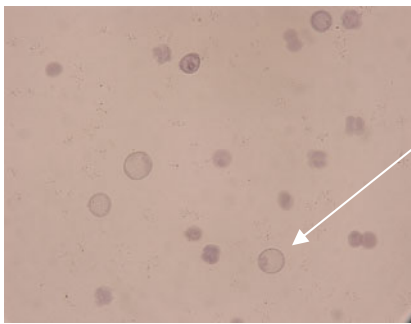


Embryology I: *Echinoderms*

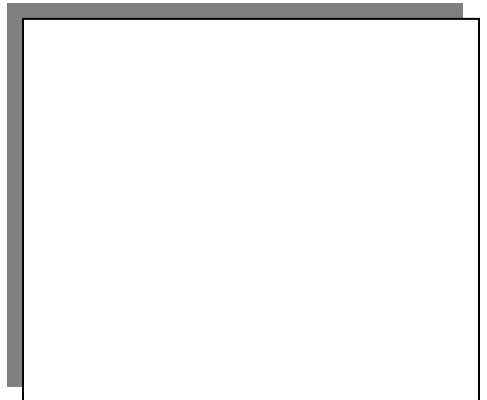
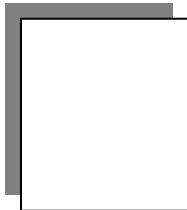
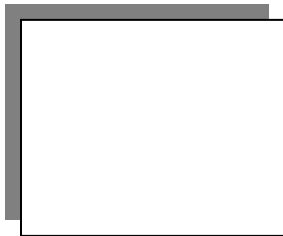
This laboratory exercise will consist of examination of commercially prepared microscopic slides of sea stars (*Asterias* sp.) and sea urchins (*Arbacia* sp.) in developmental stages ranging from the fertilized egg to bipinnaria larvae. The objectives are to identify developmental stages and make clear, labeled and scaled (see Appendices iv.) drawings of developmental stages found on the slides. Reference diagrams are included below to assist in identifying these stages, and are not to be simply copied. Draw what you see on the actual slides. Accurate labels on drawings are important. *Remember, your drawings, labels and notes will be your best source of information for the final lab practicum.* Refer to your lecture notes and text for supplementary illustrations and information. Additional reference material with illustrations may be available in books kept in our laboratory library collection.



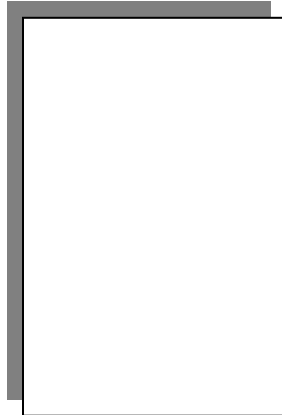
fertilized egg

SLIDES

- arbacia
- starfish
blastula/gastrula
- Asterias: all stages



Emryology I: Continued



Notes: _____

Reference Illustrations

EMBRYOLOGY II. *Chordates*

This lab is a continuation of descriptive, early embryology of a **deutersostome** (mouth developing distant from the blastopore). In this case we study a representative amphibian (*Rana spp.*) of the chordates, closely related to echinoderms by way of similar *early* embryology—cleavage through early gastrulation.

By late gastrula in the frog embryo, developmental patterns of echinoderms and chordates begin to diverge dramatically, due to the nature of the highly complex nervous system and bilateral symmetry characteristic of vertebrates. This suggests the two now distinct groups once shared a common ancestor that led very early (perhaps 500 mybp) to two separate evolutionary lineages, one (**Phylum: Echinodermata**) with radial symmetry and simple, diffuse nervous system, the other (**Phylum: Chordata**) with bilateral symmetry and highly developed, centralized nervous system.

Today, you will be examining commercially prepared slides, comparing and contrasting all stages of early development of the frog—fertilized egg to neural tube—and making clear, labeled, scaled drawings, as in the previous exercise. Slides showing the ovary and testes of a frog are also available, along with preserved specimens of tadpoles and newly metamorphosed frogs. Make as many drawings of lab slides and specimens as time permits. A few supplemental illustrations have been included to help identify the developmental stages and regions within the embryos.