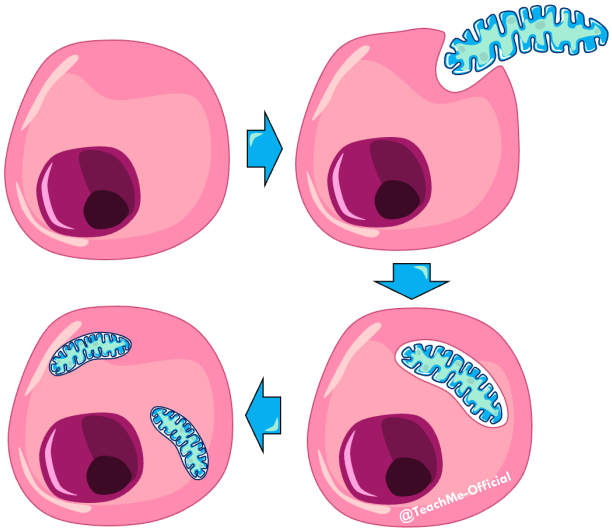
A2.2

Origin of eukaryotes (HL)

Endosymbiotic Theory

A theory that explains how a cell could progress from a simple non-compartmentalized prokaryote to a complex compartmentalized eukaryote. .



Large cell (prokaryotic) engulfs a small cell (prokaryotic).

The large cell provides protection and organic compounds (food) for small cell.

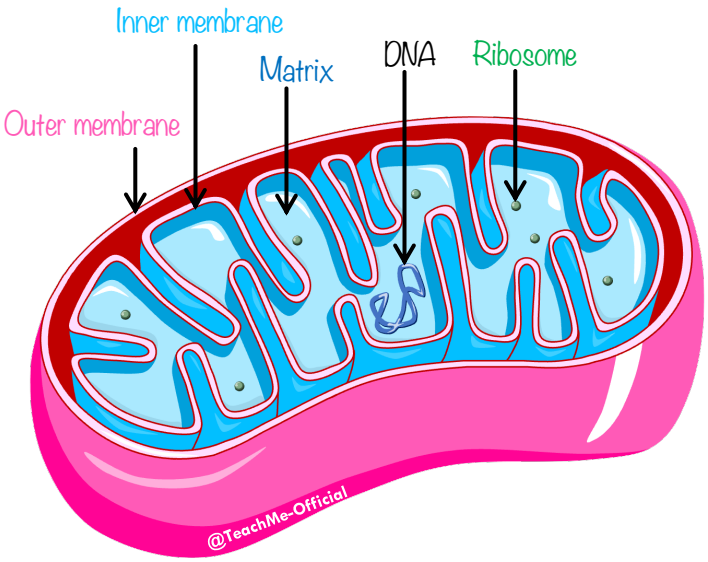
The small cell specializes gradually carrying out specific functions (ATP production) which benefits the large cell.

In this way they form a **SYMBIOTIC RELATIONSHIP**. They depend on each other.

Examples include;

Mitochondria

The organelle responsible for ATP (energy) production



THE MITOCHONDRIA SUPPORTS THE ENDOSYMBIOTIC THEORY BECAUSE;

1. Same size as bacterial cells.

2. Has double membrane: outer membrane formed from larger cell's membrane during engulfing process. Inner membrane is the small cell's membrane.

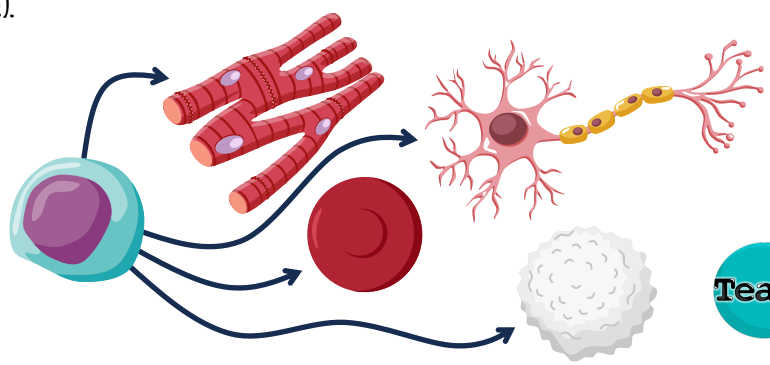
3. Inner membrane is more like prokaryote and outer membrane is more like eukaryote.

4. Contain their own DNA (circular chromosome like prokaryotes). Replicate by binary fission (like prokaryotes).

5. Ribosomes that are smaller than rest of the cell. RNA in ribosomes like that in prokaryotes.

Cell Specialization

Differentiation involves the expression of some genes from the organism's genome in the cell, but not others.



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