

B.Sc Part-I

PHYLUM- PORIFERA

Date:- 15/01/22

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CANAL SYSTEM IN SPONGES

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INTRODUCTION & DEFINITION :

All the body cavities traversed by water currents, nourishing the sponge from the time it enters by the pores until it passes out by the osculum, are collectively referred to as Canal-system.

The water circulatory system of sponges or Canal system is the unique feature of the Phylum - Porifera.

Canal System is also known as aquiferous system.

The Canal system of sponges helps in food acquisition, respiratory gas exchange and also in excretion.

The numerous perforations on the body surface of the sponges for ingression and egression of water current are the main constituents of the canal system. Water currents plays the most vital role in the physiology of the sponges.

Canal System in Sponges: —

The body wall of sponges is folded to produce a complex system of pores and canals, depending upon the these arrangements of canal in sponges. has been divided into following

Three types :-

- (i) Ascon (ii) Sycon (iii) Leucon

(i) Ascon type

(ii) Sycon type

(iii) Leucon type.

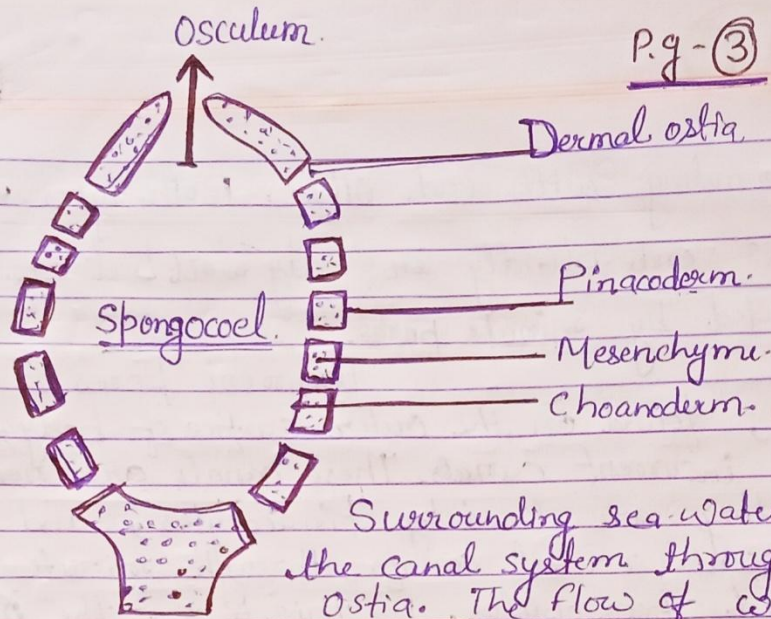
These systems differ from in each other in the increasing complexity.

(1) Ascon type :- It is the simplest type of canal system and found only in asconoid sponges type of sponges like - Leucosolenia and also in some of the developmental stages of all the syconoid sponges.

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

The spongocoel is the single, large, spacious central cavity in the sponge body and lined by the flagellated collar cells or choanocytes.

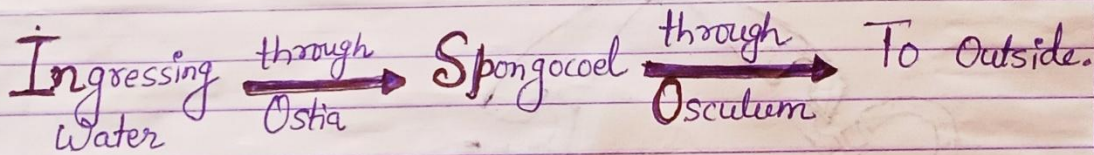
Spongocoel opens to outside through a narrow circular opening, called osculum.



Surrounding sea water enters the canal system through dermal Ostia. The flow of water is

Fig: Canal system of Ascon type of sponges. maintained by the beating of flagella of

