

2. Kingdom PROTOZOA and Ph. PORIFERA ("pore-bearers"), Ph. Placozoa

"Everybody's plastic, but I love plastic. I want to be plastic." --Andy Warhol

MAJOR TAXA	MAJOR THEMES
"Kingdom" Protozoa (35,000 species)	Lack of body symmetry
Kingdom Animalia	Ancestral traits inherited by animals
Ph. Porifera (Sponges; 10,000 species)	Intracellular digestion
Cl. Calcarea	Grades vs. clades
Cl. Demospongiae	Body size, surface area, and complexity
Cl. Hexactinellida	Material properties and skeletal support
Ph. Placozoa (1 sp., <i>Trichoplax adherens</i>)	Protozoan/metazoan relationships

OUTLINE

Recap: body plans, methods of classification, synapomorphies, why "invertebrate" is a poor term

A. A brief look at the Protozoa, and three challenges of being single-celled

B. TOP TEN areas to explore and appreciate about sponges

10. The sponge bauplan: asymmetry, cellular grade of organization, cell specialization
9. Ode to the choanocyte: flow, respiration, food capture, digestion, and reproduction
8. Support: material and structural properties of the sponge skeleton
7. Taxonomy: the composition and morphology of spicules
6. Grades of construction: internal complexity related more to size than to taxonomy
5. Aquifer system: pumping capacity and the ability to use induced flows
4. Reproduction: formation of gametes and larval forms
3. Deep phylogeny: relationships to protozoa and metazoa
2. Sessile lifestyles: mechanisms of competition and protection
1. Morphology: dynamic and plastic in response to environmental conditions

GOALS

After studying notes from the sponge lectures and associated readings, you should be able to:

- Give characteristics that together distinguish the animal kingdom from other taxa
- Describe the structures and their function involved in how many protozoans maintain water balance and regulate volume, gain nutrition, and move
- Explain the functions of components of the sponge body plan: pinacocytes, porocytes, archaeocytes, sclerocytes, spicules, spongin, mesohyl, spongocoel, ostia, oscula
- Describe the cells involved and mechanisms used by sponges to capture and digest food
- Describe at least three other functions of choanocytes
- Identify three grades of construction in sponge body form, the location of choanocytes in each, and the distribution of these grades among sponge classes
- Explain why there are no boring sponges in the class Calcarea
- Explain why sponges must grow more complex as they grow larger
- Describe several traits that support an evolutionary relationship between sponges and protozoans, and give a possible scenario for the evolutionary transition to multicellularity
- Distinguish between taxa that are relatives and taxa that are ancestor and descendent