Cellular Respiration

Presented by
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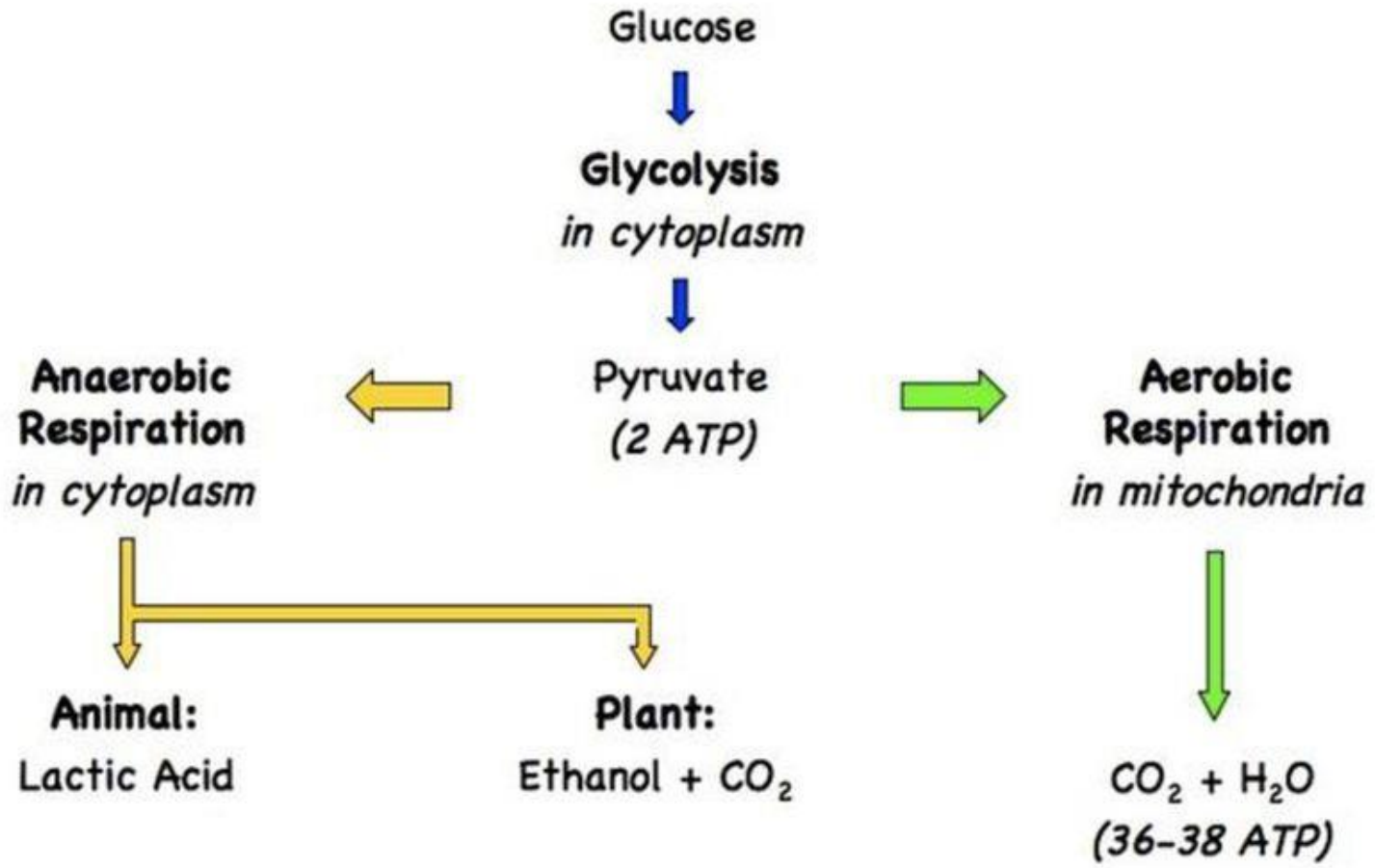
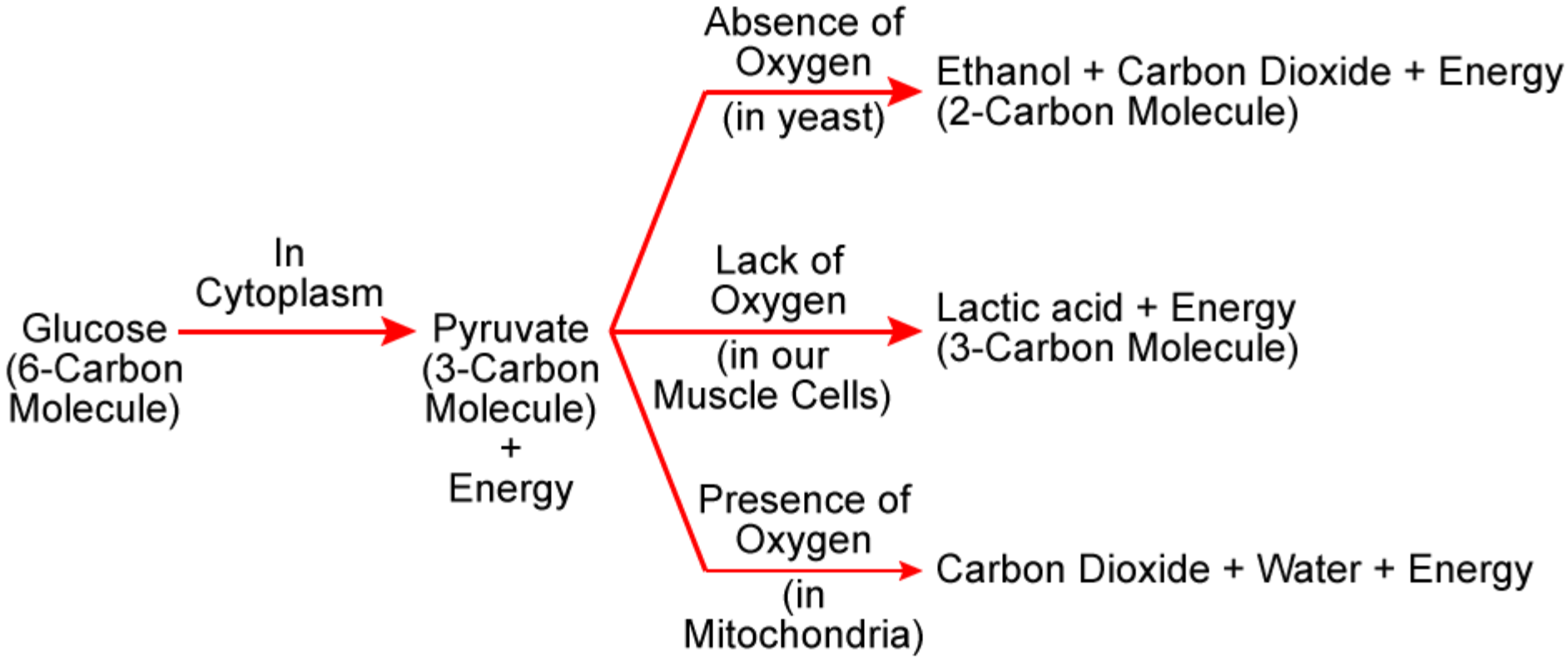
CELL RESPIRATION

