

X_ Biology_ Life Processes (Respiration)_ Handout 1/3

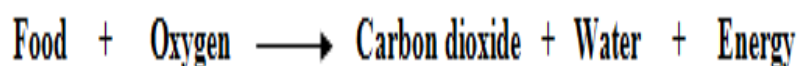
(Slide 1)

The sum total of all physiochemical processes taking place in the body is called metabolism.

Metabolism has two aspects:

- i) Anabolism- it is the metabolic process by which complex compounds are synthesized from simpler compounds. eg Photosynthesis.
- ii) Catabolism- it is the metabolic process by which larger molecules are broken down into simpler molecules. eg Respiration.

Respiration is a catabolic process wherein food (glucose) is oxidised and energy is released.



Difference between breathing and respiration:

BREATHING	RESPIRTION
Taking in oxygen and giving out carbon dioxide. It is a physical process.	It involves oxidation of food. It is a biochemical process of oxidation of food.
It is external respiration	It is internal or cellular respiration.
It occurs at the organ system level, involves lungs	It occurs in lungs and mitochondria, cellular level.
Does not release energy	Releases energy, that is stored as ATP

TYPES OF RESPIRATION:

(slide 2& 3)

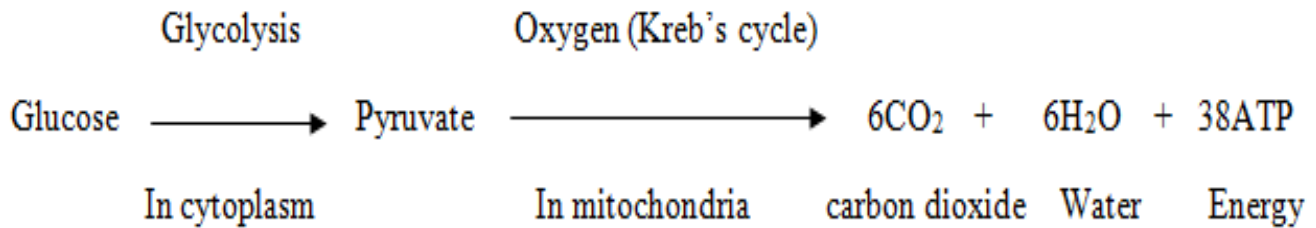
Aerobic and Anaerobic respiration

DIFFERENCE BETWEEN AEROBIC AND ANAEROBIC RESPIRATION	
AEROBIC	ANAEROBIC
1. Requires oxygen for breaking the respiratory substrate.	1. Does not require oxygen for breaking the respiratory substrate.
2. Occurs in all living cells of higher organisms.	2. Occurs in yeast and bacteria.
3. The end products are CO₂ and H₂O.	3. The end products are Ethanol and CO₂ OR Lactic acid.
4. Oxidation of one molecule of glucose produces 38 ATP molecules.	4. Only 2 ATP molecules are produced.
5. It occurs in cytoplasm and mitochondria.	5. It occurs only in the cytoplasm.

Aerobic Respiration-

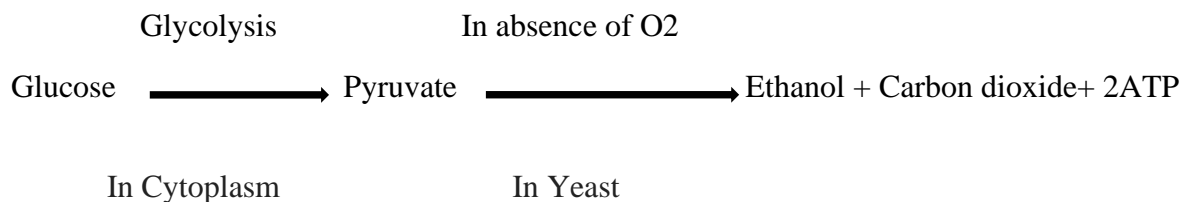
(Slide 4 & 5)

- respiration taking place in the presence of oxygen.
- Glucose is completely broken down to CO₂ and H₂O by oxidation.
- produces a considerable amount of energy for use by the organism which gets stored in the ATP molecules
- Mitochondria are the sites of aerobic respiration in the cells.



Anaerobic Respiration:

- respiration taking place in absence of oxygen.
- microscopic organisms like yeast and some bacteria obtain energy by anaerobic respiration (which is called fermentation).
- the microorganisms like yeast break down glucose (food) into ethanol and carbon dioxide, and release energy.
- Anaerobic respiration produces much less energy which gets stored in the ATP molecules.
- Takes place in the cytoplasm.



- Sometimes, when there is lack of oxygen in our muscle cells, another pathway for the breakdown of pyruvate is taken.
- Here the pyruvate is converted into lactic acid with the release of small amount of energy.
- Lactic acid is toxic so it causes cramps and pain in the muscles.

