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Mitochondria

Mitochondria are membrane bound cell organelles, essential for aerobic respiration of eukaryotic cells. These are also known as power house of the cell. Thus, they produce cellular energy in the form of ATP.

Occurrence

Mitochondria are present in all living cells except, prokaryotic cells and certain specialised eukaryotic cells such as anaerobic cells and mature RBCs.

It is revealed from the studies that mitochondria is not easily visible, unless it is specifically stained.

Shape and Size

Mitochondria vary considerably according to the shape and size. They have varying shapes such as granular fibrillar, spherical, oval, discoidal, etc. Average size of mitochondria is 2-6 μm in length and 0.5 μm in diameter (typical cylindrical or sausage-shaped mitochondria has diameter of 0.2-1.0 μm).

Ultrastructure

A mitochondrion contains two membranes, i.e., outer and inner. Out of which the outer membrane is smooth and forms the continuous boundary of the organelle. The inner membrane is semipermeable to some metabolites. It is infolded into the matrix as incomplete partitions called cristae.

The cristae are responsible for increasing the physiological active area or surface area. The density of cristae determines the intensity of respiration.

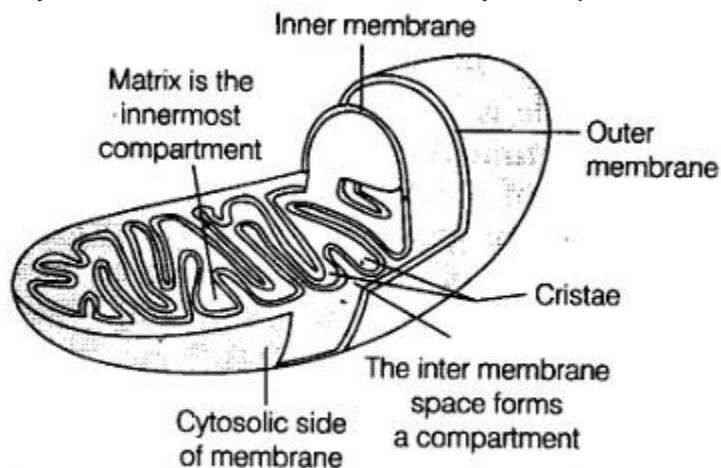


Fig. 8.9 Structure of mitochondria (LS)

The outer and the inner membranes divide its lumen into two aqueous compartments

separately, i.e., the outer and the inner compartment.

Inner compartment is also called matrix, which forms the inner core of the mitochondrion. The matrix also possesses single circular DNA molecule, a few RNA molecules, ribosomes (70S) and the components required for the synthesis of proteins. The mitochondria divide by fission. The two membranes of mitochondria have their own specific enzymes associated with mitochondrial function.

Functions

Mitochondria possess the following functions

- (i) Mitochondria provide important intermediates for the synthesis of several biochemicals like pyrimidines, alkaloids, etc.
- (ii) The inner chamber matrix of the mitochondria has enzyme for the syntheses of fatty acids.
- (iii) Helps in regulation of cellular metabolism.
- (iv) Helps in apoptosis (programmed cell death).
- (v) Each of membrane potential.

Mitochondrion is the second largest cell organelle and are more in animal cells than in plant cells.