

Models Help Us Begin to Understand Cellular Respiration

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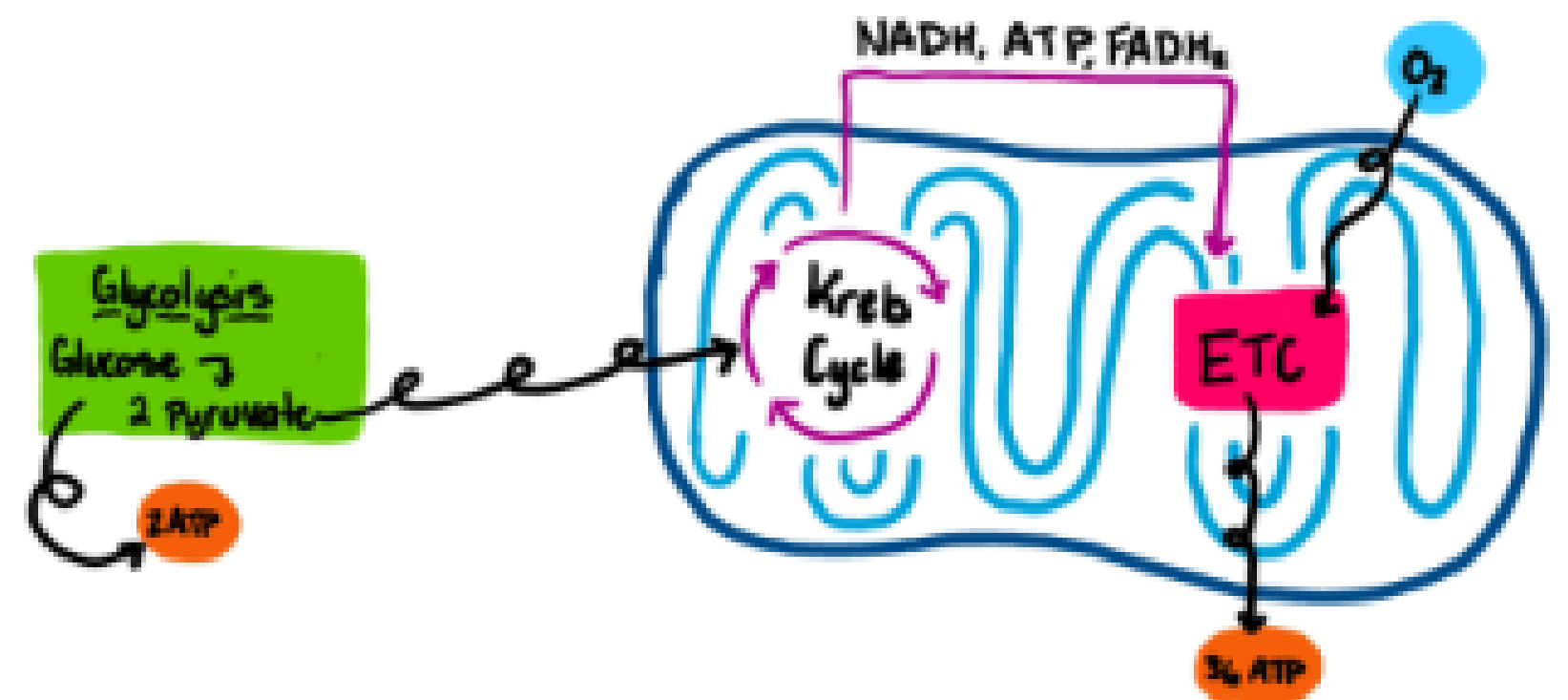
What is Cellular Respiration:

Cellular respiration is the process of taking glucose through metabolic pathways to produce adenosine triphosphate (ATP) for the cell to use for energy (Tarantino, 2025). The process combines oxygen with glucose from food consumed to convert the energy in chemical bonds to ATP (Britannica, 2026). There are three main steps of cellular respiration. Glycolysis is a series of reactions that breaks glucose to 2 3-carbon pyruvates that is then converted to acetyl-CoA, the kreb cycle take acetyl-CoA and a 4-carbon oxaloacetate through a series of processes to eventually form high energy molecules to be used in the electron transport chain (ETC). During the ETC the products are transported through complexes in the mitochondrial inner membrane to eventually produce ATP molecules to be transported out of the mitochondria to various places (Tarantino, 2025). The process of CR is very complex and involves many enzymes, molecules, and processes.

Nature of Science Principle:

Cellular respiration is a complex concept that can be very hard to understand and remember all aspects of the process. To understand topics like cellular respiration people, tend to utilize diagrams and models to grasp what is happening within the mitochondria. While these diagrams allow people to begin to understand how cellular respiration works, they cannot display the entire process and all that is going on. For example, in the image above the basic process of cellular respiration is shown but the entire process is not represented. Throughout schooling when cellular respiration is taught and discussed there is often the use of drawings to help explain what is occurring, but it is made clear that they are only a representation and not a perfect representation of what is occurring inside of the cell.

Cellular Respiration



Why Does This Matter:

Students understanding that diagrams like these are not a complete representation of the topics covered is important for learning. By understanding that these are great tools but not all they need to learn allows students to use tools like these to begin understanding the topic while still doing more to grasp the full concept that the diagram cannot cover. Tools like this also aid in teachers' lessons as many students begin to understand these difficult topics better when given a visual aid.

Case Card Use:

This case card can be used in learning to discuss how we can use diagrams and tools to help in understanding but cannot be used to teach the topic entirely. This card can also be used to introduce cellular respiration while keeping students informed that the topic is more complex than shown here.

References:

- Britannica. (2026). Cellular respiration. In Britannica. <https://www.britannica.com/science/cellular-respiration>
Tarantino, C. (2025). Cellular respiration: what it is, its purpose, and more. Osmosis; Elsevier. <https://www.osmosis.org/answers/cellular-respiration>

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