

Research paper on first eukaryotic cells from 2 billion years ago

[Environment](#), [Disaster](#)



Eukaryotes are a class of cells whose cellular contents are enclosed within a nuclear membrane. This is as opposed to the prokaryotes whose cellular contents are not enclosed within a nuclear membrane. The main difference between the eukaryotes and the prokaryotes is the existence of a nuclear membrane surrounding the genetic material of a eukaryotic cell while it is prominently absent. For a long time now there has been raging debate among scientists about the origin of the eukaryotes about 2.5 billion years ago. Due to these differences that have existed in opinion, several scientists have come up with theses that have tried to prove the eukaryotic cell origin. The sole aim of this paper is to discuss about the origin of the first eukaryotic cells. These will give an insight into the cells of eukaryotic organisms that exist in the present day. Since not one of the original eukaryotic cells is in existence, then the theories forwarded by scientists will be used as the backbone of the research and information that we have presently on the original eukaryotes. This paper considers the various angles taken by scientists and the various theories forwarded towards accomplishing the claim on the original eukaryotes. Many of these studies have indicated that the origin of the eukaryotic cell was as a result of the fusion of cells or by endo-symbiosis between a bacterium and an archaeon. Regardless of all this disagreement it has come to be accepted that all known modern eukaryotes possess the mitochondrion and are termed the archezoa. This is also supported by the fact that genes that are eukaryotic specific have been discovered, bringing in the argument that there must have been three partners in the fusion of the original eukaryotes to come up with the present day eukaryotes. Margulis put forward the argument that there was an ‘

oxygen holocaust' on the planet earth around two billion years ago (Rinehart, Holt, Wilson, 1). This holocaust caused a spontaneous increase in the quantities of oxygen in the earth's atmosphere. This resulted in the death of most of the existent bacteria, while the aerobic, oxygen utilizing bacteria survived the holocaust by feeding on the inadaptable anaerobic bacteria and directly feeding on them. These she proposed were the evolutionary predecessors of the mitochondria. Additionally Margulis proposed that the chloroplasts were as a result of the evolution from an ancient invasion, but from microscopic photosynthetic bacteria that resembles modern day blue green bacteria. These, according to Margulis were the emerging eukaryotes (Rinehart, Holt, Wilson, 2).

There is also the notion that eukaryotes evolved from the more primitive prokaryotic cells. The reasons given in support include they both have RNA and DNA as their genetic material, they both contain 20 amino acids, they both have ribosomes and they both use the L amino acids as well as D sugars(gwu, 1). An alternative theory was suggested by Autogenous. According to Autogenous, eukaryotes were a direct descendant of prokaryotes, in the sense that there were in-folding that resulted in compartmentalization of the cell functions. This theory has been accepted for the formation of such cell organelles as the endoplasmic reticulum, the nuclear membrane as well as the Golgi apparatus (Taylor, 178). The concept of mosaic evolution is also usually alluded to as being the cause of the similarities that exist between the mitochondria, chloroplasts as well as the eubacteria. Conclusively, the present day eukaryote bears a totally different appearance to its supposed ancestors and is more complex.

The structure of a Eukaryotic cell

Holt, Rinehart & Wilson (2007) (a). The Origin Of Eukaryotic Cells.

Retrieved from: http://go.hrw.com/resources/go_sc/bpe/HM9PE510. PDF

Accessed on : 12th March 2012

Holt, Rinehart & Wilson (2007) (b). The Origin Of Eukaryotic Cells.

Retrieved from: http://go.hrw.com/resources/go_sc/bpe/HM9PE510. PDF

Accessed on : 12th March 2012

GWU (2012). Origin of Eukaryotes.

Retrieved from: <http://www.gwu.edu/~darwin/BiSc151/Eukaryotes/Eukaryotes.html>

edu/~darwin/BiSc151/Eukaryotes/Eukaryotes.html

Accessed on : 12th March 2012

Taylor, F (1976). TAXON: Autogenous Theories For The Origin Of Eukaryotes.

Publishers : International Association for Plant Taxonomy (IAPT). Retrieved

from: <http://www.jstor.org/discover/10.2307/1220521?uid=2129&uid=3738336&uid=2&uid=70&uid=4&sid=47698746474557>

Accessed on : 12th March 2012

Don Fawcett-Keith Porter/ Photo researchers, inc. Image retrieved from:

<http://www.cbu.edu/~seisen/EukaryoticCellStructure.htm>

Accessed on : 12th March 2012

<https://assignbuster.com/research-paper-on-first-eukaryotic-cells-from-2-billion-years-ago/>