

How are cellular respiration and photosynthesis almost opposite processes?

[Health & Medicine](#), [Cellular Respiration](#)



Cellular respiration is the process through which cells transform fuel into energy and nutrients. To manufacture ATP and other types of energy that they can use to facilitate their life functions. Cells must have both fuel and the presence of an electron acceptor that drives the chemical process of turning energy from the fuel into a functional and serviceable form.

Photosynthesis is the biochemical pathway that converts the energy of light into the bonds of the glucose molecule. The action of photosynthesis occurs in two steps. The first step is, energy from the light is stored in the bonds of adenosine triphosphate (ATP), and nicotinamide adenine dinucleotide phosphate (NADPH). Both of energy storing cofactors are eventually used in the second step of photosynthesis to produce organic molecules from carbon dioxide. The second step of photosynthesis is relatively known as the Calvin Cycle. These organic molecules can be serviced by mitochondria to produce ATP, or they can be mixed to form glucose, sucrose, and other different carbohydrates. Why are both perceptions so vital in the world of energy here on Earth? Energy is essential to mostly all occupations in any way, shape, or form. With both of cellular respiration and photosynthesis they both assist to natural life on our planet Earth as metabolic processes. Photosynthesis is a process that plants and several other organisms use energy from the sun to orchestrate various of nutrients from water and carbon dioxide. When that happens, glucose is then transformed into the molecule known as pyruvate. Pyruvate is a very salient molecule that is prompt at the junction of several biochemical pathways. Once this occurs, pyruvate then let's go of ATP by the way and process of cellular respiration. Cellular respiration processes and reverts in the cell area of the organism for it to transfer over nutrients that

are biochemical energy into ATP. When that occurs, it then releases all its specific waste products at the same exact time. Oxygen is then formed after all of that takes place and is sorted out. Cellular respiration and photosynthesis are very preeminent for the long running energy cycle that sustains life on planet Earth as we know today. Both cellular respiration and photosynthesis have a slight bit of stages where energy is created, and both have different relationships with other organelles with the eukaryotic cell. Cellular respiration can be broken down into four stages. Step one is the Glycolysis which occurs in the cytoplasm. One glucose ($C_6H_{12}O_6$) is broken down into two molecules of pyruvic acid. This results in the production of two ATP's for every single glucose. Step two is the Transaction Reaction or stage. Pyruvic acid is shuttled into the mitochondria, where it is transfigured into a molecule called acetyl for further breakdown. Step three is the Citric Acid Cycle or Krebs Cycle which occurs in the mitochondrial matrix, known as the liquid-y part of the mitochondria. In the existence of oxygen gas all the hydrogens are taken off the acetyl, two by two, and to extract the electrons for making ATP. The Krebs cycle results in the production of just about four ATPs', but it produces a variety of NADH. Step four is the Electron Transport Chain or Chemiosmosis which occurs in the cristae of the mitochondria, the folded membranes inside of the chloroplast. Electrons from hydrogen are toted by NADH and passed down an electron transport chain to result in the absolute production of ATP. This results in the production of thirty-two ATPs' for every glucose. Photosynthesis is broken down into two simple stages. Stage one is the presence of light reactions. In the light dependent process, this takes place in the grana which are stacks of structures of thylakoids that

are embedded in the stroma of a chloroplast. The direct energy of light assists the plant to make molecules that pick-up energy for utilization in the dark phase of photosynthesis. That specific plant uses light energy to generate the co-enzyme NADPH and ATP, the molecules that carry the energy. The chemical bonds also in the compounds store the energy and are used during the dark phase in photosynthesis. Stage two is the dark reactions. The dark phase takes place in the stroma and in the dark when the molecules that help carry energy are in the presence of it, this is commonly known as the Calvin cycle or C3 cycle. The dark phase uses both the ATP and NADPH prompted in the light phase to make C-C covalent bonds of carbohydrates from water and carbon dioxide. This is with the mixture of chemical ribulose bisphosphate and a 5-C chemical gaining control of the carbon dioxide. With these six molecules of carbon dioxide entering upon the cycle, it then in return produces one molecule of sugar or glucose. One of the things that I found interesting about ATP is that when it is used in the human body it is there for muscle contraction. It is commonly mentioned as the “ratchet mechanism” that warrants acting microfilaments to be harrowed between the myosin after the ATP molecule is hydrolyzed. Cellular respiration and photosynthesis transpire in a diverse and broaden number of organelles. Cellular respiration takes effect in the organelle of the mitochondria and photosynthesis transpires in the organelle of the chloroplasts. The animals act as respiration and plants act as the process of photosynthesis. Plants can complete the process of cellular respiration as well, because mitochondria are there, and when it is night time they can't receive sunlight for photosynthesis, they eventually have respiration with the

sugars that are reserved through the process of photosynthesis. That is how both are linked to their organelles that are taken place in the eukaryotic cell. They both have a variety of ways of being responsible and being accounted for in their specific processes when it is presented to them. In that case, both cellular respiration and photosynthesis are the same and they're supposed to function correctly at that given time and circumstance. The importance and significance of both cellular respiration and photosynthesis and their cyclic interaction to the evolution and diversity of life is their life inside and outside of the earth's ecosystem. With cellular respiration and photosynthesis being interconnected with another they put out energy that some plants use and they both recycle and collect one another's waste for different types of utilization. With the assistance from cellular respiration oxygen is present it keeps cells alive and active. Oxygen that has no use or is misused can be recycled by both plants and human beings. In that case, the process starts and resets to complete the whole entire process all over again. With that process it is how natural life is prolonged in the ecosystems at many different measures. Numerous of plants go through the process of photosynthesis and they contact carbon dioxide from the air in direct range. Before the Calvin Cycle some of the plants have various actions when it meets the element of carbon. One of the main reasons why cellular respiration and photosynthesis are very important to the evolution and diversity of life is because they're used frequently on a normal basis. Every day when the sun is out it is using the process of photosynthesis to create and display sunlight. With the process of cellular respiration, it is going on relentlessly in some organisms on the planets in space. That is what keeps

us alive here on planet earth and what keeps the other planets going as well. For example, when one has a garden that grows plants and vegetables photosynthesis is required for it to make sure it can grow healthy living plants and vegetables. I always found that very neat because of how it operates and how it functions so well to make it so genuine and veritable. With cellular respiration being vital when a living and breathing organism is breaking down their food and turning it into the energy needed for their bodily functions. Without the process of cellular respiration, no living thing would survive or persevere. These processes make sure that whatever is going on in either one is known for making through and getting their job done in the correct manner. With all the importance of both cellular respiration and photosynthesis and their cyclic interaction to the evolution and diversity of life is based upon how their processes are being functioned when in use. Cellular respiration and photosynthesis are both linked into their perspective organelle in the eukaryotic cell which gives them ways on how they work in that given case. The stages and steps show us how their processes react when used and how they show interaction with various raw materials, products, and the amount of ATP is produced during their phases. I now know and have a better understanding of how cellular respiration and photosynthesis operate and how they are important towards various ways of everyday life on this planet. Both processes have an important impact on evolution, and the diversity of the life that we depend on.

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