

ZOOLOGY 101 SECTION 3 LECTURE NOTES

I. Phylum Porifera: Sponges

- Multicellularity: many celled animals (*metazoa*)

Characteristics:

1. Cellular level of organization
2. Sessile
3. All aquatic
4. Body porous with many pores and canals
5. Filter-feeders
6. Depend on water current for oxygen and food and to remove wastes
7. Lack true tissues or organs
8. Most are colonial
9. Radially symmetrical

- Skeletal support provided by calcareous or siliceous **Spicules** or by **fibers** of a collagen like substance called *spongin*.

Cell Types:

1. Most sponges have four basic cell types and **mesohyl**
2. Mesohyl = a gelatinous matrix, "connective tissue", in which the sponge cells are embedded

➤ **Pinacocytes:** external epithelium

- Thin, flat epithelial type cells
- Some "T"-shaped with parts going into mesohyl
- Cover exterior and some interior
- Help regulate the surface area of the sponge
- Contractile myocytes, regulate water flow rate

- **Choanocytes:** line interior canals and chambers
 - Ovoid cells
 - One end embedded in mesohyl
 - Exposed end bears a flagellum surrounded by a collar
 - Create some current and capture food

- **Porocytes:** canal opening for water flow
 - Tubular shaped cells
 - Found in *asconoid* sponges only

- **Archaeocytes:** free moving cells in the mesohyl
 - Amoeboid type cells, change shape
 - Carry out general metabolic functions
 - Can differentiate into other specialized cells
 - Sclerocytes: secrete Spicules
 - Spongocytes: secrete sponging fibers
 - Collencytes: secrete collagen fibers

Water Current Feeding

1. Water enters through tiny dermal pores called **ostia**
2. Water flows through several small canals
3. Some canals and chambers, if present, lined with flagellated collar cells
4. Water flows to large central cavity called **spongocoel**
5. Organic material consumed within canals and cavities, caught and absorbed by *choanocytes* and digested by *archaeocytes*
6. Water, with wastes, pumped out through one or more large openings called **oscula**

Three types of Canal Systems: determine basic groups of sponges

1. **Asconoid** = flagellated, simple, large central cavity
2. **Syconoid** = incurrent canals, flagellated radial canals
3. **Leuconoid** = several small, flagellated chambers

Reproduction: all sponges are capable of sexual and asexual reproduction

1. Sexual

- a. Sex cells modified archaeocytes
- b. Ova (eggs) fertilized by motile sperm released by other sponge
- c. Fertilization occurs within the mesohyl
- d. Zygotes develop into flagellated larvae and are released
- e. Larvae swim about, settle, attach and grow into adults
- f. Sponges may be:
 - i. Monoecious = both sexes in one individual
 - ii. Dioecious = having separate sexes

2. Asexual

- a. Form external buds
 - i. May detach and float away
 - ii. May remain to form colony
- b. Form *gemmules*
 - i. Internal buds produced during harsh or unfavorable conditions
 - ii. Encapsulated archaeocytes