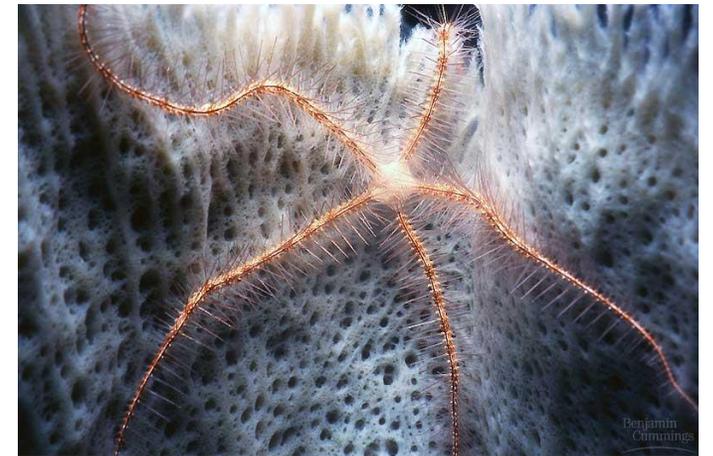
Phylum: Echinodermata, Class: Holothuroidea

- ▶ Sea cucumbers
- ▶ Soft bodied
- ▶ Lack spines
- ▶ Five rows of tube feet
- ▶ Closed ambulacral groove
- ▶ Internal madreporite
- ▶ No pedicellariae or papulae



Phylum: Echinodermata, Class: Ophiuroidea

- ▶ Brittle stars
- ▶ Five thin arms radiating from a central disc
 - ▶ No organs in arms
- ▶ Closed ambulacral grooves
- ▶ Madreporite on the oral side
- ▶ No suckers on tube feet, pedicellariae or papulae

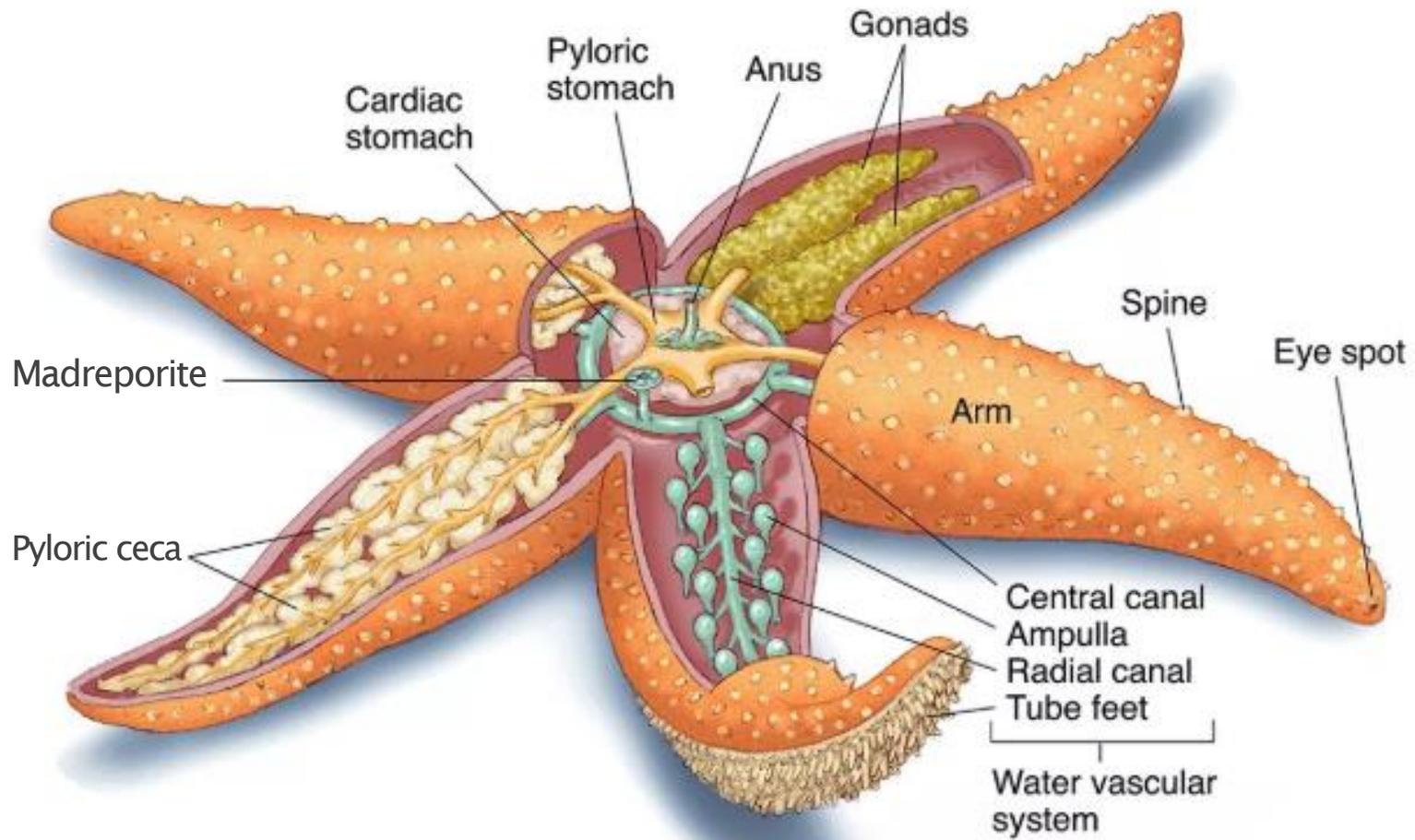


Phylum Echinodermata, Class: Asterozoa

- ▶ Sea stars (not fish!!)
- ▶ Five arms radiating from a central disc
- ▶ Open ambulacral groove
- ▶ Madreporite on the aboral side
- ▶ Contain pedicellariae or papulae
- ▶ Intertidal predators
 - ▶ Bivalves
 - ▶ Keystone species



Sea Star Anatomy



Sea Star Anatomy

