

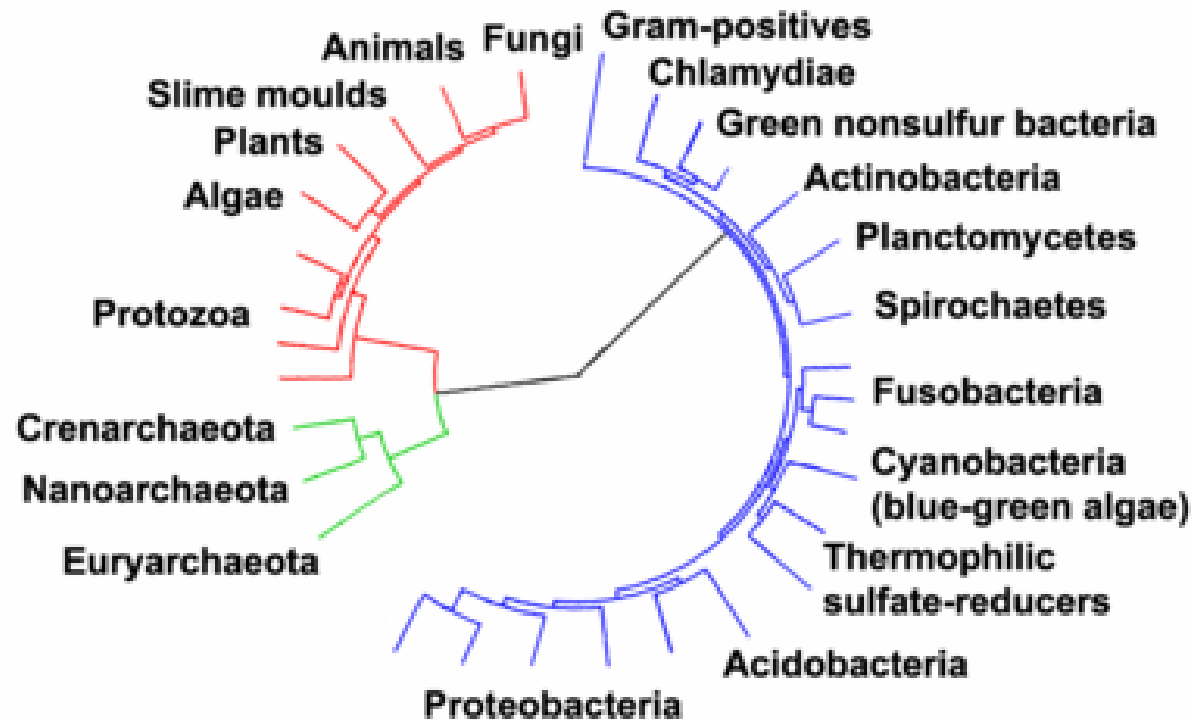
Start – slides out of order

Justin Harris

Steve Brockman

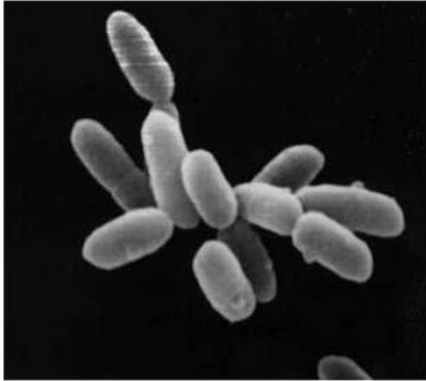
Devin Devine

Phylogenetic Tree



Ciccarelli FD, Doerks T, von Mering C, Creevey CJ, Snel B, Bork P (2006). "Toward automatic reconstruction of a highly resolved tree of life". *Science* **311** (5765): 1283–7. [doi:10.1126/science.1123061](https://doi.org/10.1126/science.1123061). [PMID](https://pubmed.ncbi.nlm.nih.gov/16497222/)

Archaea



<http://www.toptenz.net/wp-content/uploads/2009/07/archaea.jpg>

- A group of single-celled microorganisms. A single individual or species from this domain is called an *archaeon*.

They have no cell nucleus or any other membrane-bound organelles within their cells.

The Isua district of west Greenland, which include Earth's oldest sediments, formed 3.8 billion years ago. The archaeal lineage may be the most ancient that exists on earth.



