

CANAL SYSTEM IN SPONGES

Introduction → The Sponges belonging to phylum Porifera have a perforated body the body wall is pierced by a number of pores known as ostia leading into a system of tube like structures called canal system.

The most vital role of canal system is carry the exchange of materials from outside to inner body since the animals are sessile in nature and movement of sea water brings nutrients and oxygen inside the body through water current and takes away the waste materials and lay as well the reproductive cells to the surrounding medium which is fresh water (Demospongiae) and marine water. The water current is formed by the beating of flagella of collar cells.

Types of Canal System →

According to the arrangement of internal channels the canal system is divided into following three types -

1. Ascon type
2. Sycon type
3. Leucon type

Ascon type - It is the simplest type of canal system found in asconoid sponges. The body surface is pierced by a large number of minute openings called ostia or incurrent canals. These ~~open~~ pores are intracellular spaces within tube like cells, the porocytes, which extend radially into mesenchyme and open directly into spongocoel. The spongocoel is

a single large spacious central cavity lined by flagellated collar cells or choanocytes, spongocoel opens outside through a narrow circular opening the osculum fringed with monaxon spicules.

Flow of water →

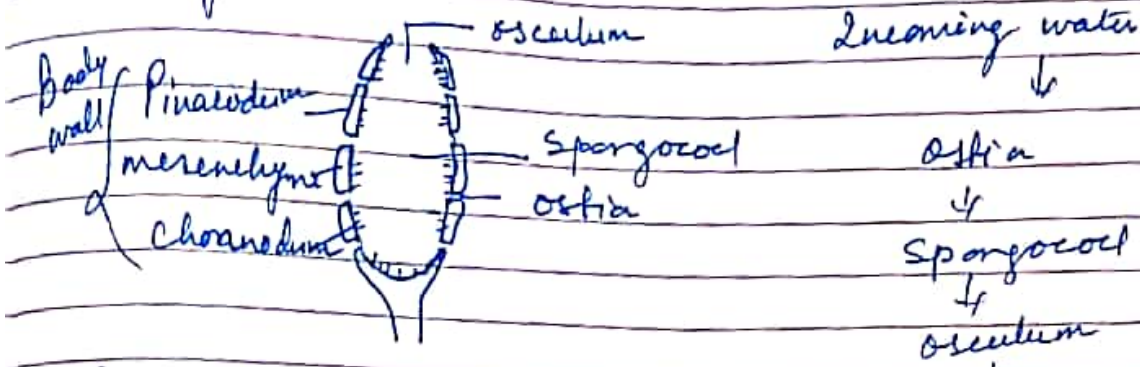
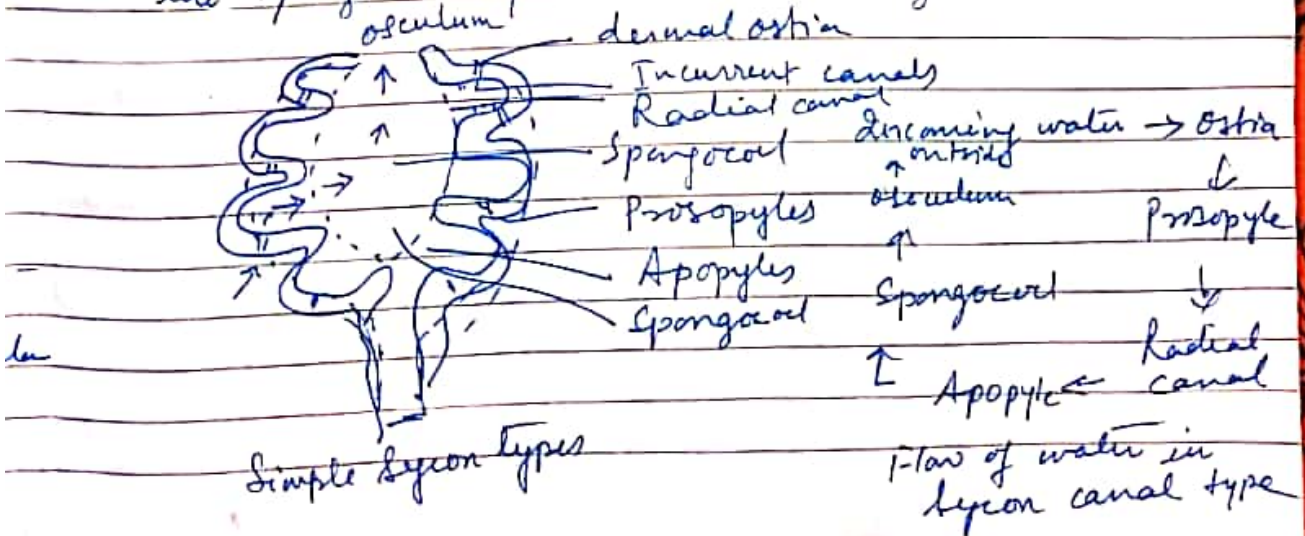


