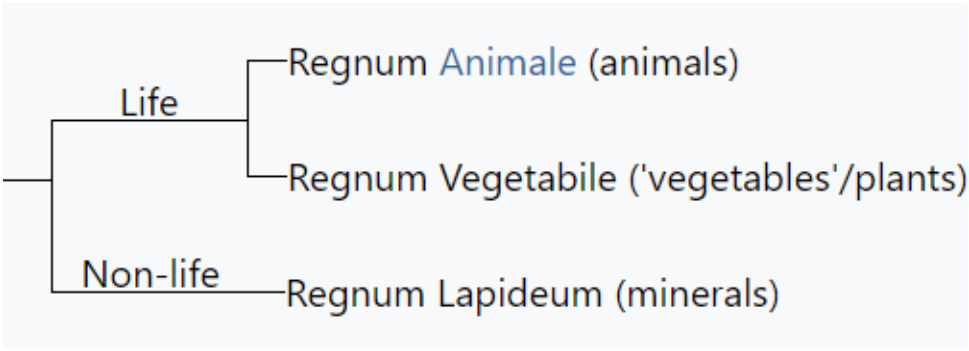
CONCEPT OF KINGDOMS

In biology, a kingdom (Latin: regnum, plural regna) is the second highest taxonomic rank, just below domain. Kingdoms are divided into smaller groups called phyla. Traditionally, some textbooks from the United States and Canada used a system of six kingdoms (Animalia, Plantae, Fungi, Protista, Archaea/Archaebacteria, and Bacteria/Eubacteria) while textbooks in Great Britain, India, Greece, Brazil and other countries use five kingdoms only (Animalia, Plantae, Fungi, Protista and Monera).

Two Kingdoms of Life

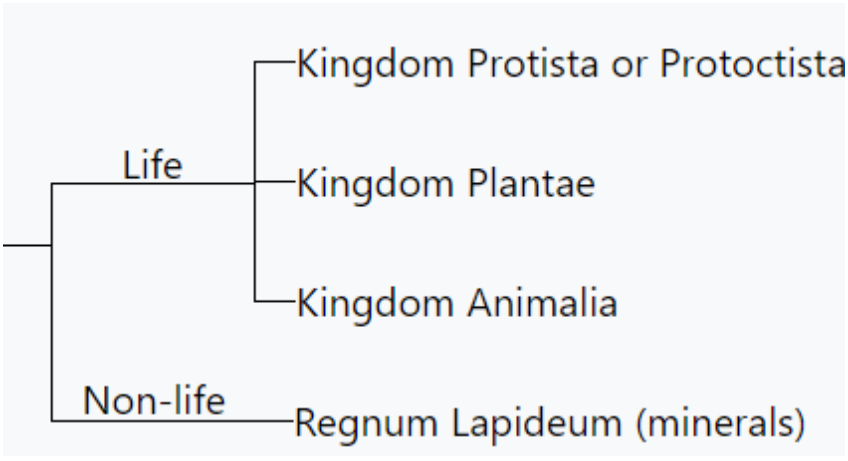
The classification of living things into animals and plants is an ancient one. Aristotle (384–322 BC) classified animal species in his History of Animals, while his pupil Theophrastus (c. 371–c. 287 BC) wrote a parallel work, the Historia Plantarum, on plants.