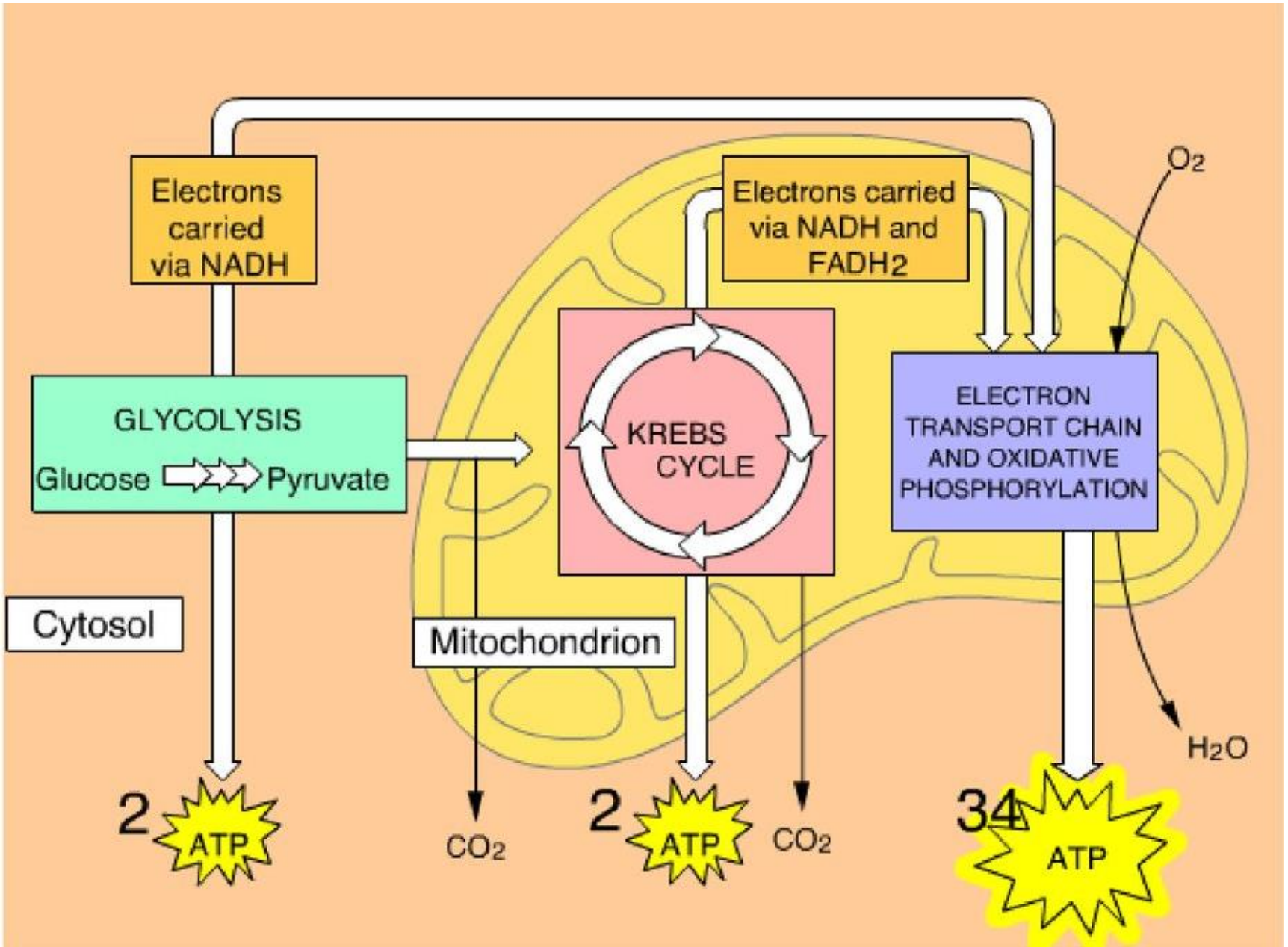



Glucose
(6-Carbon
Molecule)
In
Cytoplasm
Pyruvate
(3-Carbon
Molecule)
+
Energy
Absence of
Oxygen
(in yeast)
Ethanol + Carbon Dioxide + Energy
(2-Carbon Molecule)
Lack of
Oxygen
(in our
Muscle Cells)
Lactic acid + Energy
(3-Carbon Molecule)
Presence of
Oxygen
(in
Mitochondria)
Carbon Dioxide + Water + Energy

GLYCOLYSIS

- Glycolysis occurs **without the use of oxygen**
- Occurs in the **cytoplasm**
- One glucose molecule is converted into **two pyruvate molecules**.
- *2 ATP* molecules are used but *4 ATP* are produced, so there is a **net yield of 2 ATP**.
- 2 NAD^+ are converted into **2 NADH** + H^+

