

Zoology
B.Sc I Year Paper I Invertebrate
Zoology
UNIT - 2 Phylum Porifera

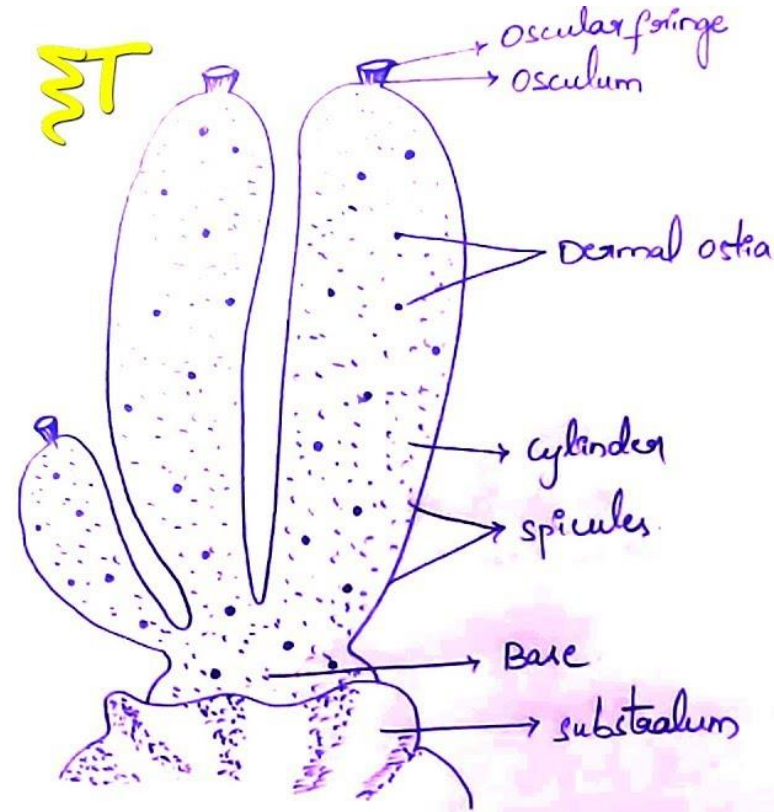
Topic – Sycon

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SYCON

Systematic position

- Phylum Porifera
- Class calcarea
- Order Heterocoela
- Genus Sycon



Introduction

- Scypha is commonly known as sponges
- Also called the crown sponge (fringe of long and straight spicules at the top looks like a little crown)

Habitat

- Marine sponge
- Widely distributed, but is best known from North Atlantic shores
- May be solitary or forms a colony by budding
- Sessile colonies of cylindrical individuals
- Found permanently attached to submerged rocks or other solid substrata
- Found in shallow sea water along the coasts
- Well oxygenated water
- Thrive well where wave action is not too strong