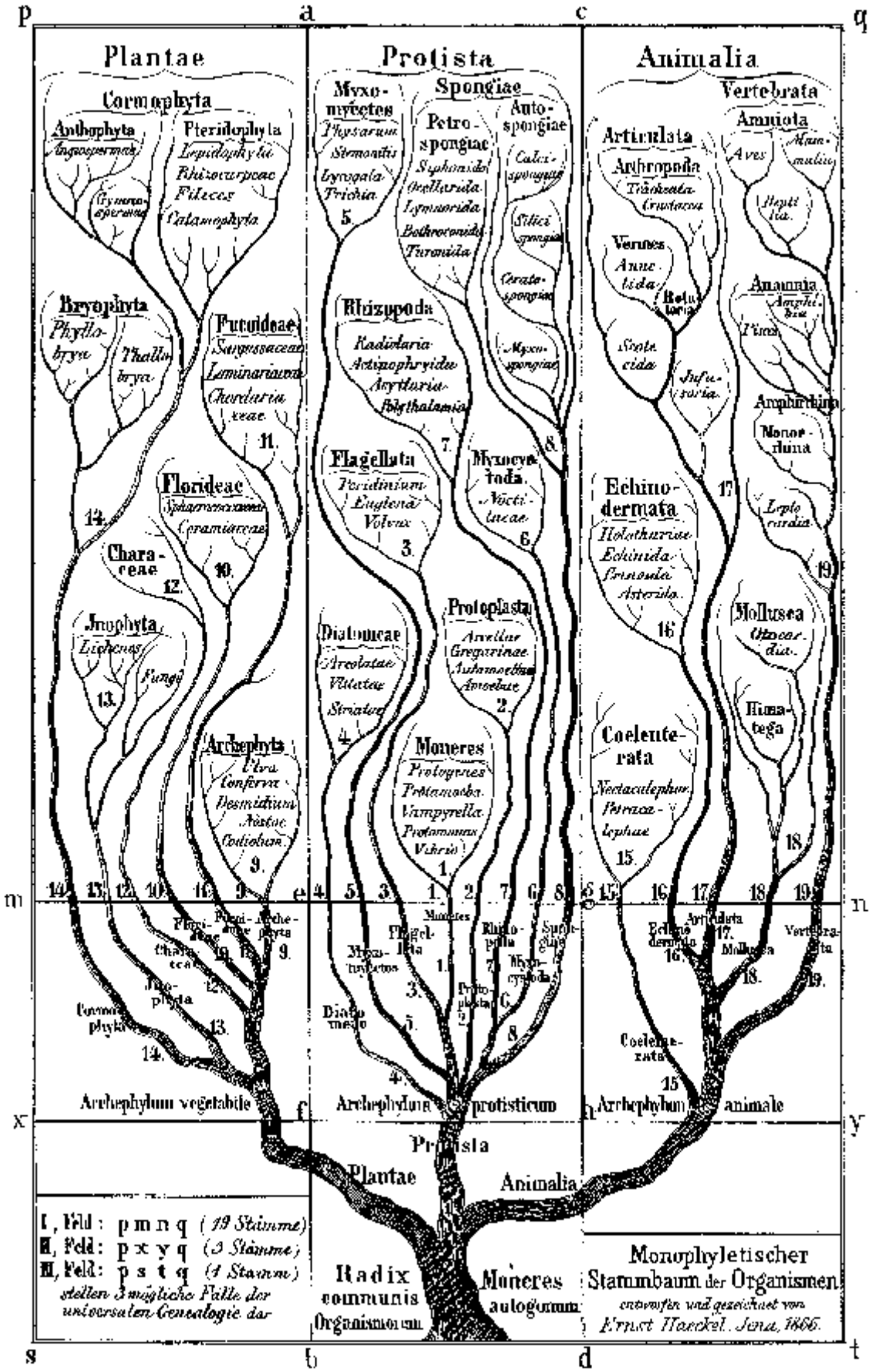
Carl Linnaeus (1707–1778) laid the foundations for modern biological nomenclature, now regulated by the Nomenclature Codes, in 1735. He distinguished two kingdoms of living things: Regnum Animale ('animal kingdom') and Regnum Vegetabile ('vegetable kingdom', for plants). Linnaeus also included minerals in his classification system, placing them in a third kingdom, Regnum Lapideum.



Three Kingdoms of Life

In 1866 Ernst Haeckel also proposed a third kingdom of life, the *Protista*, for "neutral organisms" or "the kingdom of primitive forms", which were neither animal nor plant; he did not include the Regnum Lapideum in his scheme.



