

Archaea: Extreme Living

It's midday in the summer. The Sun is up, the sky is clear, and it feels like an oven outside! You are anxious to find some shade, a breeze, or get inside with some air conditioning. How could anyone live full-time in this heat? Now imagine that it's over 100°F every day, and that you live near a pool of acid! If you think this sounds harsh, welcome to the world of archaea. These unicellular, or single-celled organisms enjoy living in some of the most extreme environments on Earth. Whether near boiling hot springs surrounding a volcano or the deepest vents on the ocean floor (where temperatures can reach 236°F and the pressure is great enough to crush a car), archaea thrive where most other organisms cannot survive.



What do archaea eat?

In such inhospitable conditions, there is little or no food available for most organisms to survive. However, archaea aren't like most organisms. They don't eat what we think of commonly as food. Instead, these tiny organisms can eat iron and sulfur from hot springs, ammonia from the soil, carbon dioxide from the air, uranium from deep in the Earth's crust, and other poisons found near toxic waste sites. Their diet seems strange compared to other organisms, but archaea lived on Earth nearly 4 billion years ago when the atmosphere and oceans were likely filled with these poisonous substances.



World changers

Scientists who study early life on Earth often identify archaea as one reason why we see such a diversity of bacteria, plants, and animals today. When consuming large quantities of carbon dioxide, iron, and sulfur, which were more common in Earth's early history,



archaea turned them into non-toxic substances like oxygen. In this way, archaea changed the surface of Earth to make it more habitable for other organisms. Today, we find archaea living in nearly every habitat imaginable, including inside our own mouth, where they protect us by eating some of the toxic substances that we unknowingly ingest.

Think about the following questions as you complete this reading:

- What do you notice about this organism that's similar or different to the other organisms and cells we've seen?
- Do they relate to our healing story? If so, how?
- How does this organism's structure and function relate to where it lives? Why do you think it lives where it does?

Sources:

- Archaea. (2020, December 19). Retrieved December 21, 2020, from <https://en.wikipedia.org/wiki/Archaea>
- Teisha Rowland Fri Feb 05, 2., Smith, D., Welsh, N., Arnold, G., Staff, I., Yamamura, J., & Hayden, T. (2019, March 29). Archaea: The Third Domain of Life. Retrieved December 21, 2020, from <https://www.independent.com/2010/02/05/archaea-third-domain-life/>
- (n.d.). Retrieved December 21, 2020, from <https://ucmp.berkeley.edu/archaea/archaea.html>