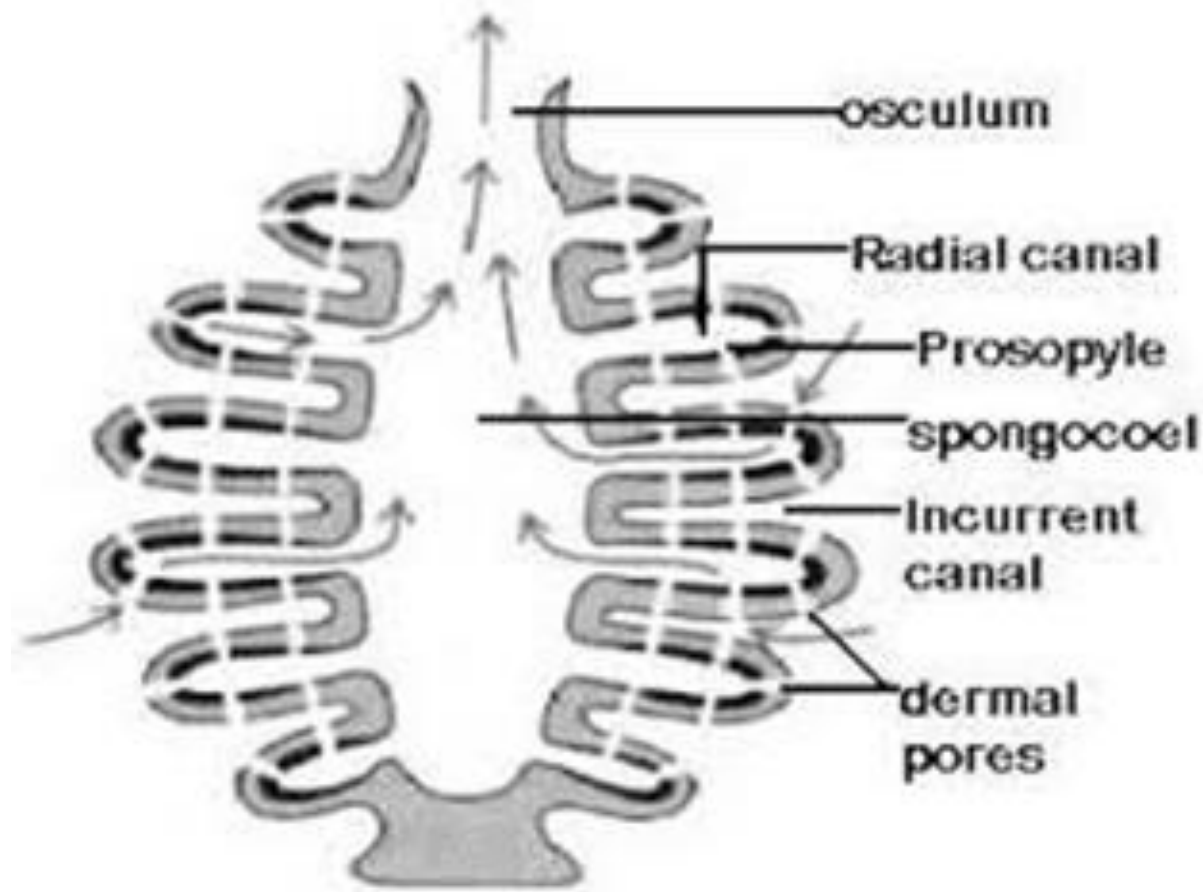
Structure

- Vase-shaped cylinder and with radially symmetrical body
- Cylinder buldges in the middle ; body is perforated by numerous pores, the ostia or incurrent pores
- Body measures form 20-30 mm in length and 5-6 mm in diameter
- Colour is not specific but varies from grey to light brown
- Free end of the vase-shaped individual bears a pore, the osculum
- Osculum is fringed with long, straight, needle-like calcareous monaxon spicules
- Oscular fringe checks small animals form entering into the body
- The body surface bears polygonal elevations from which project spear-like spicules, that impart a bristly appearance to the body
- Polygonal elevations are separated by deep grooves, bearing minute pores, i.e., ostia
- Ostia lead into the central body cavity, the spongocoel through a system of canals

Canal system

- A complex system of pores and canals
- Generally referred to as canal system or aquiferous system
- Body wall has essentially the two cellular layers, pinacoderm and choanoderm. With a non-cellular gelatinous mesenchyme in between
- Body wall is folded to form regularly arranged alternating invaginations and evaginations
- Ostia or dermal pores:
 - Pore membrane bears two or more openings called ostia
 - Pores are for the enter of outside water into the body of sponge
 - Ostia can reduce in diameter because of the presence of contractile cells or myocytes around them and thus regulate the amount of entering water

- Incurrent canals
 - Invaginated folds of body wall
 - Communicate with outside through ostia but end blindly at their inner ends
 - Pinacocytes line these canals throughout

