

The Electronic Nature of Life

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Abstract:

Sunlight free electrons from chlorophyll molecules , using electrons in making carbohydrates , animals break down plants creating protein, freeing electrons set the oxygen free to work as a strong acceptor for electrons in the mitochondria of plants and animals. Therefore carbohydrate and protein cytochrome carry only electrons, then oxidative phosphorylation takes place between nicotinamide adenine dinucleotide NAD the donor of electrons and oxygen where electrons binds phosphate with adenosine diphosphate ADP creating adenine triphosphate ATP the currency of life in all living things. It is clear that the wheel of life rotates between the Sun and the oxygen, the Sun frees the electrons from oxygen and oxygen pulls them charging the battery of life transferring ADP to ATP in all living things

Introduction:

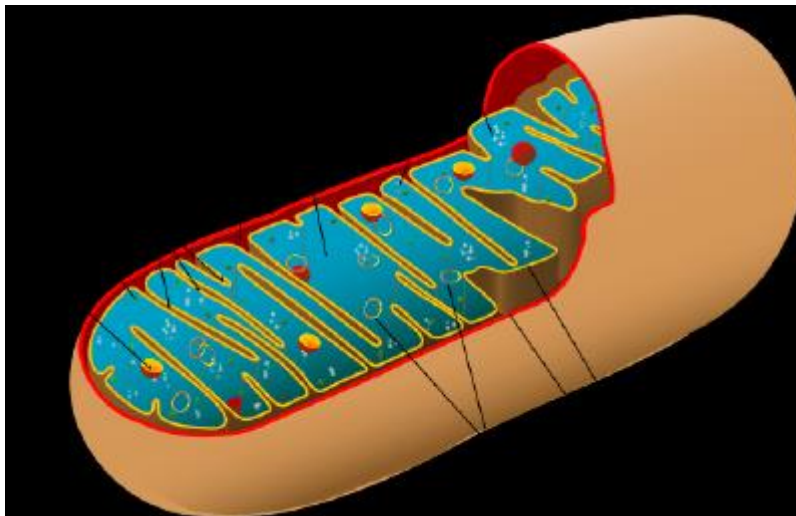
For me it was a beautiful surprise knowing that life itself is an electronic phenomenon like any electronic device in our modern life ! the energy of life is the energy of electrons where binding phosphate to ADP to create ATP is the work of electrons, this is a chemical process having its physical basis!

Electron now is my dear friend, I meet it every where , the Sun shines when the speedy electrons of the solar corona hit the gaseous atmosphere of our Earth causing their electrons to glow creating the light of the day and in the same time freeing electrons to let free oxygen pulling them and binding phosphate with ADP to create ATP in mitochondion, the house of energy of life. Here through the mitochondrial work, life is one of the images of energy in the universe, it is of electronic nature. In fact dealing with life in the light of this vision may be of great benefit in the struggling against hunger in the world, and many uncontrollable deceases up till now. Let us now see the electronic nature of our life in details.

1- Electrons work in mitochondria :

Excited electrons not only govern all our modern electric devices , but they govern also our life itself, as oxygen , the gas of life, deals only with electrons in all living cells , sunlight in plants excite only electrons separating them from protons and oxygen in the chlorophyll, where oxygen in turn works as the strongest acceptor of electrons from the rich donor of electrons in the inner mitochondrial membrane of living cell. The mitochondrion is the house of

energy in all living cells of plants and animals, this energy is released during tissue respiration. Mitochondria are tiny bodies in cells' cytoplasm of these two levels of life. They have the same structure producing the same ATP, the currency of life, but differ slightly in shape here and there, and the names of their parts as we will see⁽¹⁾ It is well known that plants build up by electrons the sugar and carbohydrate, and animals live on breaking them down as a food, but at last the energy is that of electrons. Therefore electrons mean life's energy which is simply a chemical process, . In the following image we see the structure of mitochondrion with its outer and inner membranes :



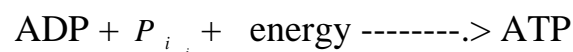
The outer most membrane is smooth, while the inner membrane has many folds, these folds enhance the productivity of cellular respiration by increasing the available surface. The inner membrane space is the narrow part between the two membranes. In the image we can see the very important ATP particles as tiny white dots in the green folds. It is worth mentioning that mitochondria are involved in cell division, growth and death.⁽²⁾

