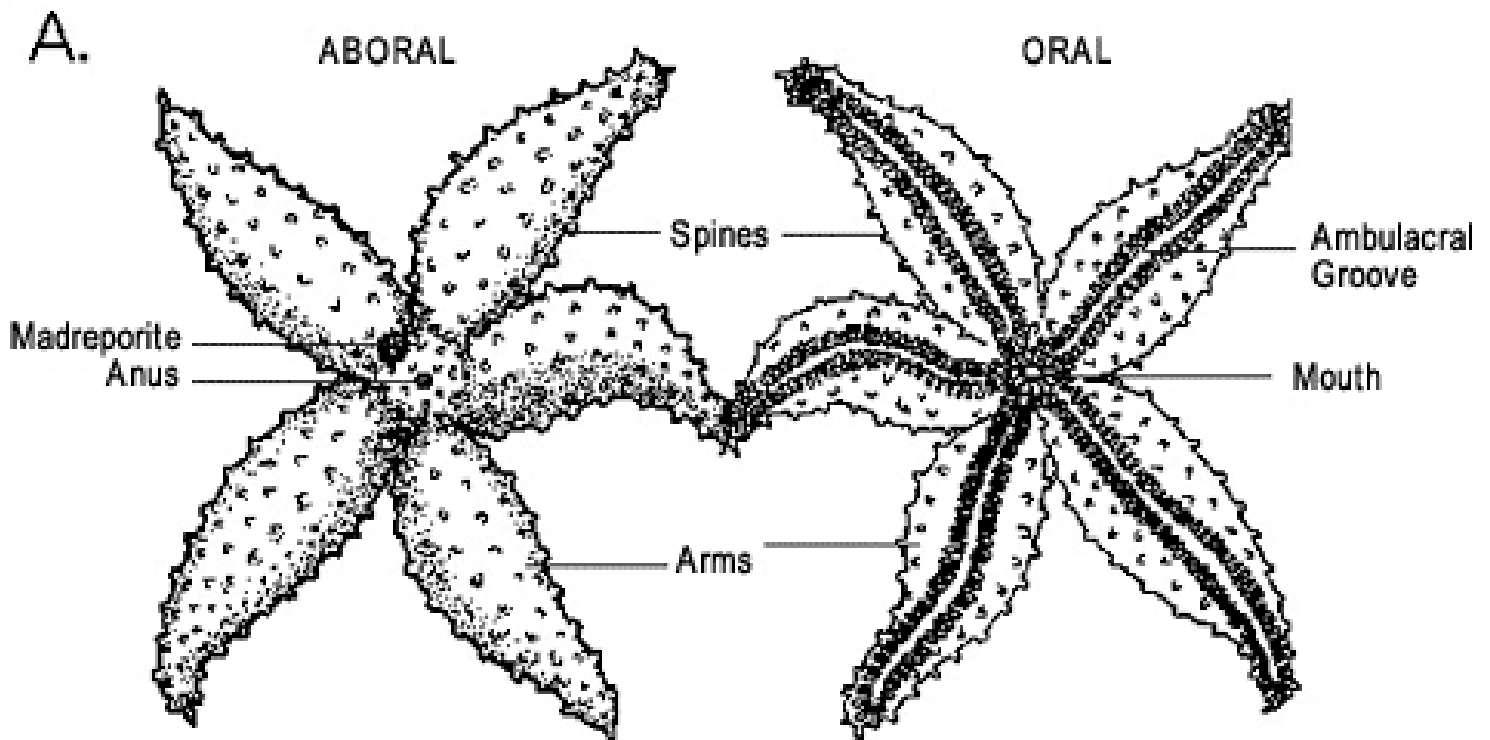


BIOLOGY TWO DISSECTION
THE STARFISH
PHYLUM ECHINODERMATA
CLASS ASTEROIDEA

PART ONE – EXTERNAL ANATOMY.

