Commentary

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A Short Note on Aerobic Respiration

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Description

Aerobic respiration is the process by which organisms convert fuel, such as fats and carbohydrates, into chemical energy by using oxygen. All cells utilize respiration to convert fuel into energy that may be used to generate cellular processes. Adenosine triphosphate (ATP) is the end result of respiration, and it utilises the energy stored in its phosphate bonds to power chemical processes. It is frequently referred to as the cell's "economy."

Aerobic respiration is substantially more effective than anaerobic respiration and generates ATP much faster. This is due to the fact that oxygen is an effective electron acceptor in the chemical processes that generate ATP.

Energy is released in a chemical equation by splitting the glucose molecules with the aid of oxygen gas. As byproducts or end products of the reactions, energy, water molecules, and carbon dioxide gas are released at the end of the chemical process.

The 2900 kJ of energy released during the breakdown of the glucose molecule is utilised to make ATP-Adenosine Triphosphate molecules, which are utilised by the system for a range of functions.

Aerobic respiration occurs in all multicellular organisms, including animals, plants, and other living things.

During the respiration process in plants, oxygen gas enters the plant cells *via* the stomata, which are present in the epidermis of the plant's leaves and stem. All green plants synthesise their food and so release energy through the photosynthesis process.

Steps of Aerobic Respiration

The aerobic respiration process is separated into four stages:

Glycolysis

The first phase in aerobic respiration is glycolysis, which occurs within the cell's cytosol. The glucose molecules are divided and separated into two ATP and two NADH molecules during the glycolysis process, which are then utilised in the aerobic respiration process.

Formation of acetyl coenzyme A

The second step of aerobic respiration is the synthesis of acetyl coenzyme A. Pyruvate is oxidized in the mitochondria, resulting in the formation of a 2-carbon acetyl group. Coenzyme A combines with the produced 2-carbon acetyl group to form acetyl coenzyme A.

Citric acid cycle

The citric acid cycle, often known as the Krebs cycle, is the third phase in aerobic respiration. The oxaloacetate reacts with the acetyl-coenzyme A to form citric acid during this stage of aerobic respiration. After a series of events, the citric acid cycle generates 2 molecules of carbon dioxide, 1 molecule of ATP, and reduced versions of NADH and FADH.

Electron transport chain

In aerobic respiration, this is the final phase. Large numbers of ATP molecules are created in this phase by transferring electrons from NADH and FADH. A single molecule of glucose generates 34 molecules of ATP.

All biological activities are sustained by aerobic respiration. The processes generate ATP, which is utilised to perform other life-sustaining functions such as growth, repair, and maintenance. The sodium-potassium pump, for example, is powered by ATP and allows organisms to function, think, and sense the world around us. ATP stimulates the activity of several enzymes as well as a slew of other proteins that keep life alive.

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