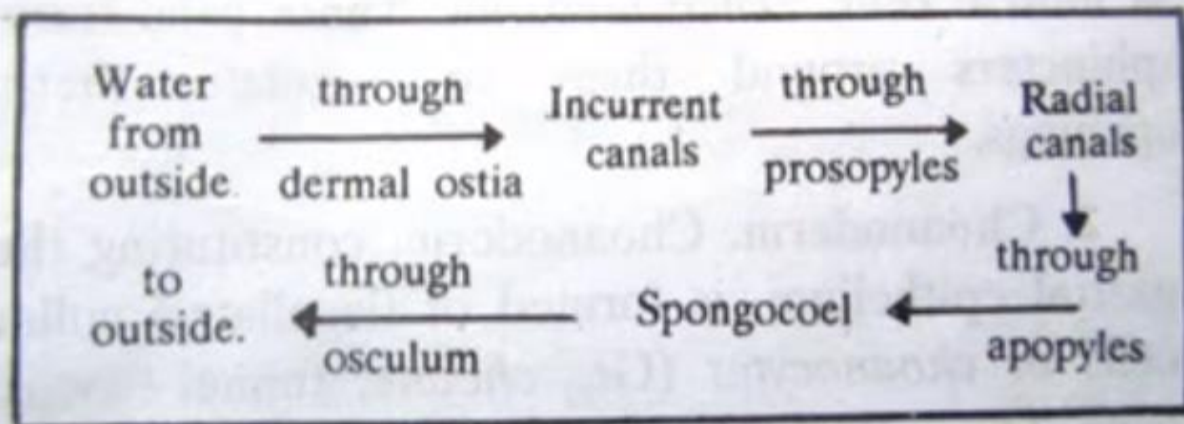


- Prosopyles
 - Incurrent canals communicate with radial canals through intercellular spaces called prosopyles
- Radial canals
 - Evaginations of body wall form thimble-shaped chambers lined by flagellated choanocytes
 - Incurrent and radial canals are parallel and alternate with each other, both vertically and radially
 - Each radial canal is surrounded on four sides by incurrent canals, and each incurrent canal is surrounded likewise by four radial canals
 - End blindly at their outer ends but lead at their inner ends into spongocoel

- Apopyles or internal ostia
 - Openings of radials canals into spongocoel
 - Surrounded by contractile myocytes serving as a sphincter
- Spongocoel
 - Large central cavity of body forming the vertical axis of the cylinder
 - Lined with the epidermal pinacocytes
- Osculum
 - Spongocoel leads to outside through a terminal opening called osculum
 - Provided with sphincters to regulate the rate of water flow in the body
 - Sphincters are lined by special contractile pinacocytes called myocytes

Canal system

- Current of water
 - Flow of water of inside canal system is maintained by continuous beating of flagella of collar cells lining the radial canals
 - Every beat of a flagellum consists of a normal active stroke and a recovery stroke
 - The rate of flow of water in sponges body is about 0.01 mm per sec.