Where Archea is Found

<http://www.nps.gov/features/yell/slidefile/thermalfeatures/hotpringsterraces/midwaylower/Images/17708.jpg> ; English Wikipedia, original upload 1 April 2004 by [ChrisO](#)

Archaeans include inhabitants of some of the most extreme environments on the planet. Some live near rift vents in the deep sea at temperatures well over 100 degrees Centigrade. Others live in hot springs, or in extremely alkaline or acid waters. inside the digestive tracts of cows, termites, and marine life where they produce methane. They live in the anoxic muds of marshes and at the bottom of the ocean, and even thrive in petroleum deposits deep underground

Archea Similarities and differences

- Despite this visual similarity to bacteria, archaea possess genes and several metabolic pathways that are more closely related to those of eukaryotes: notably the enzymes involved in transcription and translation.

The archaea exploit a much greater variety of sources of energy than eukaryotes: ranging from familiar organic compounds such as sugars, to using ammonia, metal ions or even hydrogen gas as nutrients.

Archea Similarities and differences

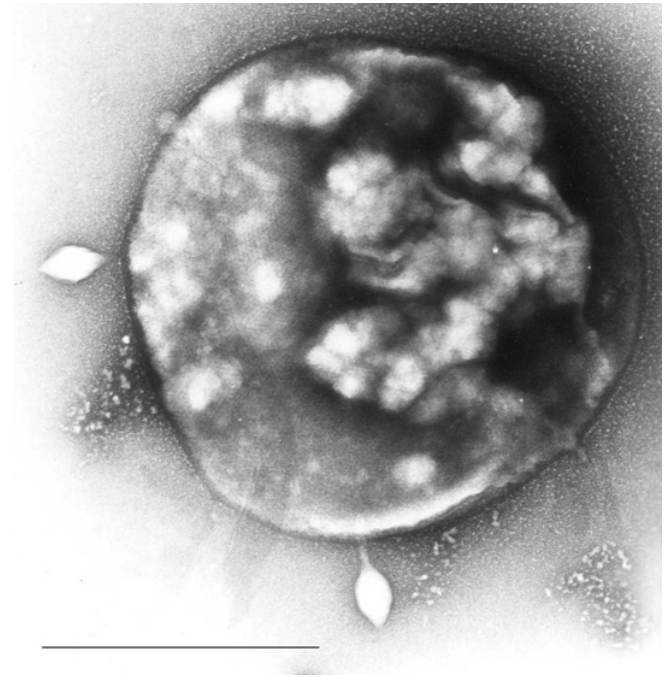
- Archaea and bacteria have generally similar cell structure, but cell composition and organization set the archaea apart.
- archaea lack interior membranes and organelles.
- archaea cell membranes are usually bounded by a cell wall and they swim using one or more flagella.
- Most have a single plasma membrane and cell wall, and lack a periplasmic space.

Genetics

Archaea usually have a single circular chromosome

Archaea are genetically distinct from bacteria and eukaryotes, with up to 15% of the proteins encoded by any one archaeal genome being unique to the domain, although most of these unique genes have no known function

The proteins that archaea, bacteria and eukaryotes share form a common core of cell function, relating mostly to transcription, translation, and nucleotide metabolism.



<http://en.wikipedia.org/wiki/File:RT8-4.jpg>

Reproduction

- Archaea reproduce asexually by binary or multiple fission, fragmentation, or budding; meiosis does not occur, so if a species of archaea exists in more than one form, all have the same genetic material.
- Cell division is controlled in a cell cycle; after the cell's chromosome is replicated and the two daughter chromosomes separate, the cell divides.
- Both bacteria and eukaryotes, but not archaea, make spores.

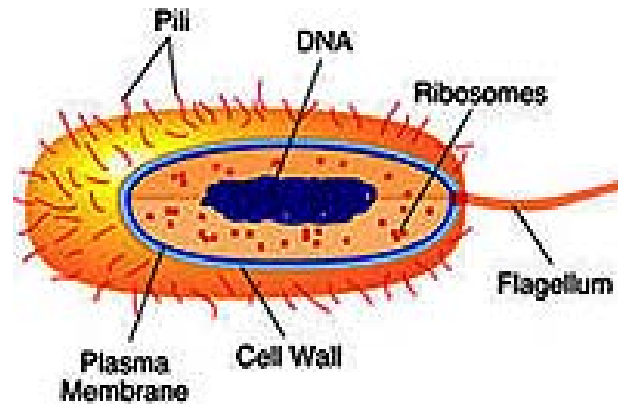
What Is Life?