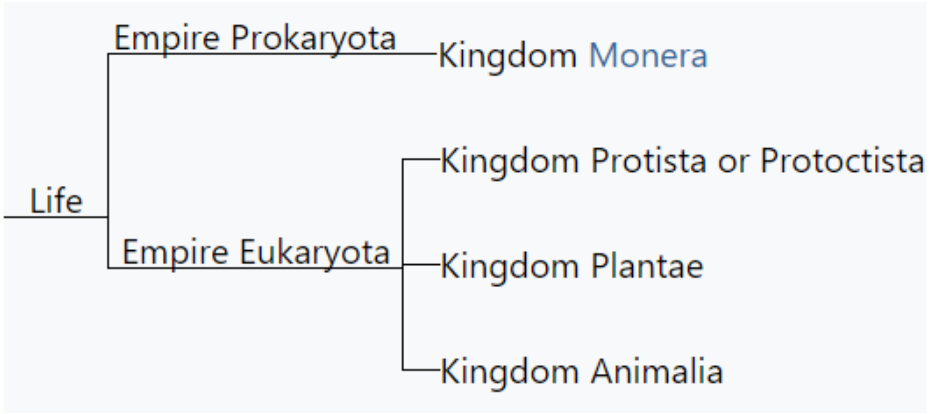


Haeckel's original (1866) conception of the three kingdoms of life, including the new kingdom Protista.

Four Kingdom

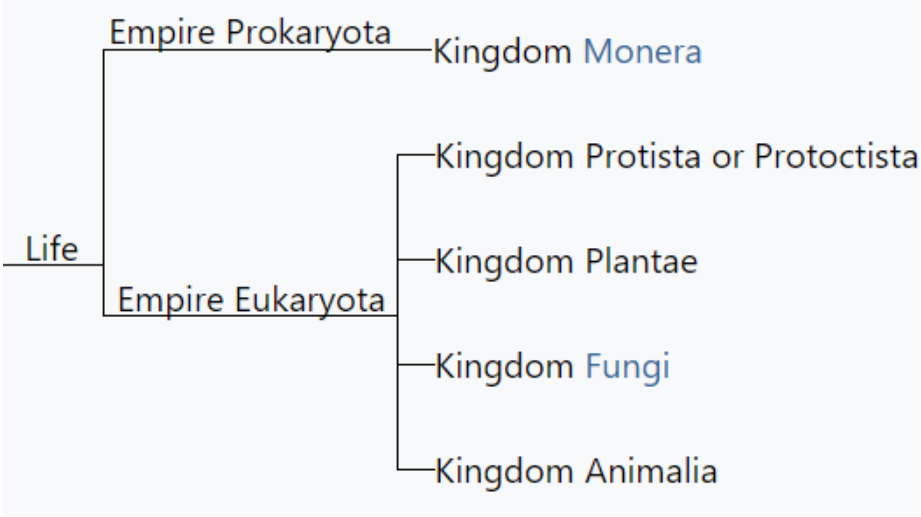
The development of microscopy revealed important distinctions between those organisms whose cells do not have a distinct nucleus (prokaryotes) and organisms whose cells do have a distinct nucleus (eukaryotes). In 1937 Édouard Chatton introduced the terms "prokaryote" and "eukaryote" to differentiate these organisms.

In 1938, Herbert F. Copeland proposed a four-kingdom classification by creating the novel Kingdom Monera of prokaryotic organisms; as a revised phylum Monera of the Protista, it included organisms now classified as Bacteria and Archaea.