2- Oxygen as the strongest acceptor of electrons:

In mitochondria electrons are transferred within the membrane space by the water-soluble electron transfer protein cytochrome which carries only electrons, and these electrons are transferred by reduction and oxidation of an iron atom, the protein holds this atom within a heme group in its structure. The whole process here is known as oxidative phosphorylation,⁽³⁾ where adding a phosphate to a molecule is called phosphorylation, this process occurs between two poles of donor (NAD) and acceptor (oxygen). Here oxygen as the strongest agent of pulling electrons binds phosphate with adenosine diphosphate ADP creating adenine triphosphate ATP.

The mentioned nicotinamide adenine dinucleotide NAD is a coenzyme found in all living cells. It consists of two nucleotides joined through their phosphate

groups with one nucleotide containing an adenine base and other containing nicotinamide, the reduced coenzyme NADH is the rich donor of electrons. Upon oxidation the electrons are removed from NADH and passed to oxygen through a series of enzymes that each release a small amount of energy, this set of enzymes contain five stages, and called the electron transport chain, they are found in the inner membrane of mitochondrion,. This process takes place through the five mentioned stages in the oxidative phosphorylation pathway, the final one is the mentioned ATP synthase or adenosine triphosphate which is found in all forms of life functioning in the same way. The known equation that describes the cycle between ADP and ATP is as follows



Where P_i is an inorganic phosphate, this process is charging an empty battery, where ADP, the adenine diphosphate, is the used battery, and ATP is the recharged one.

The present theory goes to that the energy released by electrons flowing through the transport chain is used to transport protons across the inner mitochondrial membrane in a process called chemiosmosis. This generates potential energy in the form of PH generated an electrical potential across this membrane, through the large enzyme ATP synthase. This enzyme uses the protons' energy to generate ATP from ADP. The reaction driven by protons flow forces a part in this enzyme to rotate, as the ATP synthase is a rotary machine motor. But in fact electrons transferred from electron donors to electron acceptor have enough energy for charging the battery from ADP to ATP, without the need for protons in this process, and it is clear that attaching the phosphate to ADP is a pure electronic process, as electrons are responsible for binding energy of all forms of matter. In addition, many eukaryotic organisms have transport chains that differ from the much studied mammalian enzymes. These different enzymes do not transport protons, and therefore reduce ubiquinone without altering the electrochemical gradient across the inner membrane.

3- Sun light role in exciting electrons:

Sun light energy excites electrons in the chlorophyll molecules freeing them from protons and oxygen, these electrons are used to charge the mentioned battery ADP-- \rightarrow ATP in the dependent reaction taking place in the thylakoid membrane which contain the electron transport chain, then in the light independent reaction ATP and NADPH are used to produce carbohydrates from carbon dioxide and water, this second step takes place in the stroma which is the space enclosed by the inner chloroplast⁽⁴⁾ membrane. Therefore sun light by freeing electrons set in the same time the oxygen free to work as the strongest acceptor for electrons in the mitochondria of the two levels of life: plants and

animals through the five stages of the electron transport chain. The powerful pull of oxygen on electrons appears in that one of cells of some bacteria can make two ATP molecules without oxygen for every sugar molecule metabolized but with oxygen the same cell can make 36 ATPs from each sugar molecule!

It is worth mentioning here that extracting electrons out of living plant or bacteria cell is now a recent experiment performed by different research teams . For example Stanford team placed a gold electrodes in the chloroplasts of algae cells , and siphoned off the electrons generating tiny electrical current , the by products here were protons and oxygen. After an hour the cells die. Therefore electrons play the central role in life because water itself cannot exist without the work of electrons in binding oxygen to protons.

Conclusion:

In the inner membrane of the mitochondrion , energy of life takes place in the form of electrons moving between two poles of rich donor and strong acceptor of electrons (NAD and oxygen) through the oxidative phosphorylation process where the empty battery is charged between ADP and ATP. The Sun by separating electrons from oxygen and protons gave the beginning step for life to take place on the earth as an electronic process.

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