Fig- Ascon type of Canal System. Outside
eg- Leucosolenia

SYCON TYPE → It is a characteristic canal system of Syconoid sponges. Body wall of Syconoid sponges includes two types of canals, incurrent and radial paralleling and alternating with each other. Both types of canals end blindly in body wall interconnected by minute pores called incurrent pores or dermal ostia, present at the outer surface of body. They are non flagellated, lined by pinocytes leads to adjacent radial canals called prosopyles. radial canals are flagellated chambers lined only by choanocytes, these canals opens into central spongocoel through internal ostia or apopyles. the spongocoel opens outside through osculum.

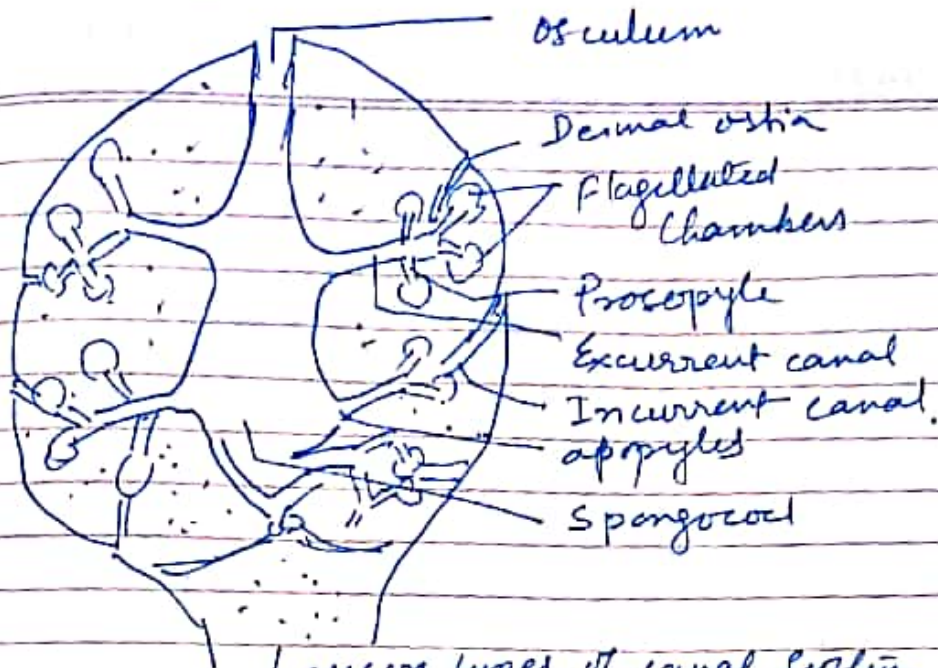


LEUCON TYPE → This type is characteristic of Leuconoid sponges for eg Spongilla in which there is further folding of body wall giving rise to more complex canal system in this system here radial symmetry is lost and canal system becomes very irregular, flagellated chambers are small, spherical and lined by choanocytes, all other spaces are lined by pinacocytes, incurrent canals open in flagellated chambers, through protopyles, which opens into excurrent canals through apopyles, the spongocoel shrinks and divides the excurrent canals opens out side through osculum.

