

Cell Evolution Puzzle

By Dr. David Whitehouse

Scientists have found an organelle - an enclosed free-floating specialized structure - inside a primitive cell for the first time.

Prokaryotic cells, such as bacteria, are relatively simple and have no nuclei.

It is believed they evolved first, then absorbed **prokaryotes** and became **eukaryotes** - complex other cells that have **nuclei** and structures like the energy- **mitochondria**.

Finding a self-contained organelle inside a **prokaryote** is a puzzle, as it suggests that the evolution of cells - the basic building blocks of higher organisms- may have to be reconsidered.

Two types of cells

Biologists recognize two types of cells in nature that are fundamentally different because of their size and internal construction.

Prokaryotes are relatively small cells that contain strands of DNA but no membrane separates them from the rest of the cell. They lack so-called organelles such as chloroplasts and mitochondria.

More complicated are the **eukaryotes**, the cells that comprise all other living things. They have their genetic material enclosed in a **nucleus** and have other enclosed structures (**organelles**) within them as well.

Professor Roberto Docampo, of the University of Illinois at Urbana-Champaign, US, has been studying the unicellular organism *Agrobacterium tumefaciens*. It is responsible for gall disease in many plants. The **organelle** he found inside the **bacteria** is practically identical to an **organelle** he found inside **unicellular eukaryotes**. This particular **organelle** helps the **bacteria** regulate its acidic content.

Novel find

According to Professor Docampo, the work is important for several reasons. He told BBC News Online that an **organelle** had never been found in a **prokaryote** before.

He says it is significant that the same organelle is found in the more complicated **eukaryotes** implying that it may have a common evolutionary origin for both types of cell.

"It appears that this organelle has been conserved in evolution from **prokaryotes** to **eukaryotes**, since it is present in both," he says. "This argues against the belief that all **eukaryotic organelles** were formed when early **eukaryotes** swallowed **prokaryotes**."

Finally, the **organelle** is known to be present in a number of pathogenic organisms, including those that cause malaria, toxoplasmosis, African sleeping sickness and Chagas disease among others.

This may provide scientists with a technique to tackle these diseases. Because the **organelle** is not present in animal cells, it may be a useful target for chemotherapy for those diseases.

Science in the News #9

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One word from the article I would like to know more about is _____ . When I looked

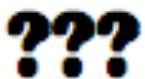
this word up in the dictionary I find out it meant _____



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