

Biology of Invertebrates

Sponges

1. Consider the absence of tissues in sponges. Some zoologists have argued in the past that perhaps sponges are not a multicellular animal but rather an elaborate form of colonial protozoan. What evidence supports the view that sponges are multicellular animals and that the sponges and other metazoa represent a monophyletic group?
Discussed in lecture; includes different cell types, coordination between cells, self-recognition etc.

2. There are three different levels of sponge body construction: asconoid, syconoid and leuconoid. Briefly describe how each of the three types differs from the others, pointing out what advantages the more complex design (leuconoid) provides over the less elaborate types (asconoid and syconoid).

Basically the differences are due to increasingly complex canal systems and flagellated chambers in the larger sponges (See figure 4.7). The greater the surface area of the flagellated chambers the more water the sponge can pump and the more food it is able to capture.

3. There are 3 taxonomic classes of sponges. The taxonomic rankings do not correspond to the asconoid, syconoid and leuconoid levels of organization. What characters distinguish the three taxonomic classes of sponges?

Features of the skeleton primarily. See pg. 82-85

4. Review the figures showing sponge cell types. How many different types of cells are found in sponges and what are the roles of these cell types?

5 principal cell types, 22 altogether. Refer to figure 4.5

5. What evidence has shown that movement of water through the flagellated chambers of sponges is very slow? Considering the rapid movement of water through a sponge how is the flow through the flagellated chambers slowed down? Why is this important to sponge feeding?

See pg. 81-82 for a discussion of figures 4.6, and table 4.1; these were also discussed in class

6. According to the author of our textbook (Jan Pechenik), sponge reproduction is elaborate considering sponges are thought by many to be "unsophisticated animals". How is sexual reproduction accomplished in sponges (see lecture slides for a diagram of this).

It involves sperm capture and transformation of choanocytes into amoeboid cells that then deliver the sperm to the ovum. The two cells fuse and the nuclei fuse to form a diploid embryo.

7. In their embryology, many sponges go through a coeloblastula stage that resembles the coeloblastula of other metazoans. From that stage onward sponge development is unique. What types of larvae develop from the coeloblastula? How is sponge development completed to produce the adult

See overview in pg. 86.

8. Define a "true" immune system. What experimental evidence indicates that sponges have a true immune system?

This topic is covered in detail in research focus 4.1