"On the Origin of Mitosing Cells" (1967), by Lynn Sagan

By: Haskett, Dorothy Regan Keywords: Lynn Margulis, Lyn Sagan, cell evolution, eukaryotic origin

"On the Origin of Mitosing Cells" by Lynn Sagan appeared in March 1967 in the Journal of Theoretical Biology. It was an early attempt to explain the evolution of eukaryotic cells. She proposed that eukaryotes originated through a process of endosymbiosis, where prokaryotic cells were engulfed by larger cells and eventually became organelles within the host cell. This hypothesis was based on genetic evidence and the fact that eukaryotic cells have nucleoli and other organelles, as discussed in Charlesworth's 1994 book "The Origins of Eukaryotes". The book provided a genetic foundation for the theory, which had been proposed earlier by Lynn Margulis. In 1967, Lynn Sagan presented her work and it was later published in the Journal of Theoretical Biology. Her article was the first major contribution to the field of eukaryotic origin, which led to the development of the endosymbiotic theory of eukaryote evolution. The theory was later confirmed by the discovery of mitochondria and chloroplasts, which are organelles that are derived from prokaryotic ancestors. These organelles are believed to have evolved through the process of endosymbiosis, where prokaryotic cells were engulfed by larger cells. The theory of endosymbiosis was further supported by the discovery of genetic evidence that showed a close relationship between mitochondria and chloroplasts and their prokaryotic ancestors. The theory of endosymbiosis has been widely accepted by the scientific community and has been a major contributor to our understanding of the evolution of eukaryotic cells.
Sources


On the Origin of Mitosing Cells by Lynn Sagan appeared in the March 1967 edition of the Journal of Theoretical Biology. At the time the article was published, Lynn Sagan had divorced astronomer Carl Sagan, but kept his last name. Later, she remarried and changed her name to Lynn Margulis, and will be referred to as such throughout this article. In her 1967 article, Margulis develops a theory for the origin of complex cells that have enclosed nuclei, called eukaryotic cells. She proposes that three organelles: mitochondria, plastids, and basal bodies, which are all parts of eukaryotic cells, were once free-living cells that took residence inside primitive eukaryotic cells. This process Margulis called endosymbiosis. Margulis' theory explained the origin of eukaryote cells, which are the fundamental cell type of most multicellular organisms and form the basis of embryogenesis. After fertilization, embryos develop from a single eukaryotic cell that divides by mitosis.

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