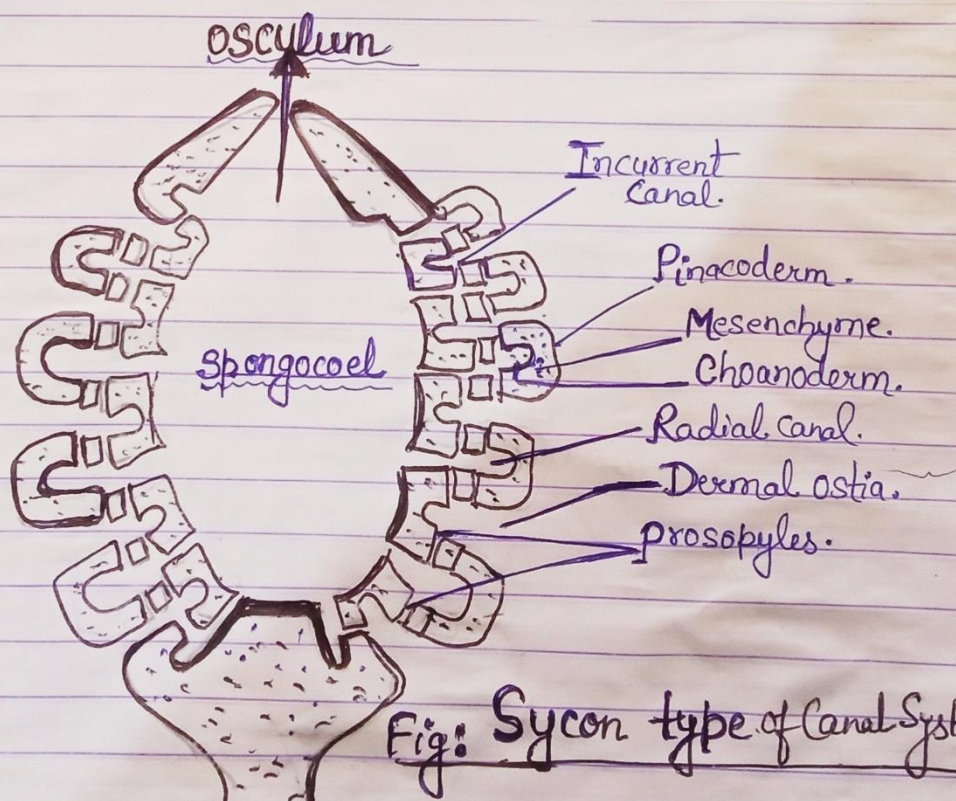
Collar cells. Course taken by water current in the body of Asconoid sponges may be shown as follow -



2) Sycon type :- Sycon type of Canal system is a more complex system of pores and canals and is characteristic of Syconoid sponges, like Scypha and Grantia. The embryonic development of Scypha clearly shows the asconoid pattern converting into Syconoid pattern. Body wall of syconoid sponges includes ~~two~~ ^{two} type of canals: incurrent and radial, which paralleling and

alternating with each other. Both types of canals end blindly in body wall but are interconnected by minute pores.

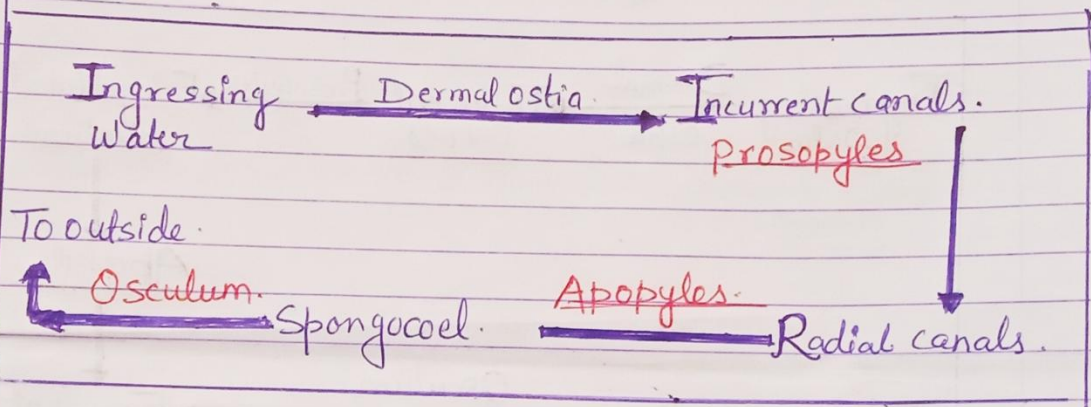
Incurrent pores or dermal ostia, found on the outer surface of body, open into the incurrent canals. These canals are non-flagellated as they are lined by Pinacocytes, and lead into adjacent radial canals through minute openings, called prosopyles. In this type, the radial canals are flagellated chambers, as only they are lined by choanocytes. These canals open into the central spongocoel by internal ostia or apopyles.



~~Spongocoel is a narrow,~~

Spongocoel is a narrow, non-flagellated cavity lined by pinacocytes. It opens to exterior through an excurrent pore, the osculum.

Course of water current may be represented as given below: —



In complex Sycon type of canal system (eg- Grantia), the incurrent canals are irregular, branching and anastomosing, forming large sub-dermal spaces. This is due to development of cortex, involving pinacoderm and mesenchyme.

