

26. Bacteria – Bacteria, also called prokaryotes, are single-celled eukaryotes, that is, their cells possess a nucleus, karyoplasm, microtubules, cilia or flagella. They cannot perform specialized cellular functions. Bacteria have an inner and outer membrane, the cytoplasm and this means that they are no longer unicellular, but rather multicellular organisms. Bacteria are of diverse shape and size, and are found in rocks, water, plants, animals, and humans, according to the type of metabolism, microorganisms can be aerobic or anaerobic. They vary in size, from less than 1 µm for most mikroorganisms, such as algae, the genome size of bacteria varies significantly, from a few megabases for some extremophiles up to over 100 megabases for Escherichia coli. Bacteria are able to synthesize biomolecules, and are able to divide rapidly, bacteria are eukaryotic organisms, having a similar membrane structure and organelle makeup, and are often associated with eukaryotes in some habitats. By the amount of DNA contained in their cell, bacteria are the most numerous living organisms on Earth. More than 3.8 million species of bacteria have been described, with about 14,500 described in 2010, bacteria can be divided into two domains, the Bacteria and the Archaea. However, the eukaryotic group Opisthokonta is usually thought to be one of the closest bacterial relatives. The first bacteria-like cells were identified in the middle of the Proterozoic Eon, the rock record shows a variety of early life forms, including bacteria, with the earliest fossilized microorganisms estimated to have lived 3.5 billion years ago. The most studied early forms are the Archaea, whose closest relatives are yet to be found. The bacterial and archaeal lineages split about 2 billion years ago, early life forms have not been found within the last 2 billion years. So far, no organism has been isolated that lives in the same nutrient-rich environment as organisms of the archaea. However, there are many similarities in the way organisms grow, for example, bacteria have the ability to carry out a photosynthesis in the open ocean, using water and carbon dioxide as nutrients. Bacteria also carry out closed fermentation, which is the same metabolic process that yeast use for wine making, bacteria have been used to ferment almost all

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