

NCERT QUESTIONS WITH SOLUTIONS

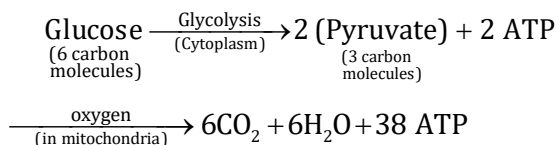
1. What advantage over an aquatic organism does a terrestrial organism have with regard to obtaining oxygen for respiration?

Ans. Air contains about 21% of oxygen while water has less than 1% oxygen in dissolved state. A terrestrial organism is able to get several times more oxygen than an aquatic organism in one breath.

2. What are the different ways in which glucose is oxidised to provide energy in various organisms?

Ans. Different ways in which glucose is oxidised to provide Energy in various organisms -

(i) Aerobic respiration: It is a process in which complete breakdown of food (glucose) into carbon dioxide and water in the presence of oxygen and energy is released.



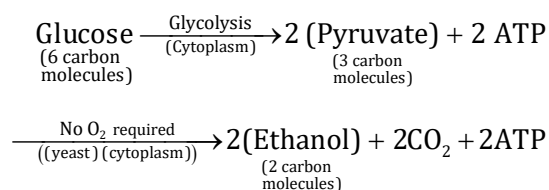
(ii) Anaerobic respiration: It is partial breakdown of food (glucose) without using molecular oxygen, the respiration is called anaerobic respiration. In this type of respiration very less amount of energy is produced. It also includes glycolysis which takes place in the cytoplasm. During this process one molecule of glucose is degraded into two molecules of pyruvic acid (pyruvate) and little energy (2 ATP) is produced. The pyruvic acid is further broken down into two different manners:

- (i) Fermentation

- (ii) Anaerobic respiration in muscle cells

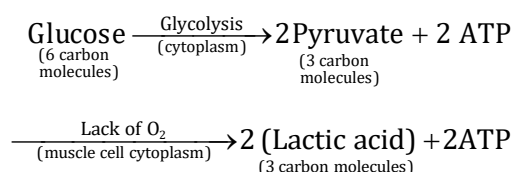
(a) Fermentation

[Alcoholic Fermentation] : It is a kind of anaerobic respiration in which the microorganisms (yeast) break down glucose into ethyl alcohol and carbon dioxide and energy (2 ATP) is released.



(b) Anaerobic respiration in muscle cells [Lactic acid fermentation]:

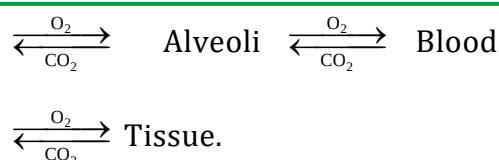
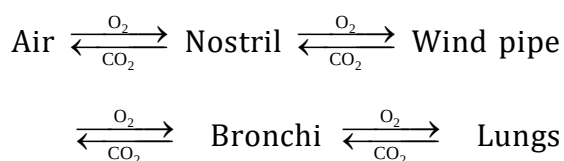
Human muscle cells make ATP by lactic acid fermentation, when oxygen is scarce. This occurs at the time of vigorous exercise, when demand of oxygen by the muscles is greater than its supply. Therefore, the muscles switch from aerobic respiration to fermentation resulting in the production of lactic acid. This lactic acid accumulates in the muscles causing cramps or muscle fatigue.



3. How is oxygen and carbon dioxide transported in human beings?

Ans. During inhalation, oxygen comes into alveoli of the lungs. The alveoli is surrounded by very thin blood vessels called capillaries. So, the oxygen is carried by blood to all the parts of body by binding it with haemoglobin present in blood.

The blood passes through the tissues of the body and oxygen present in it diffuse into the cells (due to its higher concentration in the blood). This oxygen combines with the digested food present in the cells to release energy. Carbon dioxide is produced as a waste product during respiration in the cells of the body tissues. This CO₂ diffuses into the blood (due to its higher concentration in body tissues). Blood carries CO₂ back to the lungs where it diffuses into the alveoli of the lungs and pass into the trachea, nostrils and then out of the body into air. CO₂ is more soluble in water than oxygen and hence mostly transported in the dissolved form in our blood.



4. How are the lungs designed in human beings to maximize the area for exchange of gases?

Ans. Lungs are soft, spongy structures located in the thoracic cavity. Each lung is enclosed in a double-walled sac called pleura. In the lungs, the air passage (wind pipe) divides into smaller tubes called bronchi which in turn form bronchioles. The bronchioles later terminate in balloon-like structures called alveoli. The presence of alveoli in the lungs provides a very large area for the exchange of gases and this availability of large surface area maximizes the exchange of gases. The alveoli have very thin walls and contain an extensive network of blood vessels to facilitate exchange of gases.

5. The breakdown of pyruvate to give carbon dioxide water and energy takes place in –

- (a) Cytoplasm
- (b) Chloroplast
- (c) Mitochondria
- (d) Nucleus

Ans. (c) Mitochondria

6. What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.

Ans.

Aerobic Respiration	Anaerobic Respiration
O ₂ is required.	O ₂ is not required.
It occurs in cytoplasm and mitochondria.	It occurs in cytoplasm only.
Complete breakdown of glucose takes place.	Incomplete breakdown of glucose takes place.
End products are CO ₂ and H ₂ O.	End products are CO ₂ and ethyl alcohol or lactic acid.
38 ATP produced from one glucose molecule.	2 ATP produced from one glucose molecule.

Yeast & most of the bacteria use the anaerobic mode of respiration.

7. How are the alveoli designed to maximize the exchange of gases ?

Ans. Alveoli designed to maximize the exchange of gases because of

- (i) Large surface area to get enough oxygen.
- (ii) Thin permeable membrane for easy diffusion of gases.
- (iii) Abundant blood supply for transporting respiratory gases.