



Question 4. What are the differences between aerobic and anaerobic respiration? Name some organisms that use the anaerobic mode of respiration.

Solution:

The food material taken in during the process of nutrition is used in cells to provide energy for various life processes. Diverse organisms do this in different ways – some use oxygen to breakdown glucose completely into carbon dioxide and water; some use other pathways that do not involve oxygen. In all cases, the first step is the breakdown of glucose, a six-carbon molecule, into a three-carbon molecule called pyruvate. This process takes place in the cytoplasm. Further, the pyruvate may be converted into ethanol and carbon dioxide. This process takes place in yeast during fermentation. Since this process takes place in the absence of air (oxygen), it is called anaerobic respiration. Breakdown of pyruvate using oxygen takes place in the mitochondria. This process breaks up the three-carbon pyruvate molecule to give three molecules of carbon dioxide. The other product is water. Since this process takes place in the presence of air (oxygen), it is called aerobic respiration. The release of energy in this aerobic process is a lot greater than in the anaerobic process.

Question 5. How are the alveoli designed to maximise the exchange of gases?

Solution:

Within the lungs, the passage divides into smaller and smaller tubes, which finally terminate in balloon-like structures, which are called alveoli. The alveoli provide a surface where the exchange of gases can take place. The walls of the alveoli contain an extensive network of blood vessels. As we have seen in earlier years, when we breathe in, we lift our ribs and flatten our diaphragm, and the chest cavity becomes larger as a result. Because of this, air is sucked into the lungs and fills the expanded alveoli. The blood brings carbon dioxide from the rest of the body for release into the alveoli, and the oxygen in the alveolar air is taken up by blood in the alveolar blood vessels to be transported to all the cells in the body. During the breathing cycle, when air is taken in and let out, the lungs always contain a residual volume of air so that there is sufficient time for oxygen to be absorbed and for the carbon dioxide to be released.

Question 6. Describe double circulation in human beings. Why is it necessary?

Solution:

The double circulatory system of blood flow refers to the separate systems of pulmonary circulation and the systemic circulation.

The adult human heart consists of two separated pumps, the right side with the right atrium and ventricle which pumps deoxygenated blood into the pulmonary circulation.

The oxygenated blood re-enters the left side of the heart through the pulmonary vein into the left atrium and passes to the left ventricle where it is pumped to the rest of the body. This part of the circulation is called as systemic circulation. This type of circulation is called double circulation. The advantage of a double circulatory system is that blood can be pumped to the rest of the body at a

higher pressure.

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