3) Leucon type : — This type of canal system is characteristic of leuconoid sponges, such as Spongilla. This is due to result of further folding of body-wall, the sycon type gives rise to a still more complex canal system called the leucon type. In this radial symmetry is lost and canal system^{has} become very irregular. Flagellated chambers are small, spherical and lined by choanocytes. and all other spaces are lined by pinacocytes.

Incurrent canals open into flagellated chambers through prosopyles and flagellated chambers communicate with excurrent canals through apopyles. In addition, the excurrent canals communicate with outside through an osculum.

Course taken by water current is given below —

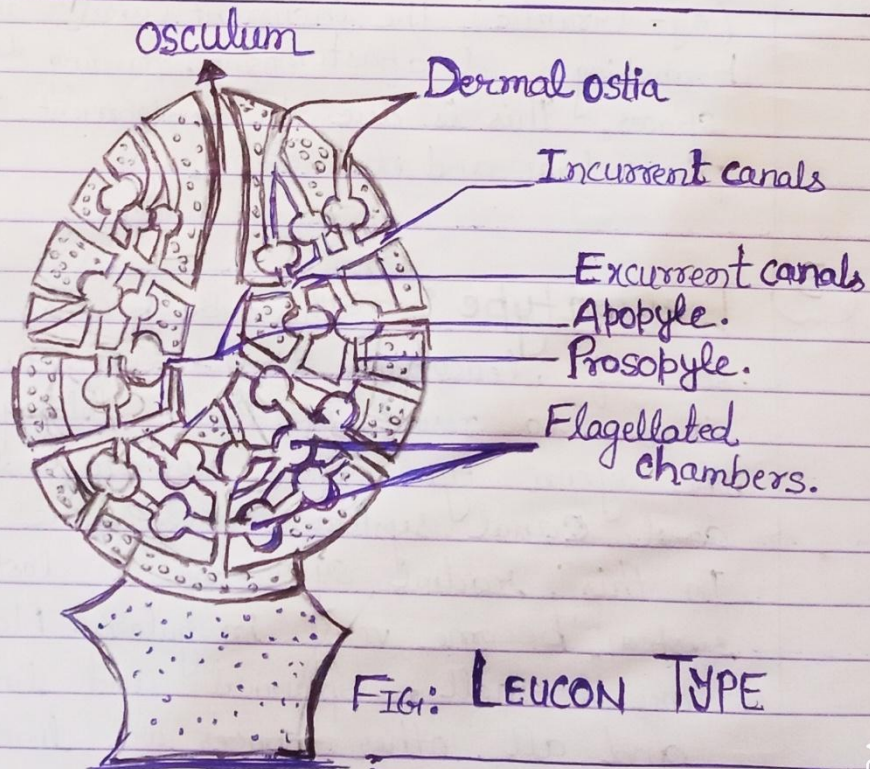
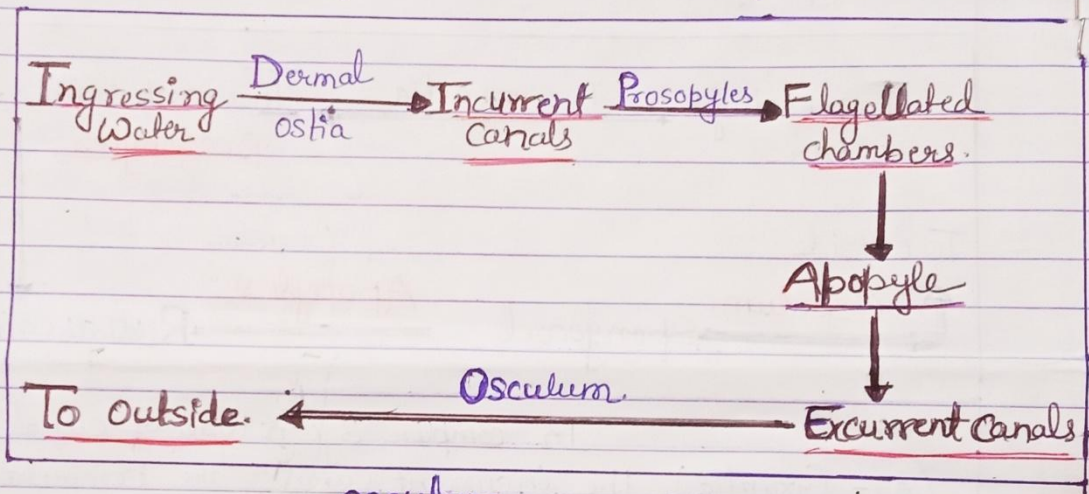


FIG: LEUCON TYPE