Early Life

by Sophia

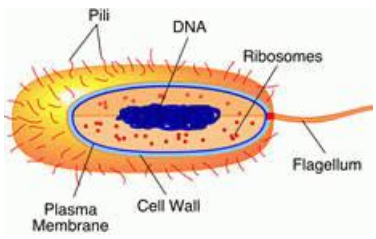
WHAT'S COVERED

In this lesson, we're going to provide a brief overview of early life formation on Earth—from single-celled organisms to plant and animal life and their transition from water to land. Specifically, this lesson will cover the following:

1. Early Organisms

Early life didn't just pop into existence. It was a process that took place over the course of millions of years. At first, small, inorganic molecules in a water environment combined into larger, more complex organic molecules as a result of lightning.

These molecules became encapsulated in a membrane over time, and eventually, these membrane molecules gained the ability to replicate themselves. They were the earliest forms of life, called “prokaryotes” (their structure is shown in the diagram below), and they formed about 3.8 billion years ago.



2. Plant Adaptation

Over time, prokaryotes split into other varying types, which included bacteria. They developed the capacity to metabolize things, including each other. One of these types of metabolism was photosynthesis. Photosynthetic metabolism led to free oxygen production.

Some prokaryotes began to form symbiotic relationships with each other about 1.8 billion years ago. One would protect the other, while the other focused on energy production. This relationship led to the emergence of eukaryotes. About 600 million years ago, eukaryotes formed multi-celled organisms, where different cell types specialized in different tasks for the functioning of the whole. This led to the emergence of new life forms such as fungi, algae, plants, and animals.

3. Transition From Water to Land

Eventually, water subsided from certain parts of the planet, which created enough dry land for plants to adapt to a terrestrial environment. As more terrestrial plants evolved, they provided a potential food source for animals to consume on land.

Plants and animals faced other challenges in adapting to land, such as the following:

- Death by drying out if they couldn't find a water source
- Solar radiation, which could lead to mutations that killed organisms
- Movement outside of water with a different sense of gravity

Organisms also had to adapt the process of reproduction to life on land. Such processes had previously relied on an aquatic environment. It wasn't until enough oxygen collected in the atmosphere and then reacted with solar radiation to form a thick enough ozone layer that protected organisms from radiation, that land adaptation began in earnest.

SUMMARY

In this lesson, we talked about early life formation on Earth, including **early organisms** like prokaryotes

and eukaryotes, which eventually led to **plant adaptation** and the emergence of animals. We also discussed the transition of these plants and animals from **water to land**.

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