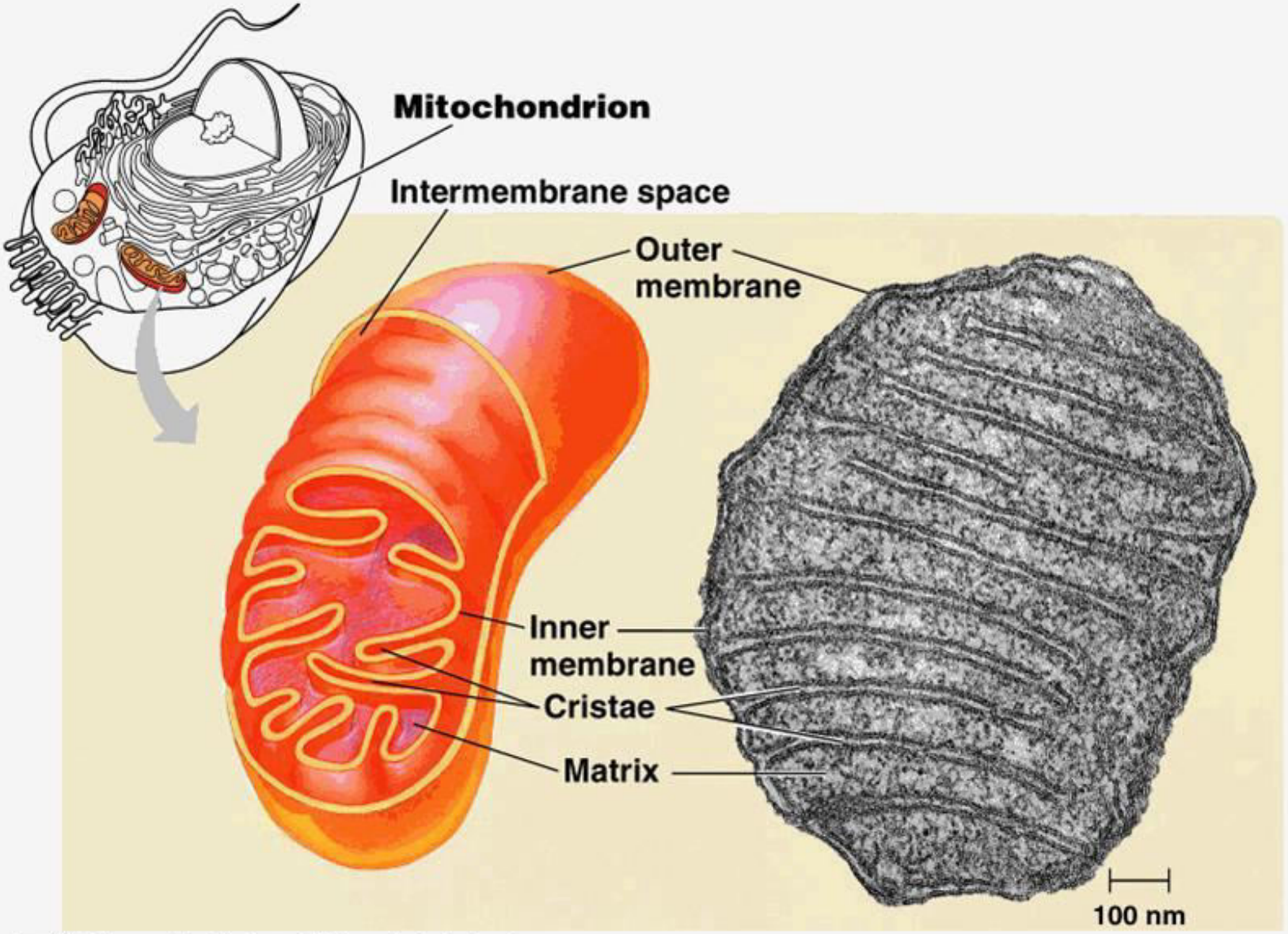
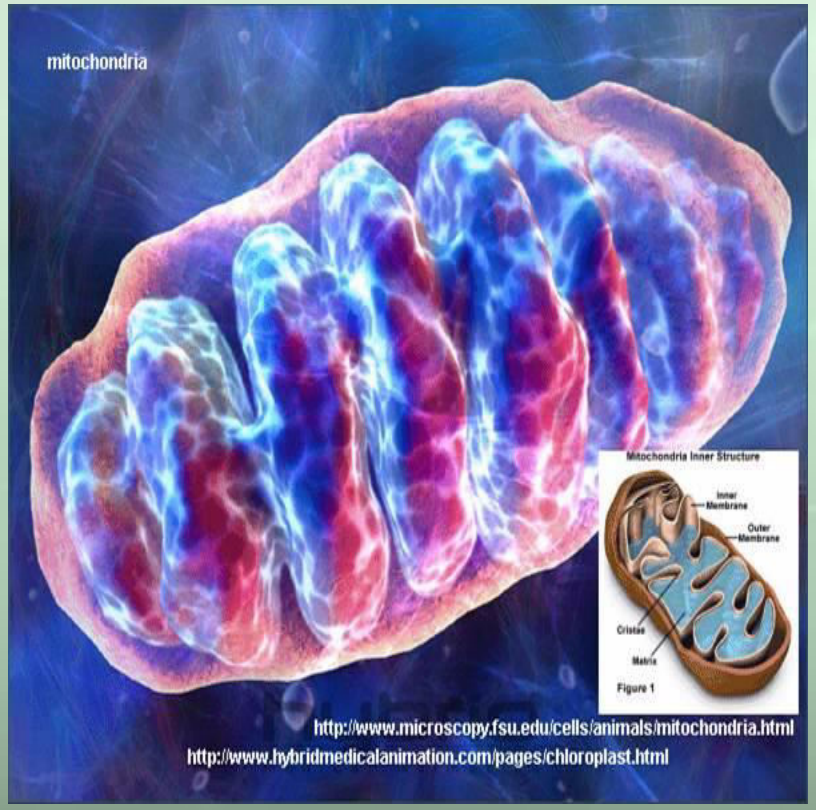
Cellular Respiration