Aerobic Respiration

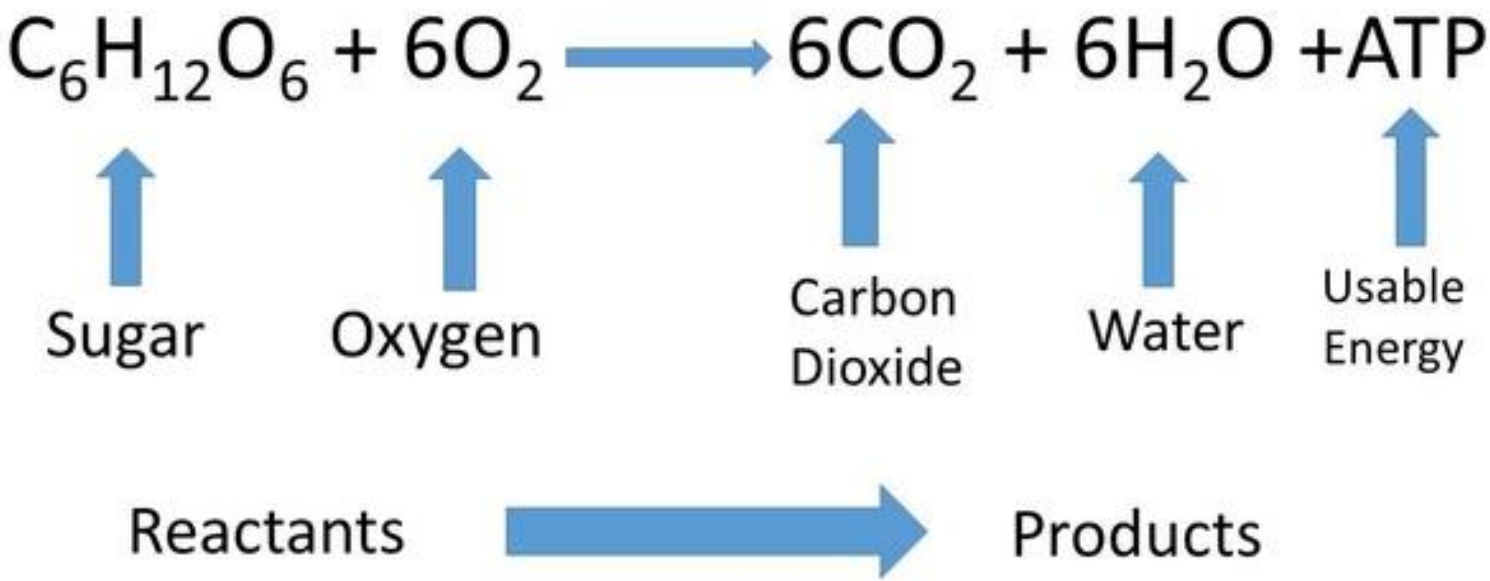


ANAEROBIC RESPIRATION

- **Location:**
  in the **cytosol** of the cell
- **Energy yield:**
  a **small** yield of ATP (only the **2 ATP** molecules from glycolysis)
- **Oxygen requirement:**
  oxygen absent
- **Results in:**
  - **lactic acid** (animal cells)
  - **ethanol + CO_2** (plant cells = fermentation)

Chemical Equation

C=Carbon, H=Hydrogen, O=Oxygen



S. No.	Aerobic respiration	Anaerobic respiration
1.	It takes place in presence of oxygen.	It does not require oxygen.
2.	It always releases carbon dioxide.	It may or may not release carbon dioxide.
3.	It provides much more energy (38 ATP molecules).	It provides less energy (just 2 ATP molecule).
4.	It occurs both in cytoplasm (glycolysis) & in the mitochondria (Kreb's cycle & electron transport chain).	It takes place in the cytoplasm, certain tissues and cells of higher animals.
5.	Examples - In most plants and animals.	Examples – In anaerobic bacteria, yeasts, muscles and parasitic worms like, *Ascaris*, *Fasciola*, *Taenia* and germinating seeds.

Questions?

1. Give the general equation for respiration?
2. How is respiration different from breathing?
3. In which kind of respiration is more energy released?
4. Name the respiratory organs of
   (i) fish
   (ii) mosquito
   (iii) earthworm
   (iv) dog

   Solution:
   The respiratory organs of
   (i) fish – gills
   (ii) mosquito – tracheoles
   (iii) earthworm – skin
   (iv) dog – lungs.
5. State the function of epiglottis.

   Solution:
   Epiglottis prevents the food from entering into the trachea.

7. The walls of trachea do not collapse when there is less air in it. Why?
8. Give reasons for the following:
   (i)The glottis is guarded by epiglottis.
   (ii) The lung alveoli are covered with blood capillaries.
   (iii) The wall of trachea is supported by cartilage rings.
9. State the role of the following in the human respiratory system
   (i)Nasal cavity (ii) Diaphragm (iii) Alveoli

10. Explain the process of inhalation in human being.

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

12. Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like human?

