

capitolo 8 Il mondo della cellula

verifica la comprensione

Leggi il brano e rispondi alle domande.



The endosymbiotic theory.

Probably the most important scientific contribution of Lynn Margulis is the endosymbiotic theory of the origin of mitochondria as separate organisms that long ago entered a symbiotic relationship with eukaryotic cells through endosymbiosis. The endosymbiotic theory concerns the origins of mitochondria and chloroplasts, which are organelles of eukaryotic cells.

According to this theory, these originated as prokaryotic endosymbionts, which came to live inside eukaryotic cells. The theory postulates that the mitochondria evolved from aerobic bacteria (probably proteobacteria, related to the rickettsias), and that the chloroplast evolved from endosymbiotic cyanobacteria (autotrophic prokaryotes). The endosymbiotic theory of organogenesis gained strong support in the 1980s, when the genetic material of mitochondria and chloroplasts was found to be different from that of the symbiont's nuclear DNA. The evidence for this theory is compelling as a whole, and it is now generally accepted.

The idea that the eukaryotic cell is a group of microorganisms was first suggested in the 1920s by the American biologist Ivan Wallin. The endosymbiont theory of mitochondria and chloroplasts was

proposed by Lynn Margulis of the University of Massachusetts Amherst. In 1981, Margulis published *Symbiosis in Cell Evolution* in which she proposed that the eukaryotic cells originated as communities of interacting entities that joined together in a specific order. The prokaryote elements could have entered a host cell, perhaps as an ingested prey or as a parasite. Over time, the elements and the host could have developed a mutually beneficial interaction, later evolving in an obligatory symbiosis.

Dr. Margulis has also proposed that eukaryotic flagella and cilia may have arisen from endosymbiotic spirochetes, but these organelles do not contain DNA and do not show any ultrastructural similarities to any prokaryotes, and as a result this idea does not have wide support. Margulis claims that symbiotic relationships are a major driving force behind evolution. According to Margulis and Sagan (1996), «Life did not take over the globe by combat, but by networking» (i.e., by cooperation, interaction, and mutual dependence between living organisms).

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- What supposition did Mendel base his concept of dominance on?
- What are probably the reasons why Mendel's work was ignored for 35 years?
- When was Mendel's work rediscovered?