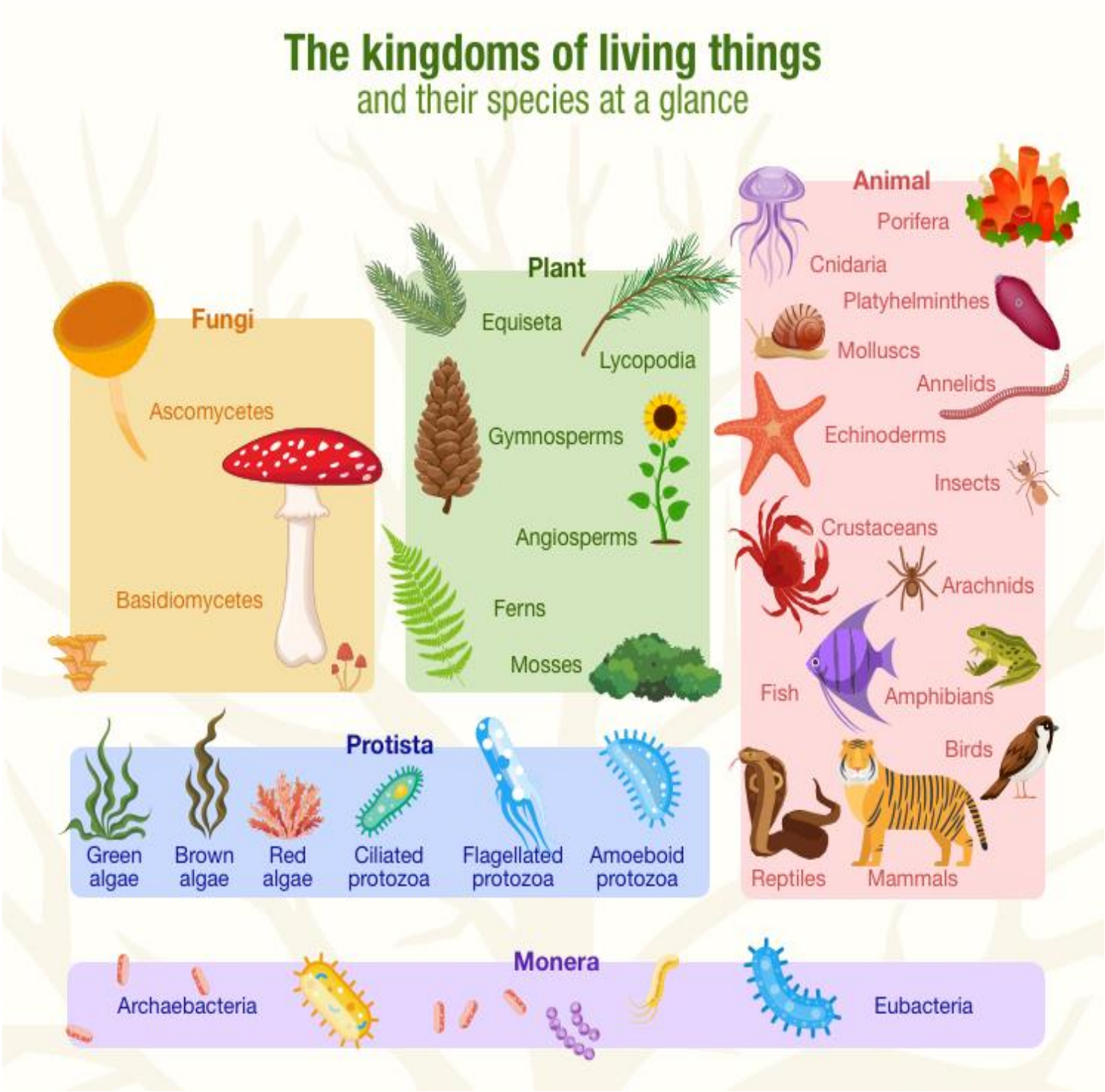
Five Kingdoms

Haeckel had moved the fungi out of Plantae into Protista after his original classification, but was largely ignored in this separation by scientists of his time. Robert Whittaker recognized an additional kingdom for the Fungi. The resulting five-kingdom system, proposed in 1969 by Whittaker, has become a popular standard and with some refinement is still used in many works and forms the basis for new multi-kingdom systems. It is based mainly upon differences in nutrition; his Plantae were mostly multicellular autotrophs, his Animalia multicellular heterotrophs, and his Fungi multicellular saprotrophs.



