

## **Echinoderms and Chordates**

These organisms are also called deuterostomes. In these organisms the second embryonic opening becomes the mouth.

**Phylum Echinodermata**- Sea star, brittle star, sea cucumber, sea urchin and sand dollar

Bilateral symmetry in larvae, radial symmetry in adults

Water vascular system providing locomotion via tube tube feet in most forms

Endoskeleton- calcium carbonate

Observe radial symmetry, Oral (surface with the mouth) and aboral surface, mouth, ambulacral groove, tube feet sieve plate (madreporite). Observe internal parts including stomach, digestive glands, gonads.

## **Phylum Chordata**

**Common chordate characters:**

(1) **Dorsal tubular nerve chord**

(2) **Pharyngeal slits**

(3) **Notochord**

(4) **Post anal tail**

**Subphylum-Urochordata**- tunicates (sea squirts), See fig.2

All chordate characteristics are present in the larva, but not in the adult.

**Subphylum-Cephalochordata**- lancelet (amphioxus) See fig.3

All chordate characters are present in the adult. Observe slide of amphioxus whole mount and cross section. Try to locate the chordate characters.

## **Subphylum-Vertebrata**

All chordate characteristics are present at some stage of the life cycle.

Notochord partially or completely replaced by vertebral column.

## **Class (see table 2)**

**Agnatha** - jawless fishes, no paired appendages e.g. lamprey and hag fishes

**Chondrichthyes** - cartilaginous fishes e.g. sharks, rays, skates

**Osteichthyes** - bony fishes e.g. catfish, lungfish, perch

**Amphibia** - amphibians e.g. frogs, toads, salamanders

**Reptilia** - reptiles e.g. crocodiles, alligators, turtles, lizards, snakes

**Aves** - birds

**Mammalia** - mammals. Three patterns of reproduction

true placental mammals-longer gestation period, embryos are nourished for a long period in uterus. e.g. bats, moles, humans etc.

marsupial mammals-brief gestation period, born underdeveloped, complete their growth in mother's pouch e.g. koala, kangaroo etc.

egg-laying mammals (monotremes) e.g. platypus, spiny anteater

**Note: Learn distinguishing characters and identify organisms belonging to phyla, subphyla and classes included in this handout.**