Rhagon type - In Demospongiae the leuconoid condition derives from a larval stage called rhagon, spongocoel of rhagon is surrounded by flagellated chambers opening into it through very wide apopyles, a single osculum opens at the top of spongocoel

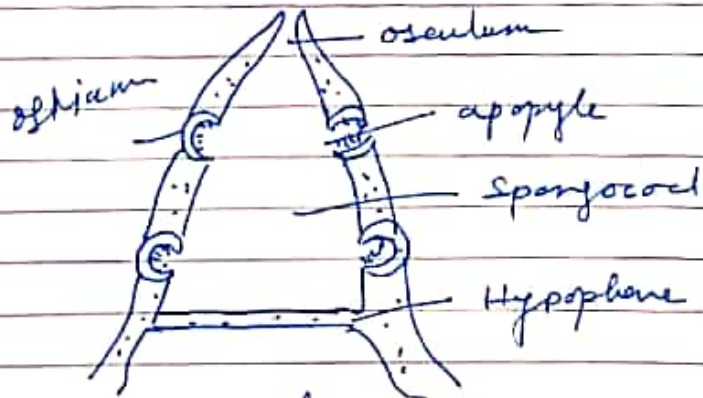
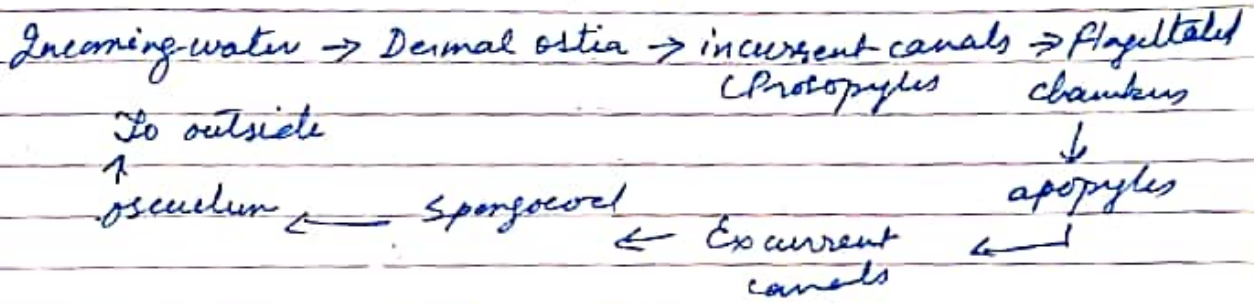
The leucon type of canal system is of three types of the basis of evolutionary pattern -

- (a) Eurypyloric type - Simple and most primitive, the flagellated chambers communicate directly by broad apertures the apopyles with excurrent canals eg - Plakina
- (b) Aphodal type - Apopyle is drawn out as a narrow canal called aphodus connecting the flagellated chambers with excurrent canal eg - Geodia
- (c) Diplodal type - In some sponges like Spongilla and Oscarella besides aphodus another narrow tube called protodus is present between incurrent canal and flagellated chamber

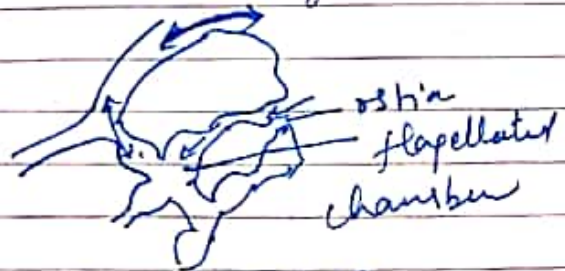


Leucosolenia type of canal system

Flow of Water in Leucosolenia type of Canal System



Rhagon larva in vertical section.



Eurypylous type



Aphodal type



Diptodal type