Marine Organisms - Inverts

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3:16 PM

Invertebrates

A. Animal Characteristics

- Multicellular
- Eukaryotic cells
- Lack cell wall
- Heterotrophs - do not produce their own food
- Motile at some stage
- All above sponges have muscle and nervous tissue

B. Animal Classification

- Millions of spp
- Grouped according to similarities
- Most similarities reflect evolutionary history
- Basis for grouping includes:
  - Tissues
  - Symmetry
  - Body cavity
  - Segmentation
  - Cephalization

** a convenient way of surveying marine animals is based on the presence of a vertebral column:

C. Inverts
D. Vertebrates

C. Survey of Marine Inverts Phyla

- Porifera - sponges
- Cnidarians - jellyfish, coral, hydroids
- Ctenophores- comb jellies
- Nemertea - ribbon worms
- Nematoda - roundworms
- Mollusca- snails, bivalves, squid
- Annelida - segmented worms
- Arthropods- crustaceans
- Echinodermata- starfish, sand dollars, urchins

D. Porifera- sponges

- Characteristics
- Structure
- Body form
- Feeding
- Reproduction
- Ecological role

E. Characteristics

- Sessile- attached to bottom
- Lack symmetry
- Lack tissues- several specialized cells
- Suspension feeders - filter food from water
- Many drab, some brightly colored
- Wide variety of shapes and sizes
    - Shape and size determined by substrate and water currents

F. Structure

- Built around system of water canals
- Water in through tiny pores (ostia)
- Water out through large opening (osculum)
- Water brings in oxygen and nutrients
- Outgoing water takes wastes out
- Lack tissues, but have specialized cells
- Collar cells- choanocytes
    - Flagellated
    - Beating creates water current
- Pinacocytes
    - Layer of cells that form outer covering
- Amoeba- like cells
    - Move within sponge
    - Transport food
    - Repair- can form any type of sponge cell
- Spicules - $CaCO_3$ or SiO_2
    - Support body
- Matrix of flexible protein

G. Body form

- Size limited by ability to circulate water
- Evolution- folding of body wall allowed increased water flow and larger size
- Types of sponges:
    - Asconoid
        - Simplest body form
        - Tubular, always small
        - Found in clusters
    - Leuconoid
        - Highest degree of folding
        - Many chambers lined with choanocytes
        - Most sponge spp this type

H. Feeding

- Filter feeders
- Beating of flagella creates currents drawing water through ostia and out osculum
- Eat bacteria, plankton, detritus
- Few animals can capture food as small as food of sponges
- Utilize untapped food resources not available to others
- Accounts for success of sponges

e. Reproduction

- Asexual
  - Fragmentation
    - New sponge from pieces broken off
  - Budding
    - Cells on outer surface develop into small new sponge
    - Drops off and forms new individual
- Sexual
  - Most hermaphroditic - both male and female gametes - fertilization in water

f. Ecological role

- Competition for space with bryozoans and corals
- Symbiosis - many have cyanobacteria
- Predator-prey
  - Few animals eat sponges
  - Some fish, mollusks, hawksbill turtle
- Nutrient cycling - Ca++

2. Cnidarians- jellyfish, coral, hydroids
   a. What are cnidarians?
   b. Body forms
   c. Tissue organization
   d. Stinging cells
   e. Classification
   f. Feeding
   g. Reproduction
   h. Ecological role

3. What are cnidarians?
   a. Jellyfish, coral, anemone, hydra
   b. Simple design but wide array
   c. Radial symmetry
   d. Two tissue types
   e. Gelatinous layer
   f. Gastrovascular cavity surrounded by tentacles
   g. Tentacle with stinging cells- nematocysts

- Body forms
  a. Radial symmetry - body parts arranged in circular patterns around central axis
  b. Two life stages
     - Polyp
       - Benthic
       - Cylindrical body with opening at one end
       - Mouth surrounded by tentacles
     - Medusa
       - Free floating (jellyfish)
     - Many exhibit both life stages
     - Some only in polyp stage (coral, anemone)

c. Tissue organization