

Biology of Prokaryotic algae (572 MIC)

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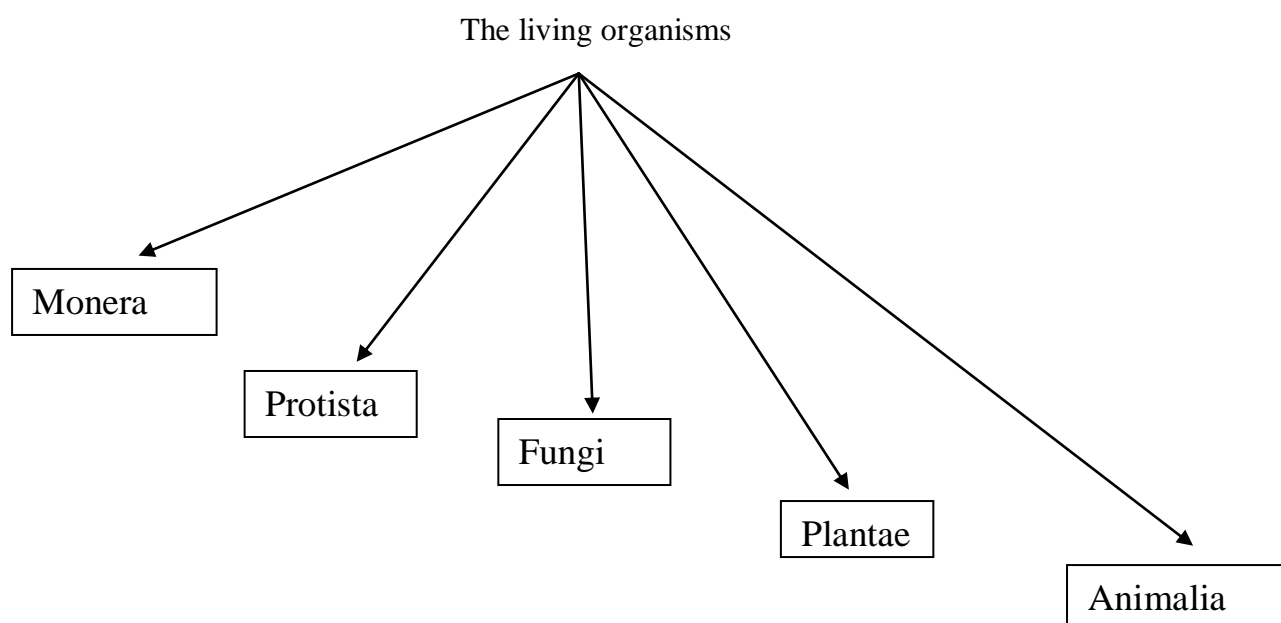
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Classification of living organisms

The modern classification of five Kingdoms system of living organisms, according to Whittaker (1969), classify the living organisms to five kingdoms:



KINGDOM MONERA

Two groups were included in Kingdom Monera: Eubacteria (true bacteria) and Cyanobacteria (blue-green algae). Some texts consider these groups as subkingdoms and others consider them as divisions of Kingdom Monera. Bacteria are unicellular organisms which lack chlorophyll. They possess certain biological properties and they multiply by binary fission. Members of Cyanobacteria reproduce in the same way and thus bacteria and blue greens are grouped under this kingdom due to this primitive type of reproduction.

Cyanobacteria or blue-green algae are the oldest groups of living on the planet. It is estimated that more than old (2.5-3) billion years (Golubic, 1976). During the past three decades the blue-green algae become of the largest groups in the Kingdom of prokaryotic. These organisms were distributed in most of the lands and

were found in all soil samples, but their numbers do not reach the vast numbers of bacteria, actinomycetes and fungi (Alexander, 1982).

Blue-green algae characterized by on its proximity chlorophyll (a) and thus it is considered as autotrophic organisms. Those they get the energy needed for it by undertaking the process of photosynthesis. If there present in the depths of the soil away from the light, they remain static, but there are some species remain in the active image as it is optional in the fed (Heterotrophs) in the sense that in the absence of light feeds the sources of carbon membership such as the alga *Nostoc muscorum* (Stewart, 1970).

Due to the primitive structures and for the installation of simple cells, the blue-green algae are group of the Kingdom prokaryote. There are photoautotrophs, build carbohydrates from (CO₂) carbon dioxide, water and energy from the sun with the assistance of chlorophyll (Al-Aroussi and Wasfy, 1993).

Although it acceded to the Kingdom of prokaryote, which includes true bacteria, the chlorophyll of the blue-green algae is different in composition from the bacterial chlorophyll which representative the Photosynthetic Bacteria, as well as that there is another difference is the production of S in the case of bacteria photosynthesis instead of the free oxygen product in the case of blue-green algae (Bold and Wynne, 1985).

In spite of these differences between bacteria and the blue-green algae, Stanier (1977) reported that, the blue-green algae are in close association to bacteria more than to algae due to the similarity in both in the cellular and biochemical activity. Also, It was found that bacteria and blue-green algae similar in the following features:

- Primitive cells with nuclei.
- Absence of motile reproductive units.
- There is no sexual reproduction.
- Similarity in the components of cell walls by the presence of (Muco peptide).
- The presence of Diaminopimelic acid as a reserve food materials.
- The ability of some species to fixed the atmospheric nitrogen.
- The ability to live in high temperatures.

- It is also the pattern of injury of blue-green algae by phages which in similar pattern of infection of bacteria by Bacteriophages (Alsrani et al, 2000).

It still a dispute exists so far in the taxonomic status of blue-green algae between the bacteria scientists and algae scientists.

General characteristics of blue-green algae:

The blue-green algae are characterized by in several recipes, including:

1. It is Procaryotic organisms.
 2. Lacking of flagella and the movement by gliding with helping by the secretion of a gelatinous-coated (mucilaginous sheath).
 3. Contains three types of pigments, namely:
 - A - Green pigment (Chlorophyll) that absorbing light at specific wavelengths, the most important chlorophyll *a*.
 - B- Phyco-biliproteins which is the most important types:
 - 1 – The blue pigment (Phycocyanin) which characterized to the blue-green algae, which represent about (70%) of this type of dyes.
 - 2 - The red pigment (Phycoerythrin), which represents (7%).
 - 3 – Day Allophycocyanin, represent about (13%).
 - C. Carotenoid pigments, which includes two basic types: are the xanthophyll and carotene (Saad et al, 1988).
 - 4 - Blue-green algae store their food in the form of protein called (Cyanophycin), or in the form of sugars known as Cyanophycean starch or in the form of oil droplets (Alsrani et al, 2000).
 - 5 - Some species abundant in hot springs where the temperature reaches about 85°C. Others are live in a symbiotic life with other organisms. Some workers were isolate some cyanobacterial species from the digestive tract of humans and animals (Alsrani et al, 2000).
- In general, the blue-green algae which containing gas vesicles are present in the group of plankton in the water bodies of the tropical weather warm to cold temperate regions (Fogg, 1969).
- 6 – The cell diameters ranging from less than 0.5 mm to more than 100mm.
 - 7 – The blue-green algae is a Gram negative (Bergey, 1994).