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Biology Homework 2-4.2: Cellular Respiration II

Organisms need energy to perform processes such as growth, movement, transport, and reproduction. This energy comes from food. Originally, the energy in food comes from the sun. While plants utilize **photosynthesis** to make their own food in the form of **glucose**, organisms that do not conduct photosynthesis obtain food by eating other organisms.

Whether an organism produces its own food or consumes food, ultimately, the food is broken down to release its energy that is then converted into a usable form of energy by cells. This usable form of energy is **ATP**.

Respiration is the process of converting energy found in food into ATP which is easily used by cells for many processes. ATP is short for adenosine triphosphate.

Respiration that takes place in the presence of oxygen is called **aerobic respiration** and it yields a large amount of ATP. Aerobic respiration takes place in the **mitochondria**. Aerobic respiration is often called **cellular respiration**. Cellular respiration consists of two steps: 1. The Krebs Cycle and 2. The Electron Transport Chain. The formula for cellular respiration is given below.



Respiration that takes place in the absence of oxygen is **anaerobic respiration**. Anaerobic respiration generates much less energy than aerobic respiration. **Anaerobic respiration takes place in the cytoplasm. Organisms that have no oxygen or no mitochondria will perform anaerobic respiration.** There are two types of anaerobic respiration:

1. Alcohol Fermentation: Glucose \rightarrow Ethyl Alcohol + CO₂ + 2 ATP

2. Lactic Acid Fermentation: Glucose \rightarrow Lactic Acid + 2 ATP

Both aerobic and anaerobic respiration begin with a process called glycolysis that takes one, six carbon glucose molecule and breaks it down into two, three carbon pyruvate molecules.

Glucose \rightarrow Pyruvate + Pyruvate

C-C-C-C-C-C \rightarrow C-C-C + C-C-C

Once glycolysis is complete, the presence or absence of oxygen determines if the pyruvate will enter aerobic or anaerobic respiration.

1. Why is cellular respiration important?

2. What is the importance of ATP in a cell?

3. Glucose is the starting point of cellular respiration. What type of biomolecule is glucose?

- a. Lipid
- b. Nucleic Acid
- c. Carbohydrate
- d. Protein

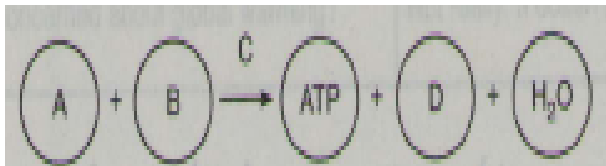
4. Which of the following contains an organelle for cellular respiration?

- a. Prokaryote
- b. Eukaryote
- c. Bacterial Cell
- d. A cell without a nucleus

5. Which of the following organisms conduct aerobic respiration?

- a. Plants
- b. Animals
- c. Bacteria
- d. Plants and Animals

6. A biological process that occurs in plants and animals is shown below. Which row in the chart identifies the lettered substances in this process?



Row	A	B	C	D
(1)	O ₂	CO ₂	glucose	enzymes
(2)	glucose	O ₂	enzymes	CO ₂
(3)	enzymes	O ₂	CO ₂	glucose
(4)	glucose	CO ₂	enzymes	O ₂