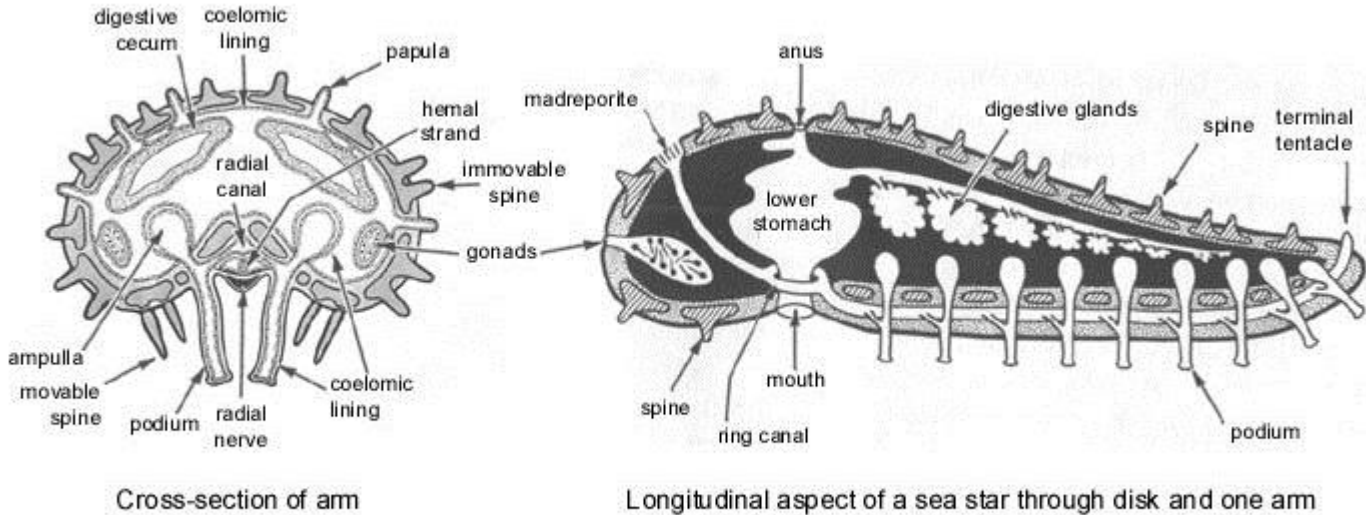
1. Distinguish the oral side from the aboral side.
2. Locate the central disk and the aboral madreporite
3. A pair of arms, the bivium, borders the madreporite. The other arms form the trivium.
4. The anus is a fine pore in the center of the aboral surface.
5. Observe the mouth on the oral surface.
6. Around the mouth is a soft membranous zone called the peristome and a protective circle of movable oral spines.
7. Examine the other spines.
8. Study the ambulacral grooves in the arms on the oral surface. Observe the arrangement of the tube feet (or podia.)
9. Examine the aboral surface with a dissecting scope. Identify the dermal branchiae. These represent the major surface in contact with the aquatic environment. They offer an excellent means of respiratory exchange.
10. Still with the dissecting scope, identify the pedicellariae. Locate some pedicellariae jaws. These are used as tiny snap jaws to rid the starfish of external parasites.



PART TWO – INTERNAL ANATOMY.

Scissors will be more effective than a scalpel.

1. Cut off one arm of your specimen and observe the cross section of the stump.
2. Observe the arrangement of ossicles and their fixed aboral spines and movable oral spines along the ambulacral groove,



Schematic diagram of a common sea star

Use the diagrams on the following pages for guidance

THE DIGESTIVE SYSTEM.

