

Theory of Endosymbiosis

Evidence

- ◆ structural
 - mitochondria & chloroplasts resemble bacterial structure
- ◆ genetic
 - mitochondria & chloroplasts have their own circular DNA, like bacteria
- ◆ functional
 - mitochondria & chloroplasts move freely within the cell
 - mitochondria & chloroplasts reproduce independently from the cell



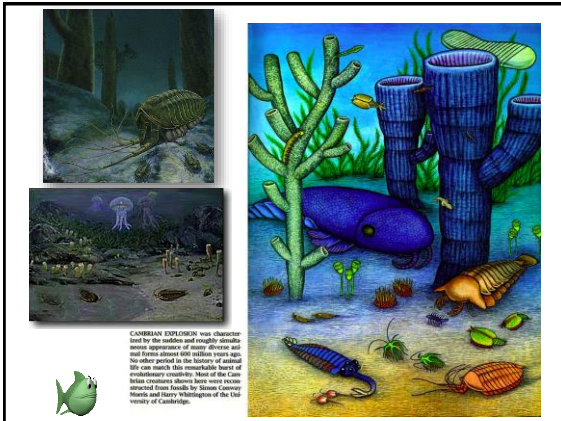
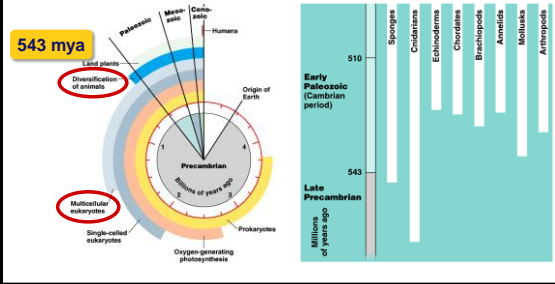
Lynn Margulis



Cambrian Explosion

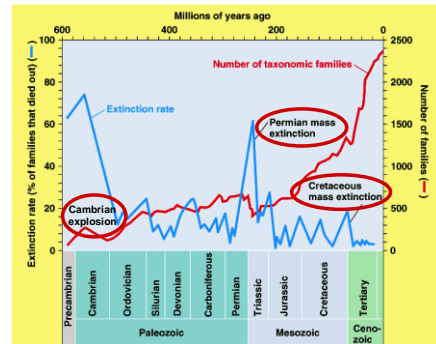
Diversification of Animals

- ◆ within 10–20 million years most of the major phyla of animals appear in fossil record



CAMBRIAN EXPLOSION was characterized by the sudden and rapid diversification of many different animal and plant groups in the history of animal life on earth that resulted from the Cambrian explosion. The fossils of the Cambrian explosion show that many more species existed than fossils by Steven Conway Morris and Harry Whittington of the late 1980s of Cambria.

Diversity of life & periods of mass extinction



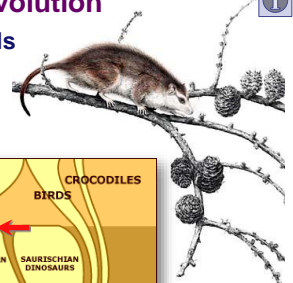
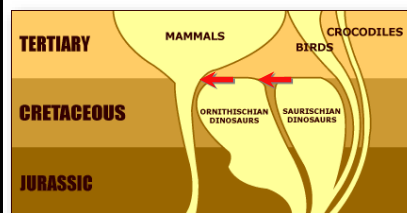
Cretaceous Extinction

The Chicxulub impact crater in the Caribbean Sea near the Yucatan Peninsula of Mexico indicates an asteroid or comet struck the earth and changed conditions 65 million years ago



Early Mammal Evolution

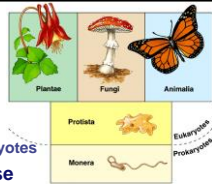
- 125 mya mammals began to radiate out & fill niches



Classifying Life

▀ **Molecular data** challenges 5 Kingdoms

- ▀ Monera was too diverse
 - ♦ 2 distinct lineages of prokaryotes
- ▀ Protists are still too diverse
 - ♦ not yet sorted out



(a) The five-kingdom system



(b) The three-domain system



(c) How many kingdoms?

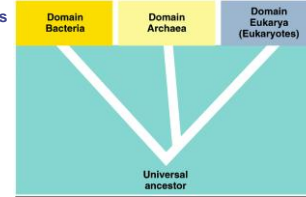
3 Domain System

▀ Domains = "Super" Kingdoms

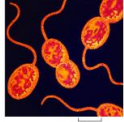
- ♦ Bacteria
- ♦ Archaea
 - ▀ extremophiles = live in extreme environments
 - ♦ methanogens
 - ♦ halogens
 - ♦ thermophiles

♦ Eukarya

- ▀ eukaryotes
 - ♦ protists
 - ♦ fungi
 - ♦ plants
 - ♦ animals

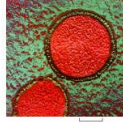


Domain Bacteria



3.8 μm
Kingdom Bacteria

Domain Archaea



1.7 μm
Kingdom Archaeobacteria

Domain Eukarya



Kingdom Protista



Kingdom Fungi



Kingdom Plantae



Kingdom Animalia

Any Questions?

Is there life elsewhere?

Does it look like life on Earth?

