

7:15a Theories of the Origin of Life

In the Beginning

- Earth began about 5 billion years ago.
- For a half billion years it was a gaseous mass.
- 4.5 billion years ago it condensed into a sphere.
- The first solid rocks appeared about 4 billion years ago.
- The earth was bombarded with meteors from space and ravaged by volcanic activity for about a quarter of a billion years.
- This set up the materials needed for the early atmosphere.

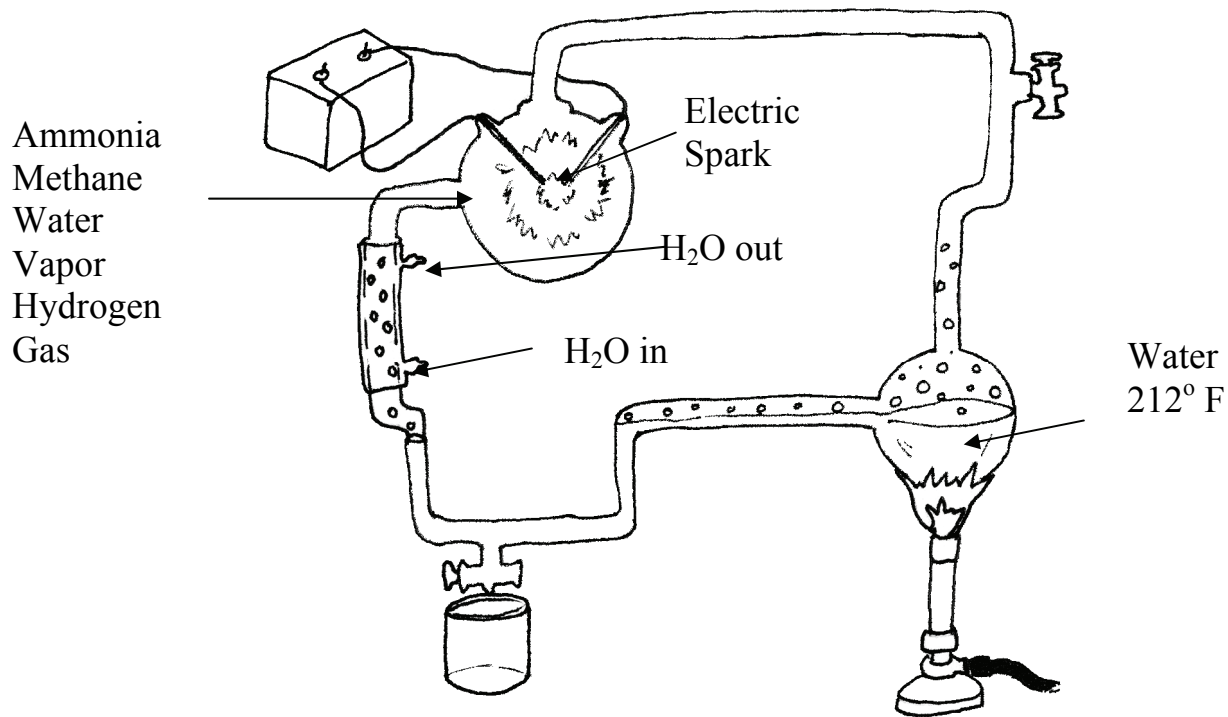
How Could Life have Began?

- What was the early atmosphere like?
- It contained water vapor, Carbon monoxide, Nitrogen, Carbon dioxide, Hydrogen sulfide, and Hydrogen cyanide.
- With the addition of unlimited heat and ultraviolet radiation a series of chemical reaction began to take place.
- These reactions produced amino acids and other organic molecules.

Could this Idea Be Proven?

- An experiment conducted in 1951 by Stanley Miller and Harold Urey showed that the idea of the earth's early atmosphere and its results were highly possible.

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Formation of Complex Molecules

- The main problem of organic synthesis is how did these molecules develop without the aid of enzymes to speed up the reactions?
- Sidney Fox, of the University of Miami, dripped a dilute solution of organic monomers onto hot sand, clay, and rock.
- The water vaporized and left behind polypeptides he called proteinoids.
- Other molecules could have also formed: alcohols, lipids, carbohydrates, and nucleic acids.

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Pre-Cells to Cells

- Once these organic compounds were produced, aggregates of these proteinoids self-assembled into small spheres called protobionts
- These small spheres were capable of osmotic swelling and shrinking and even able to produce a membrane potential.

Real Life

- Bacteria appeared on earth between 3.4 and 4 billion years ago
- Precambrian evidence of filamentous bacteria-like structures, found making up fossilized sediments called stromalites, has been discovered in Australia and southern Africa.
- These fossils date back between 3.4 and 3.5 billion years old.