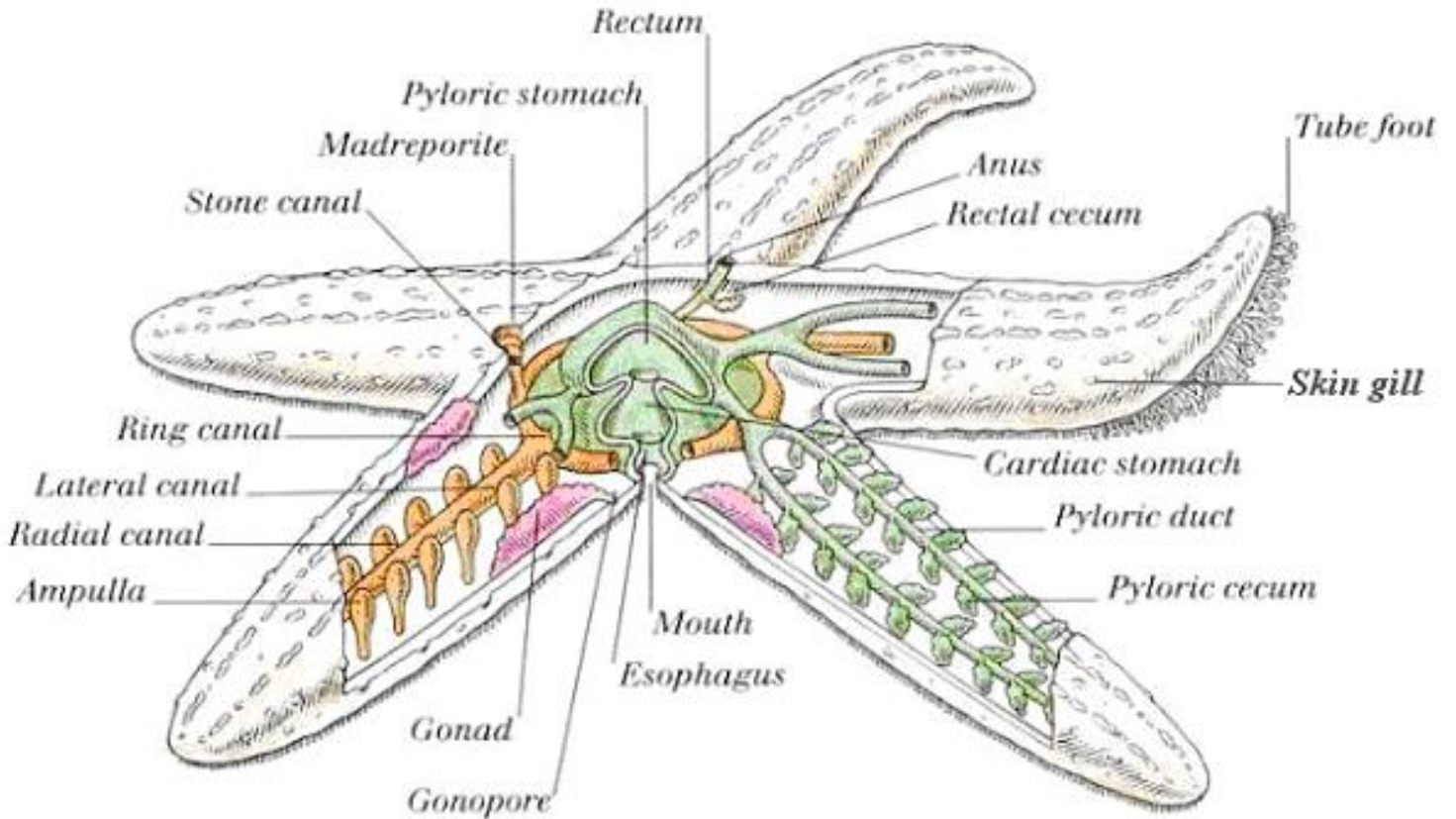
3. Digestive organs are best seen by removing the aboral body wall. Cut the tip from one arm.
4. Then make two lateral cuts extending toward the central disk.
5. Lift the endoskeleton by trimming the mesenteries attached to it so as not to disturb the pyloric ceca, large paired organs just under the aboral endoskeleton.
6. Next, remove the aboral disk by making a circular cut, loosening adherent mesenteries as before. Avoid cutting out the Madreporite.
7. Cutting outward from the central disk, finish removing the aboral endoskeleton from each of the remaining arms.
8. Trace the connection between the digestive glands and disk.
9. Note where the two hepatic ducts of each arm join and enter the stomach.
10. Observe that the stomach has two portions. The small aboral pyloric stomach, connecting with the hepatic ducts, and the larger bag like cardiac stomach that lies orally and is the portion everted through the mouth while feeding.
11. Five pairs of retractor muscles, one pair from each arm, attach to the cardiac stomach walls.
12. Aboral to the pyloric stomach, near the center of that stomach, is the single pair of small lobed rectal ceca. These are attached to a fine intestine that opens externally to a small anal pore.