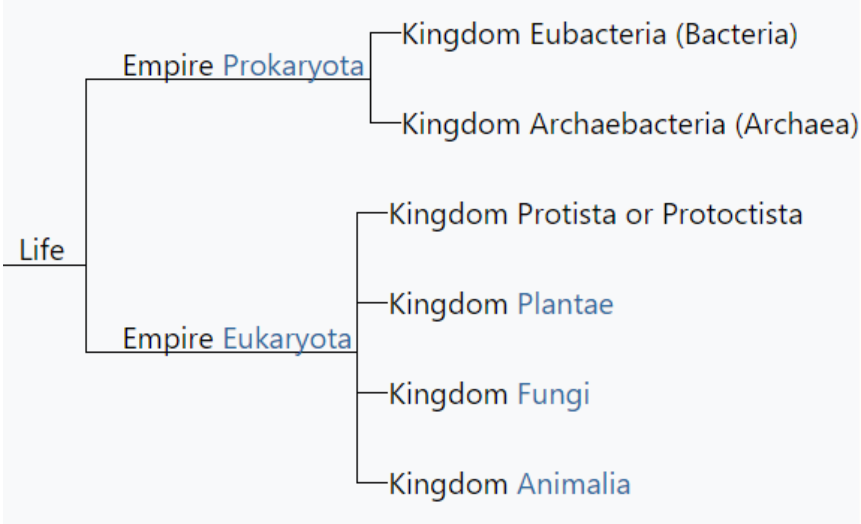
The kingdoms of living things

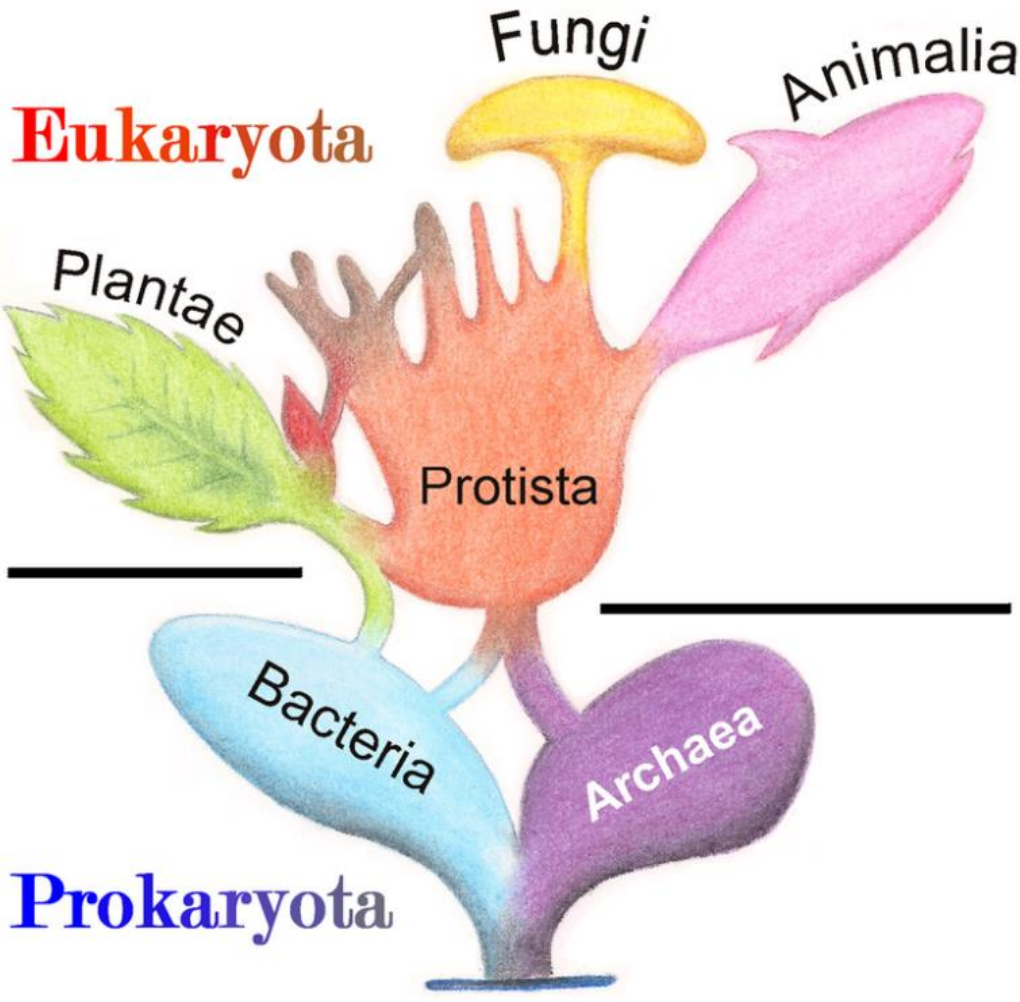
and their species at a glance



Six Kingdoms

In 1977, Carl Woese and colleagues proposed the fundamental subdivision of the prokaryotes into the Eubacteria (later called the Bacteria) and Archaebacteria (later called the Archaea), based on ribosomal RNA structure; this would later lead to the proposal of three "domains" of life, of Bacteria, Archaea, and Eukaryota. Combined with the five-kingdom model, this created a six-kingdom model, where the kingdom Monera is replaced by the kingdoms Bacteria and Archaea.





Phylogenetic and symbiogenetic tree of living organisms, showing the origins of eukaryotes and prokaryotes.