Biology 337 **College of Charleston**
Biology of Invertebrates **Dr. Bob Podolsky**

3. Ph. CNIDARIA ("stinging thread") & Ph. CTENOPHORA

"Death, where is thy sting?" --1 Corinthians 15:55

MAJOR TAXA	MAJOR THEMES
Ph. Cnidaria (≈10,000 species)	Epithelia
Cl. Hydrozoa	Tissue grade of construction, diploblasty
O. Hydroida	Cnidaria: Alternating generations
O. Siphonophora	Incomplete gut, extracellular digestion
O. Chondrophora	Propulsive locomotion
Cl. Scyphozoa (large jellies)	Polymorphism
Cl. Cubozoa (sea wasps)	Nerve net, sensory structures
Cl. Anthozoa	Cnidocytes, contractile cells
Hexacorals (sea anemones, stony corals)	Hydrostatic skeleton
Octocorals (sea pens, gorgonians, soft corals)	Cnidarian/protist symbiosis
	Patterns of coral diversity by geography/depth
Ph. Ctenophora (≈100 species)	Coral bleaching
Cl. Tentaculata (e.g. *Pleurobrachia*)	Ctenophora: biradial symmetery
Cl. Nuda (e.g. *Beroe*)	ctenes, balancers, & ciliary locomotion
	colloblasts

Recap: The sponge bauplan: cellular grade of construction, gutless, asymmetric, morphologically plastic--the simple life of a sedentary filter-feeder

TOP TEN ideas to understand and appreciate about cnidarians and ctenophores

10. *An homage to epithelia*: the emerging ability to physiologically regulate internal spaces
9. *Body plan*: radial and biradial symmetries, tissue grade of organization, diploblasty
8. *Alternation of generations*: which came first, the polyp or the medusa?
7. *Feeding*: gastrovascular cavity, incomplete gut, extracellular digestion
6. *Specialized cell types*: roles of cells in the gastrodermis and epidermis
5. *An ode to the cnidocyte*: operation in the causes of feeding and defense
4. *Nervous system*: a network without central processing, sensory structures
3. *Life cycle and body plan variation*: differences among classes, zooid polymorphism
2. *Body support*: hydrozoan chitin, scyphozoan mesoglea, anthozoan hydrostatic skeleton
1. *Transparency:* cnidarians and ctenophores ("jellies") are superficially similar but anatomically and functionally distinct

GOALS

Following this lecture and the associated reading, you should be able to:

- Describe how epithelial tissue of cnidarians differs from the pinacoderm and choanoderm of sponges, and how an epithelium allows specialization in body function
- Contrast the body symmetries of sponges, solitary cnidarians, and cnidarian colonies
- Contrast how sponges and cnidarians achieve feeding and digestion
- Contrast the structure and function of the cnidarian cnidocyte and the ctenophore colloblast

- Explain the distribution and function of cells within the two cnidarian epithelia, including myoepithelial cells, gland cells, and nerve cells
- Explain how different body forms within the Cnidaria (hydrozoan polyps, anthozoan polyps, and medusae) derive structural support
- Explain the role of the "alternation of generations" in the cnidarian life cycle and its prominence in different cnidarian classes
- Describe variations on the generalized life cycle within and between the cnidarian classes
- Identify which phase is typically sexual and which asexual in different cnidarian life cycles
- Describe the function and location of specialized sensory structures involved in light and gravity detection in certain medusae
- Describe factors that help to determine the vertical and geographic distribution of coral reefs
- Explain why coral reefs are among the most productive marine habitats
- Describe processes responsible for both the construction and destruction of coral reefs
- Describe costs and benefits to each participant in the symbiotic relationship between cnidarians and protists
- Describe historically observed patterns, underlying processes, and likely mechanisms involved in the phenomenon of coral bleaching
- Explain how ctenophores, which superficially resemble jellyfish, differ in symmetry, locomotion, prey capture, digestive system, life cycle, and other functional traits