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Human Physiology

CAT - 1

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Part - A

1. Role of Haemoglobin -

Haemoglobin is essential for transferring oxygen in your blood from the lungs to the tissues.

2. The respiratory system is the network of organs and tissues that help you breathe. It includes your airways, lungs and blood vessels. These parts of (lungs, ribs, and diaphram) work together to move oxygen throughout the body and clean out CO_2.

3 Haemoglobin (Hgb or Hb) is the primary carrier of oxygen in humans. Approximately 98 % of total oxygen that is carried by the respiratory system is dissolved in Hb in the form of "Oxyhaemoglobin"

4. Principle of respiration

Respiration is a catabolic reaction that breaks down glucose to release energy (ATP).

Energy is stored in the cell as ATP or NADH. Glucose + oxygen → carbon dioxide + water + Energy.

5. Use of diaphragm in lungs -

Upon inhalation, the diaphragm contracts and flattens and the chest cavity enlarges. This contraction creates a ~~vacuu~~ vacuum, which pulls air into the lungs.

~~Upon~~ Upon exhalation, the diaphragm relaxes and returns to its domelike shape, and air is forced out of the lungs.

Part - B.

6. Chloride Shift -

. The chloride shift is an exchange of ions that takes place in our red blood cells in order to ensure that no build up of electric charge takes place during gas exchange. Within our tissues, the cells produce a bunch of carbon -dioxide molecules that are ultimately expelled by the cell and travel to the blood plasma.

. once inside the blood plasma, the majority of carbon dioxide moves into the RBCs, where they are converted into bicarbonate ions with the help from carbonic anhydrase. Unlike carbondioxide, bicarbonate is very soluble in the blood plasma and therefore must return there by moving out of the red blood cell

- However, as it moves across a special ion-exchange membrane protein, a chloride ion is brought into the cell (in a one-to-one ratio). This is known as the chloride shift and it takes place in order to maintain electric neutrality so that there is no build up of charge.

- The same thing happens in our lungs just the process is reversed (i.e bicarbonate ions are brought into the RBCs while the chloride ions are moved out of the cell).

The Bohr's Effect.

- The Bohr effect is a physiological phenomenon first described in 1904 by the Danish physiologist Christian Bohr, stating that haemoglobin's oxygen binding affinity is inversely related both to acidity and to the concentration of Carbon dioxide.

- Since Carbondioxide reacts with water to form Carbonic acid, an increase in CO_2 results in a decrease in blood pH, resulting in haemoglobin proteins releasing their load of oxygen.

- Conversely, a decrease in Carbon dioxide provokes an increase in pH, which results in haemoglobin picking up more oxygen.