New understanding about ancient branch of life on Earth

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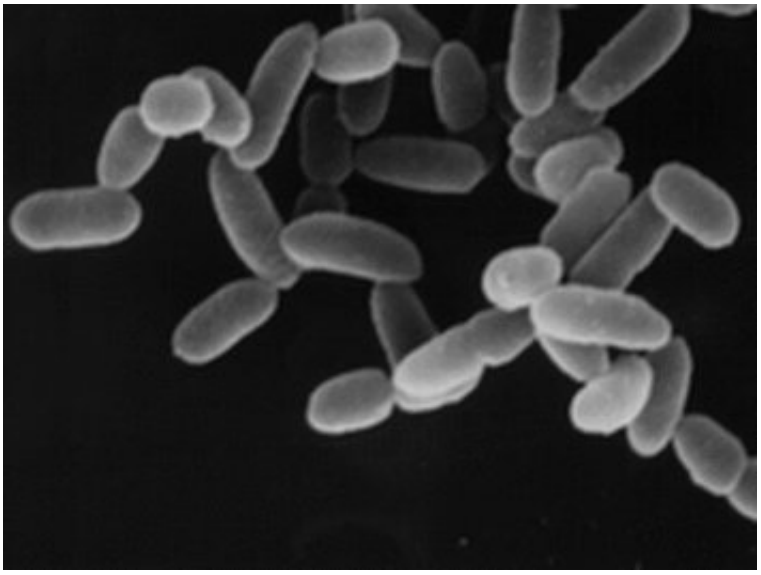

Archaea, a single celled microorganism. Credit: CC4 Kaden11a https://commons.wikimedia.org/wiki/File:Archaea.gif

Aberdeen scientists have made an important discovery about a branch of ancient life which plays an important—if perhaps not fully understood role—in our world's ecosystem.

All life on Earth can be divided into three broad domains—archaea, bacteria, and eukaryotes.

Humans, other animals, plants, fungus—right down to some single-celled

organisms—belong to the Eukaryotes.

Bacteria are single-celled organisms and include species that cause disease as well as beneficial species that contribute to human and animal health.

Archaea are lesser understood, single-celled organisms, but in recent years they have been shown to play import roles in the global flow of chemical elements between living organisms and the environment—known as biogeochemical cycles. These cycles explain how the planet conserves matter and uses energy, making archaea high interest organisms in the study of sustainable agriculture and climate change.

Scientists from the University of Aberdeen, along with researchers from the universities of Bristol and Warwick have been attempting to learn more about archaea in a project funded by the Natural Environment Research Council (NERC).

They have studied how the microorganisms have evolved over hundreds of millions of years and now have an understanding of how they have adapted to terrestrial environments.

The team discovered that archaea use 'gene duplication' to increase their ability to develop genetically in the same way as eukaryotes, enabling them to expand into a wide variety of ecosystems. Eukaryotes have used this strategy of gene duplication to give rise to the massive complexity we see in animals, plants, fungi and other eukaryotes.

The findings have been published in *Nature Communications*.

Lead researcher, Dr. Paul Sheridan, said: "The Archaea are an ancient branch of life, only distantly related to both Eukaryotes, such as humans,

and bacteria.

"We looked at how these microorganisms have evolved over hundreds of millions of years and this allowed us to understand how the genes of these microorganisms duplicated—revealing the major driving force in their evolution.

"This mechanism is important in the evolution of animals, plants and fungi and appears to have wider implications in the evolution of life."

More information: undefined undefined et al. Gene duplication drives genome expansion in a major lineage of Thaumarchaeota, *Nature Communications* (2020). DOI: 10.1038/s41467-020-19132-x

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