13. What is the reason of muscle cramp in players?

14. Write the differences between aerobic and anaerobic respiration.

MCQ

1. Question. Which is the correct sequence of air passage during inhalation?

(a) Nostrils → Larynx Pharynx → Trachea → Lungs

(b) Nasal passage → Trachea → Pharynx → Larynx → Alveoli

(c) Larynx → Nostrils → Pharynx → Lungs

(d) Nostrils → Pharynx → Larynx → Trachea → Alveoli

2. Question. During respiration exchange of gases take place in

(a) Trachea and larynx

(b) Alveoli of lungs

(c) Alveoli and throat

(d) Throat and larynx

MCQ

3. Glycolysis is part of
(a) Only anaerobic respiration
(b) Krebs cycle
(c) Only aerobic respiration
(d) Both aerobic and anaerobic respiration

4. In glycolysis, glucose splits onto compounds which are
(a) 5-C
(b) 4-C
(c) 2-C
(d) 3-C

MCQ

5. Site of glycolysis or EMP is
(a) Mitochondria
(b) Cytoplasm
(c) E.R.
(d) Ribosomes

6. The cycle in which pyruvic acid is broken down in presence of oxygen is known as
(a) Glycolysis
(b) Krebs cycle
(c) Anaerobic respiration
(d) None of the above

MCQ

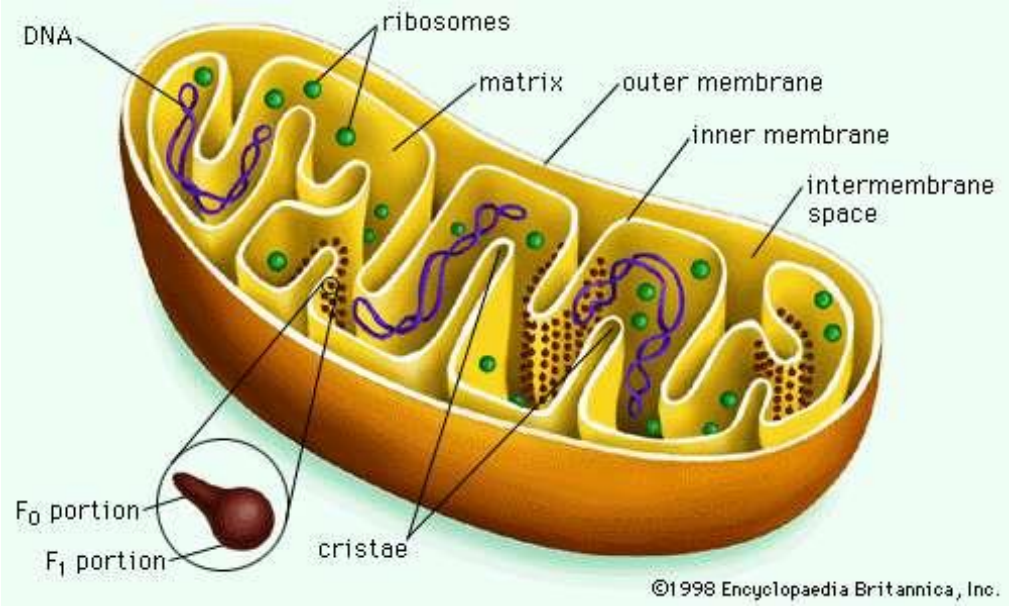
6. In mitochondria, ATP formation occurs

(a) Over cristae

(b) Over outer membrane

(c) Inside matrix

(d) In intracristal space



MCQ

8. _____ is a product of aerobic respiration

a) Malic acid
b) Pyruvate
c) Ethylene
d) Lactose

9. Glycolysis is also known as _____

a) EMP pathway
b) TCA pathway
c) carbon sequestration
d) None of the above

MCQ

10. Respiration is
(a) Anabolic process
(b) Physical process
(c) Catabolic process
(d) Biophysical process

11. Respiration is an (CPMT 1986)
(a) Endothermic process
(b) Exothermic process
(c) Anabolic process
(d) Endogonic process


Thank you very much