

15BT101-BIOLOGY FOR ENGINEERS

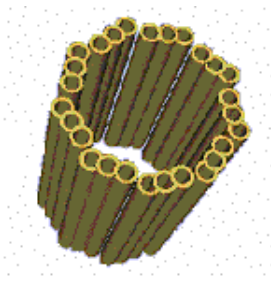
UNIT I

- Introduction
- Cell structure and function
- Genetic information, protein synthesis, and protein structure
- Cell metabolism
- Homoeostasis
- Cell growth, reproduction, and differentiation

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- The microtubular structure of the centriole is the same as that of the basal body and may have arisen from primitive basal bodies during cellular evolution.
- Centrioles probably play a role in the formation of the spindle apparatus, which is an essential feature of both mitosis and meiosis.

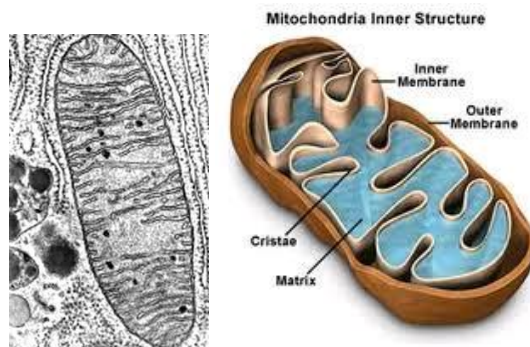
CENTRIOLES



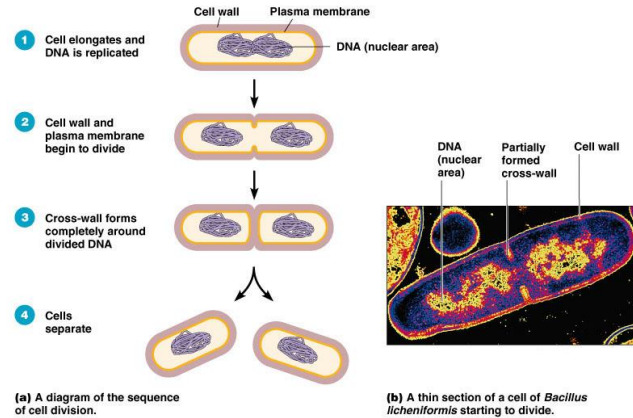
MITOCHONDRIA

- Mitochondria are rounded or cigar-shaped organelles that are particularly prominent in cells with high metabolic activity. Their name derives from their threadlike appearance (Greek mitos, “thread”) under the light microscope.
- Mitochondria have a double wall: an outer smooth membrane which forms the outer boundary and an inner membrane which is extensively folded. The folds, or cristae, project into the interior of the organelle and have a variety of enzymes embedded in them.
- These enzymes are involved in a systematic degradation of organic molecules to yield energy for the cell. Like the chloroplasts of plants, the mitochondria contain their own DNA and ribosomes, they replicate independently of the rest of the cell and appear to control the synthesis of their membranes.

MITOCHONDRIA



BINARY FISSION



Bacterial Recombination:

Conjugation

Some bacteria are capable of transferring pieces of their genes to other bacteria that they come in contact with. During conjugation, one bacterium connects itself to another through a protein tube structure called a pilus. Genes are transferred from one bacterium to another through this tube.

Transformation

Some bacteria are capable of taking up DNA from their environment. These DNA remnants most commonly come from dead bacterial cells. During transformation, the bacterium binds the DNA and transports it across the bacterial cell membrane. The new DNA is then incorporated into the bacterial cell's DNA.

Transduction

Transduction is a type of recombination that involves the exchanging of bacterial DNA through bacteriophages. Bacteriophages are viruses that infect bacteria. There are two types of transduction: generalized and specialized transduction

Mitosis

Mitosis is the process during which the chromosomes are distributed evenly to two new cells that arise from the parent cell undergoing division.

- During the S phase of interphase before mitosis proper, each chromosome will have replicated. The two chromosomal strands (chromatids) are identical in their genetic material and are joined at a constricted region called the centromere. Within the centromere are one or more rings of protein known as kinetochores. The kinetochores