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The function and structure of the mitochondria.

The mitochondria is known to be an organelle which is found in most of the cells. Mitochondria are in both plant and animal cells , mitochondria are a rod - shaped structure which enclose with two membranes (inner membrane and outer membrane) .Biochemical processes of respiration and energy production also occur in the mitochondria. The mitochondria has a double membrane which in the inner part is folded inwards which then forms layers, the mitochondria are the power producers of the cells. The mitochondria are small organelles which float throughout the cell , many cells have several thousand mitochondria while others have none. Muscle cells are known to need lots of energy this is why they have lots of mitochondria neurons which are cells that transmit nerve impulses , they don't need as many mitochondria , If a cell ever feels as it is not getting enough energy to survive mitochondria can be created . Mitochondria can grow larger or can even combine with other mitochondria this all depends on what the cell needs.

The mitochondria consists of two membranes the outer membrane which is smooth and the inner membrane which is very twisted to increase surface area. The cristae carry out anaerobic respiration which then combines the sugar with the oxygen to make ATP molecules which is the source of energy in the cells. Mitochondria convert energy into forms which the cells are able to use, located in the cytoplasm they are sights of cellular respiration which generate fuel for the cells activities . The mitochondria are also involved in many cell related processed such as cell division and growth as well as cell death.

The mitochondria are important because these organelles supply all the necessary biological energy of the cell and they obtain this energy by oxidizing the substrates of the krebs cycle. The cell energy if formed by the enzymatic oxidation of chemical compounds in the mitochondria , therefore the mitochondria are also known as the power house of a cell. Nearly all eukaryotic cells have mitochondria even though they are lost in later stages of development of a cell like red blood cells or in elements of the phloem sieve tube.
As mitochondria are the cells power producers they convert energy into forms which are located in the cytoplasm they are sites of respiration which generate fuel for the cells activities , the mitochondria are also involved in many more cell processes.

The mitochondria is a cellular structure which is a membrane bound. The mitochondria ranges from 0.5 to 1.0 micrometer in diameter, the organelles generate most of the energy in the cell in the adenosine triphosphate and it is used as a source of chemical energy. Each the membranes of the mitochondria is a phospholipid bilayer with embedded proteins. Mitochondria are semi autonomous this means that they are on the cell to replicate and grow , they have their own DNA, ribsomes and can also make their own proteins very similar to bacteria mitochondria have circular DNA and replicate it by a productive process known as fission.

The mitochondria also takes part in many other cellular activities such as signalling , cell diffraction, cell senescence and the control of the cell cycle and also the cell growth, the mitochondria can also affect humans and also the health of humans with mitochondria

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disorder and cardiac dysfunction and they also play a very important role in the aging process.

The structure of the mitochondria are smooth and is composed of equal amounts of phospholipids also it has a large number of special proteins which are known as porins ,the porins are integral membrane proteins which allow movement of molecules which are 5000 daltons or less in weight pass through it , the outer membrane is freely permeable to nutrient molecules , energy molecules ions like APT and ADP molecules. The inner membrane of the mitochondria is much more complex when it comes to the structure , it is folded many times this is known as the cristae, the folding is what helps increase the surface are inside the organelles. The cristae and protein of the inner membrane aids in the production of ATP molecules. Many chemical reactions take place in the inner membrane of the mitochondria , unlike the outer the inner membrane is strictly permeable it is only permeable to oxygen , ATP and it also helps regulating transfer of metabolites across the membrane.

The mitochondria contains two main membranes which are composed of phospholipids bilayers and proteins. The smoother outer membrane, encloses the whole organelle this contains porin protein molecules which serve as diffusion channels for minute protein molecules across the membrane , larger molecules can only either enter if the signalling sequence can bind to a large tralslocase protein in the outer membrane.

The inner folded membrane contains up to about 1/5th of mitochondria protein , but this has no porin protein and it also includes several hundred polypeptides . The inner membrane is impermeable and ions and molecules. Therefore require a special membrane transporters tp pass through it , the inner membrane folds are known as cristae.

Intermembrane space is the space between the inner and outer membrane of the mitochondria , it is known to have the same composition as that of the cells cytoplasm , the difference is in the protein content which is in the intermembrane space.
The matrix of the mitochondria is a mixture of proteins and enzymes these enzymes are important for the synthesis of APT molecules , mitochondrial ribosome's tRNAS and mitochondrial DNA, the matrix also contains up to 2/3rds of the total mitochondrion protein.

The functions of the mitochondria vary this is according to the type of cell they are present in . The most important function of the mitochondria is the produce of energy , food which is eaten is broken into simple molecules such as carbohydrates and fats etc.. in the body . These are then sent to the mitochondrion this is where they process further and produce charged molecules which combine with oxygen and produce ATP molecules . The whole of this process is known as oxidative phosphorylation . It is very important to maintain proper concentration of calcium with many compartments of the cell. The mitochondria helps cells to achieve their goal by serving as storage tanks of calcium , they also help in the building of certain parts of the blood and hormones like testosterone and oestrogen. Mitochondria in the liver cells have enzymes that detoxify ammonia , they also play an important role in the process of programmed cell death and excess cells which are

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pruned away during the development of an organism , the process which is known as apoptosis . Abnormal cell death is due to mitochondrial dysfunction which can affect the function of a organ.

Almost every genetic material is in the nucleus the mitochondria have their own DNA .The mitochondria have their own machinery for protein synthesis and reproduction which is by the process of fission , because the mitochondria is independent from the DNA and similarities with bacteria it is known that mitochondria have originated from bacteria by endosymbosis.

Just like eukaryotic cells mitochondria in plants also play an important in the production of ATP via the process of oxidative phosphorlation . Mitochondria also play essential roles in many other aspects of plants such as performance and also the development , it also has various properties which allow the mitochondria to interact with special features of metabolism in the cell of the plant. In the animal cells the mitochondria are organelles which have their own small genome , they divide independently this is by simple fission , the division of the mitochondria is a result in energy demand most of the chemical reactions take place in the mitochondria.

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