

Origins of Eukaryotes

| Theory Name | Definition | Evidence |
|----------------------|---|---|
| Endosymbiotic theory | Eukaryotic cells are believed to have evolved from early prokaryotes that were engulfed by phagocytosis | Mitochondrion and Chloroplast have double membranes, can reproduce in a fission-like process, have their own DNA which is similar to prokaryotic DNA, and has ribosomes similar to prokaryotes. |

Origins of Life

| Theory Name | Definition | Evidence |
|-------------|--|--|
| Abiogenesis | life evolved from nonliving chemical systems | Oparin-Haldane hypothesis and Miller-Urey Experiment |

Origins of Life

| Hypothesis/Experiment | Definition | Evidence |
|---------------------------|---|--|
| Oparin-Haldane hypothesis | life arose gradually from inorganic molecules, with "building blocks" like amino acids forming first and then combining to make complex polymers. | Miller-Urey Experiment |
| Miller-Urey experiment | organic molecules needed for life could be formed from inorganic components | Used a sparking device to mimic a lightning storm on early Earth. Their experiment produced a brown broth rich in amino acid |

Origins of Life (cont)

| | | |
|--------------------------------------|--|---|
| RNA world hypothesis | that the first life was self-replicating RNA | Scientists think RNA building blocks (nucleotides) emerged in a chaotic soup of molecules on early Earth. These nucleotides bonded together to make the first RNAs. RNA store of genetic information, self-replicate, and act as a cellular catalyst |
| Metabolism-first hypothesis | metabolic networks before DNA or RNA | origin of life is triggered by the accumulation of very simple organic molecules in thermodynamically favorable circumstances. Simple organic molecules can then be combined in various ways that result in simple amino acids, lipids, etc. These, in turn, could act as catalysts for the formation of more organic molecules. This is the beginning of metabolism. |
| Organic compounds came on meteorites | Simple organic compounds might have come to early Earth on meteorites. | 70 kinds of amino acids found on them - delivered by comets - |



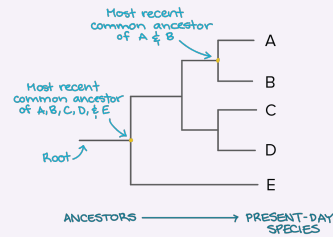
Origins of Life (cont)

Life life could Yes - life is there despite scalding temper-
 in have started atures and no sunlight, many types of
 Sea in the oceans. creatures are surviving here

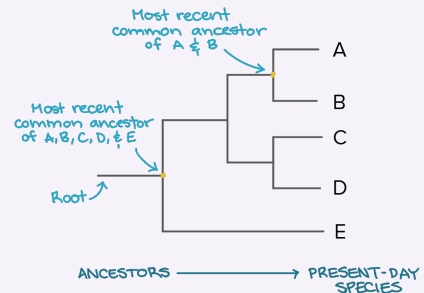
Biological Classification

| | |
|-----------------------|--|
| Taxonomy | the practice of identifying different organisms, classifying them into categories and naming them |
| Binomial Nomenclature | A standard way to refer to the scientific name of an organism by using the genus and species |
| Phylogeny | the process of classifying and organizing organisms based on evolutionary relationships |
| Domain | The new highest level (Eukarya, Eubacteria, Archaeobacteria) |
| Kingdom | The old highest level of classification (Plantae, Animalia, Fungi, Protista and Eubacteria, Archaeobacteria) |
| Phylum | The next level of classification where along a number of Classes are clubbed up to form one Phylum |
| Class | A group of Orders which share a few similarities |
| Order | A group of families showing somewhat few similarities |
| Family | It comprises of a number of genus which share some similarity among themselves |
| Genus/Genera | It composes of multiple species which have similar characteristics but different from that of species from other genus |
| Species | It is the lowest level of classification and shows the high level of similarities among the organisms |

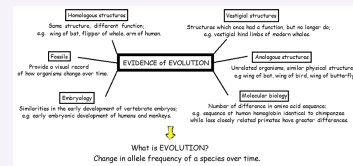
Phylogenetic Tree



Phylogenetic Tree



Evidence for Evolution



Darwin's Theory

- Organisms differ; variation is inherited.
- Organisms produce more offspring than survive.
- Organisms compete for resources.
- Organisms with advantages survive to pass them on to their children.
- Species alive today are descended with modifications from common ancestors.
- This is the theory of Natural Selection.