THE REPRODUCTIVE SYSTEM.

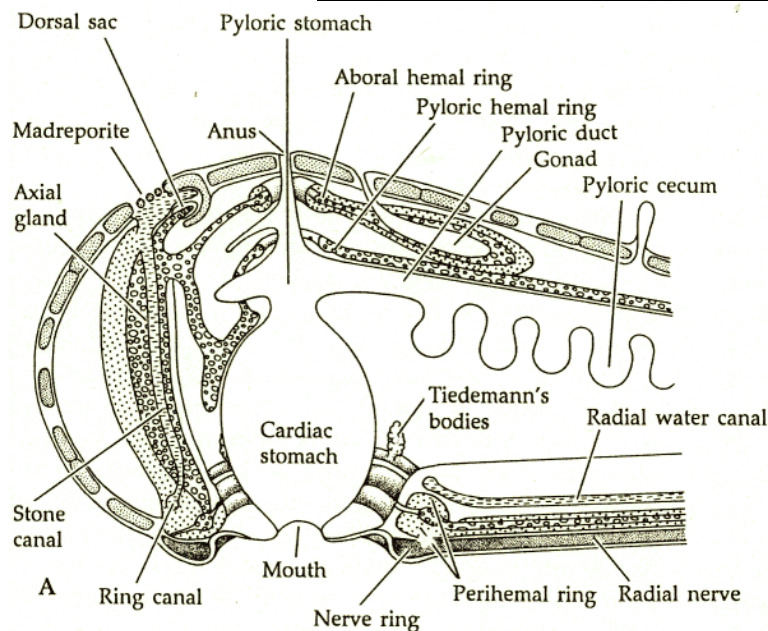
13. A pair of glandular gonads lies under the hepatic ceca in each arm, usually ventrolaterally, along side the ambulacral groove.
14. Gonads vary in size from the insignificantly small to those filling most of the coelomic space. This depends on the breeding cycle phase at the time of the animal's capture.

15. Gonaducts between the arms send sexual products out via extremely small genital pores in the disk. One per gonad, two per arm around the periphery of the central disk.
16. Make a wet mount of a very small portion of the gonadal tissue and examine it under a microscope.