There are Six Things For Life to Exist

1. Intake of Energy
2. Dispose of Waste
3. Grow and Develop
4. Respond to Environment
5. Reproduce
6. Evolve

Prokaryote Cells

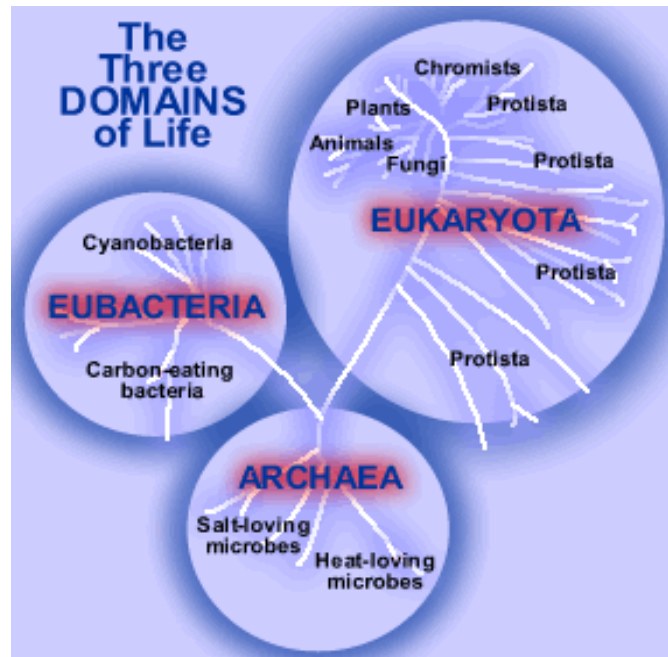
- Primitive Cells
- Lack Nucleus or Membrane
- DNA in “Nuclear Area”



<http://www.spacedaily.com/news/life-01zm.html>
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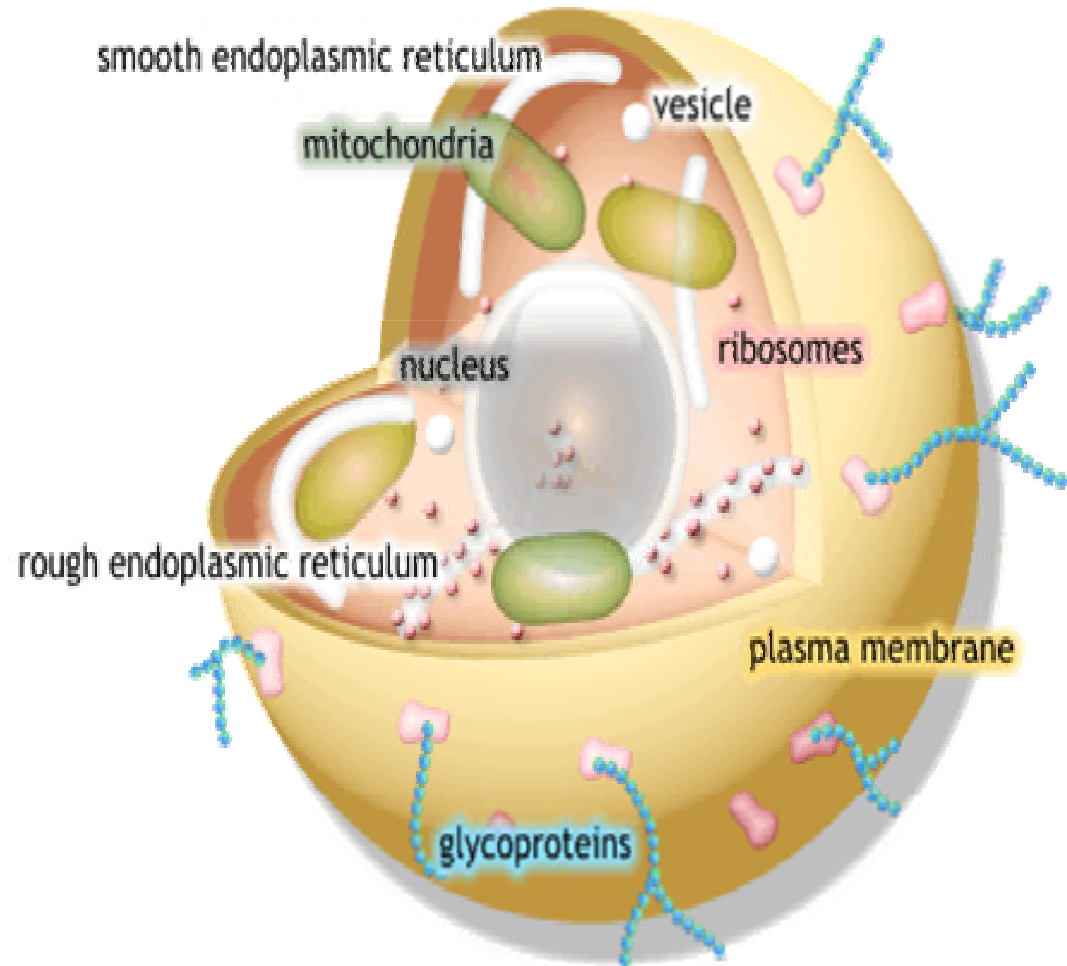
Three Domains of Life