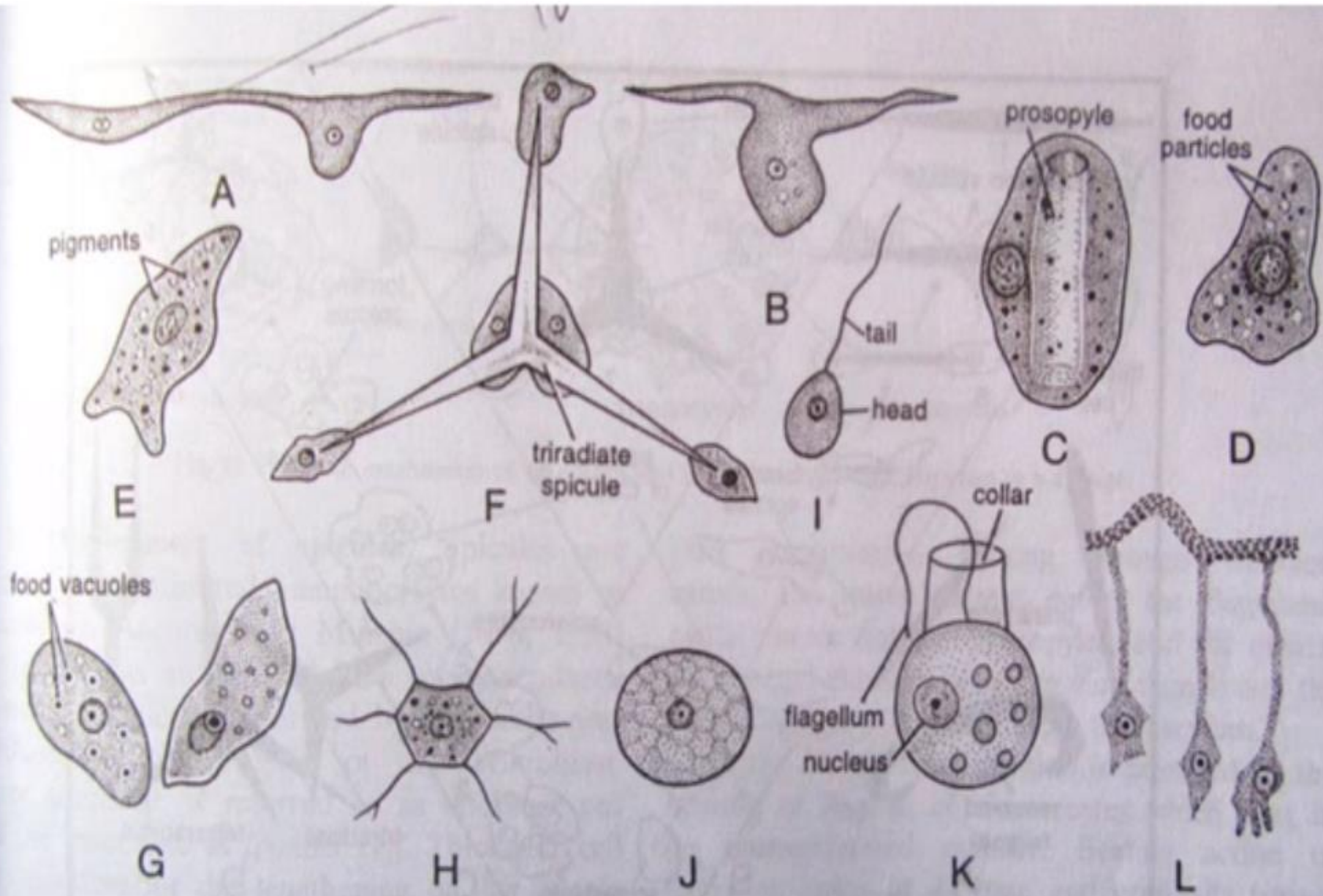


Fig. 8. *Scypha*. Kinds of cells. A—Pinacocytes. B—Myocyte, C—Porocyte. D—Thesocyte. E—Chromocyte. F—Sclerocytes. G—Archaeocytes. H—Collencyte. I—Sperm. J—Ovum. K—Choanocyte. L—Gland cells.

Skeleton

- The skeleton consists of calcareous spicules
- Spicules constitute the *endoskeleton* that protects and supports the softer parts of the body
- Spicules have crystalline appearance
- They have an axis of organic material around which is deposited the inorganic substance either calcium carbonate or hydrated silica
- Spicules present a great variety of shape
- Embedded in mesenchyme
- Types and structure of spicules
 - A. Monaxon spicules
 - B. Tetraxon spicules

Nutrition

- Filter feeder, subsisting on minute organisms (planktons) and organic particles
- Food enter through ostia which allow the entry of only small particles
- The beating of flagella of collar cells causes water to circulate
- Microvilli of collars act as a filter for trapping food particles
- The food particles are engulfed by pseudopodial action of choanocytes and then taken up into food vacuoles
- Initially the food vacuoles is acidic and then alkaline

Respiration

- Gaseous exchange by simple diffusion between the water and cells of sponge
- Oxygen dissolved in water diffuses into cells and brings about oxidation of protoplasmic molecules with the liberation of energy which is entrapped in ATP

Excretion

- Nitrogenous metabolic waste produced in sponges is largely ammonia
- No special excretory tissue is present for excreting this to the outer medium
- Excretory materials leaves the body in the outgoing water current by diffusion