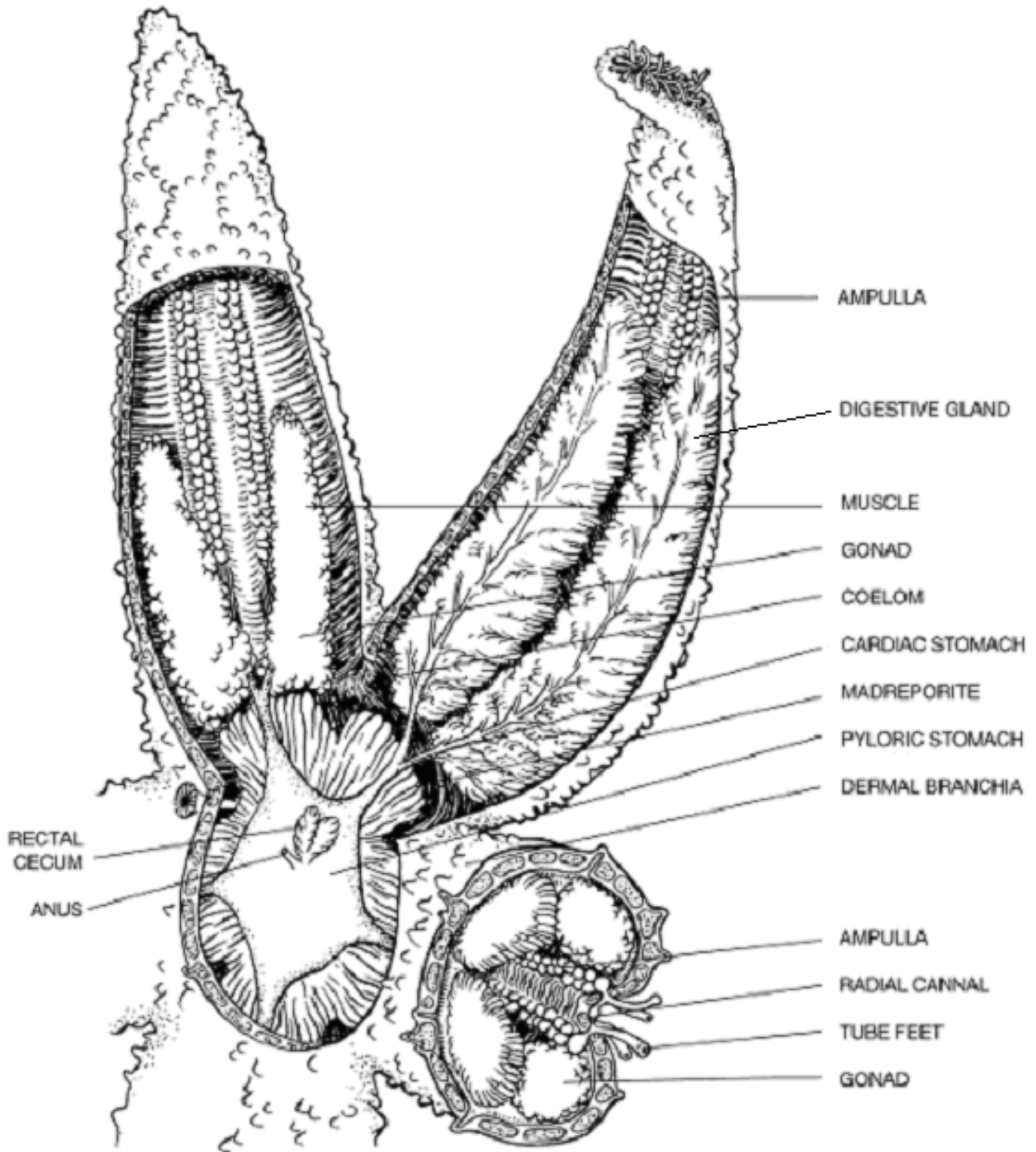
INTERNAL ANATOMY OF A STARFISH



CROSS SECTION THROUGH THE CENTRAL DISK



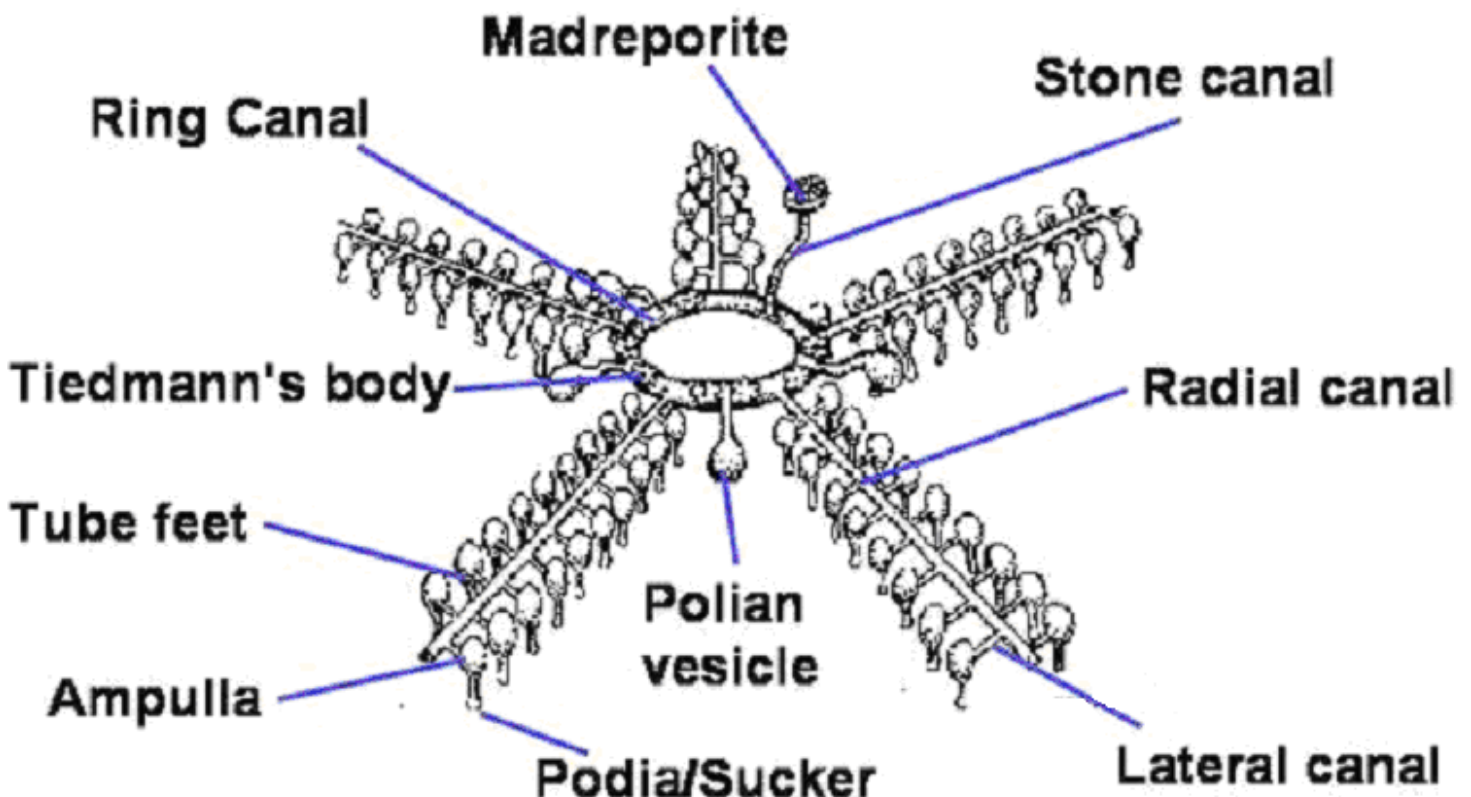
DETAILS OF THE STARFISH INTERNAL ANATOMY



THE WATER-VASCULAR SYSTEM

17. The water-vascular system, a unique internal water pressure system consists of a madreporite leading ventrally through a stone canal to a ring canal circling the mouth and branching out into each arm via radial canals.
18. The Tiedemann bodies are nine small swellings on the inner margin of the ring canal. They are related to the formation of certain cells in the water-vascular fluid.
19. The basic units of the water-vascular system are the tube feet. They lie alongside the radial canals, each tube foot connected to the canal by a short lateral canal.
20. Each tube foot consists of a tubular portion protruding into the ambulacral groove, and an internal swollen ampulla.
21. Next, find the radial canal in the center of the ambulacral groove of the cut arms.
22. Dissect further in this cut portion until you can discern the lateral canal between the radial canal and a tube foot. Trace the radial canal toward the disk and find its connection to the ring canal.
23. Expose the ring canal in turn and find the Tiedemann bodies.
24. The ossicle reinforced stone canal rises from the ring canal and emerges to the outside via the madreporite.

A DIAGRAM OF THE WATER-VASCULAR SYSTEM



ANOTHER DIAGRAM OF THE WATER-VASCULAR SYSTEM ON THE NEXT PAGE...

► The starfish's water vascular system provides the water pressure that operates the animal's tube feet. From the madreporite, water moves into the ring canal, then into the rays through radial canals, and finally to the tube feet. The canals are like a network of water pipes attached to the tube feet. Water also exits the body through the madreporite.

