Bio. 3302 Introduction to Evolution
Lecture Study Guide
Cambrian Explosion and Life in the Paleozoic
Evo-Devo

Important Terms and Concepts

Adaptive Radiation
Age of Fish
Allometric Growth
Amniote egg
Amphibia
Archean
Bilateral symmetry
Blastopore
Blastula
Burgess Shale
Cambrian Explosion
Carboniferous
Cephalization
Chordata
Coelocanth
Cooksonia
Devonian
Ectoderm
Ediacaran Fossils
Embryology
Endoderm
Endosymbiosis
Eukaryote
Eurypterids
Evo-Devo
gastrula
Gene duplication
Gill slits
Gill arches
Grypania
Hallucigenia
Heterochrony
Homeotic Genes
Hox Genes
Ichthyostega
Isometric growth
Jawless fish
Jaws
Lamprey

Lobe-finned fish
MADS-box genes
Nerve chord
Notochord
Opabinia
Ordovician
Ordovician-Silurian Extinction
Ostracoderm
Paedomorphy
Paleozoic
Pangaea
Pikaia
Precambrian
Radial symmetry
Seed Fern
Silurian
Snowball Earth
Tiktaalik
trilobites
Vendian
Wiwaxia

Discussion Questions

1. Describe 5 ways in which eukaryotes differ from prokaryotes. How are eukaryotes distinguished in the fossil record? What environmental factor may have allowed cells to get bigger? When did this happen?

2. How might multicellular animals arisen? What is the Gastrula (Gastrea) hypotheses of metazoan origin?

3. Discuss the nature and significance of the Ediacaran fossils and the controversy about what phyla they represent. Does the existence of this fauna solve the problem of the ancestry of the Cambrian fauna?

4. When do hard body parts first appear in the rock record? What possible explanation is there for why hard body parts appear at this time?

5. Discuss the geological, atmospheric and ecological factors which may have contributed to the "explosion" of life forms and phyla in the Cambrian. What might the Red Queen have to do with this explosion of diversity?

6. In what way might oxygen have played a role in the diversification of animal life that took place during the Cambrian?

7. How might Hox genes been involved in the Cambrian Explosion?

8. What features distinguish Chordates from other phyla? What is one of the earliest Chordates known?

9. Which geologic Period is considered to be the Age of Fishes? Why?

10. When did jaws evolve in fish? What was the morphological origin of jaws, and what advantages did jaws provide?

11. What were the first living organisms to move from the ocean to land? When did the first organisms move on to land?

12. When did amphibians first evolve? Which organism is considered to be the immediate ancestor of amphibians? What evidence indicates that early amphibians were related to Rhipidistian fish (fossil lobe-fin fish similar to a Coelocanth)?

13. What advantages did the amniotic egg offer to reptiles?

14. Discuss Haeckel's Biogenetic Law that "Ontogeny Recapitulates Phylogeny". Is this law really correct?

15. What evolutionary event happened at the end of the Permian Period? What is unique about this event? What caused this event?