- Eukarya, Eubacteria (true bacteria), and Archaea.



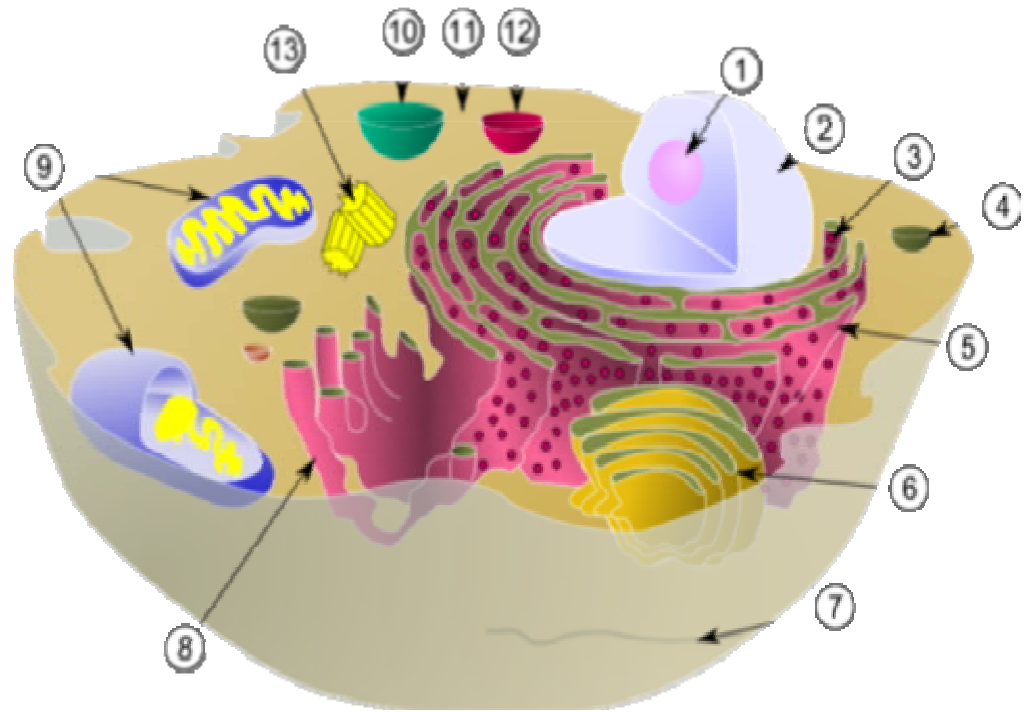
Eukaryotic Cells

These are organisms whose cells contain complex structures enclosed with membranes. Eukaryotic cells contain a nucleus or nuclear envelope in which the genetic material is carried.



Organelles

These are specialized subunits within a cell that have a specific function. Individual organelles are as followed: **nucleus** (2) which is responsible for DNA maintenance and RNA transcriptions, **endoplasmic reticulum** (5,8) which translates and folds new proteins & expresses lipids, **golgi apparatus** (6) which sorts and modifies proteins, **mitochondria** (9) for energy production, and **vacuole** (10) for storage and homeostasis. All Eukaryotic cells have these characteristics . Plants have **chloroplast** which is responsible for photosynthesis. All species of large organisms are Eukaryotes, including animals, plants and fungi.



How do prokaryotic cells differ from Eukaryotic cells?

- Prokaryotic cells have no cell nucleus or any membrane bound organelles. They are very small cells. The ribosome's of a prokaryotic cell are also smaller than a Eukaryotic cell. They are part of the bacteria and archaea domain.
- Eukaryotic cells have a nucleus which carries its genetic material. It also has membrane bound organelles. Almost all species of large organism are Eukaryotes including large animals, plants, and fungi.