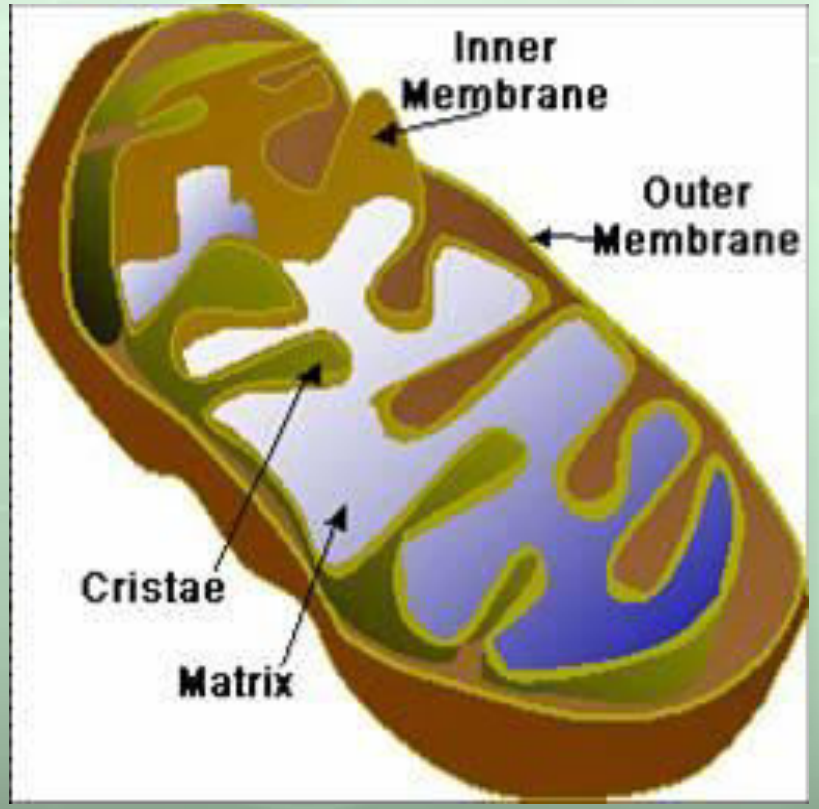
Mitochondria



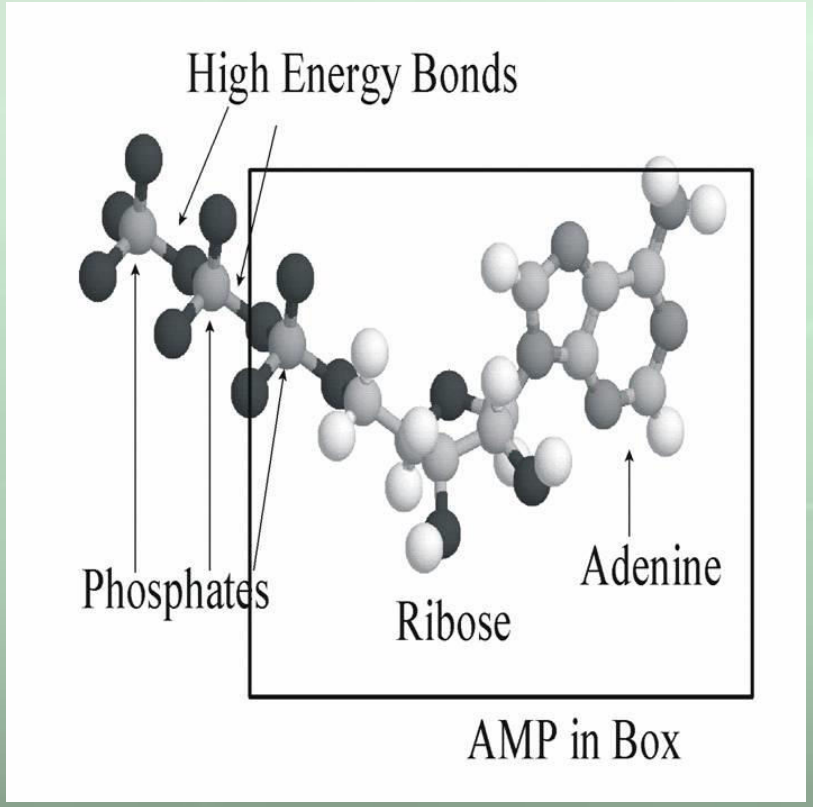
- The **matrix** where 3-carbon pieces that came from carbohydrates are broken down to (CO_2 and water)
- The **cristae** is where ATP is made

Cellular Respiration

- Is a series of reactions where fats, proteins, and carbohydrates, mostly glucose, are broken down to make CO_2, water, and energy.



ATP



- Most of the energy from cell respiration is converted into ATP
- ATP is a substance that powers most cell activities.

Vocabulary

- **Cellular Respiration –** the transfer of energy from an organic compound into ATP
- **Fermentation** – the breakdown of carbohydrates by enzymes, bacteria, yeasts, or mold in the absence of oxygen
- **Pyruvate**- an ion of a three-carbon organic acid called pyruvic acid.

Cellular Respiration

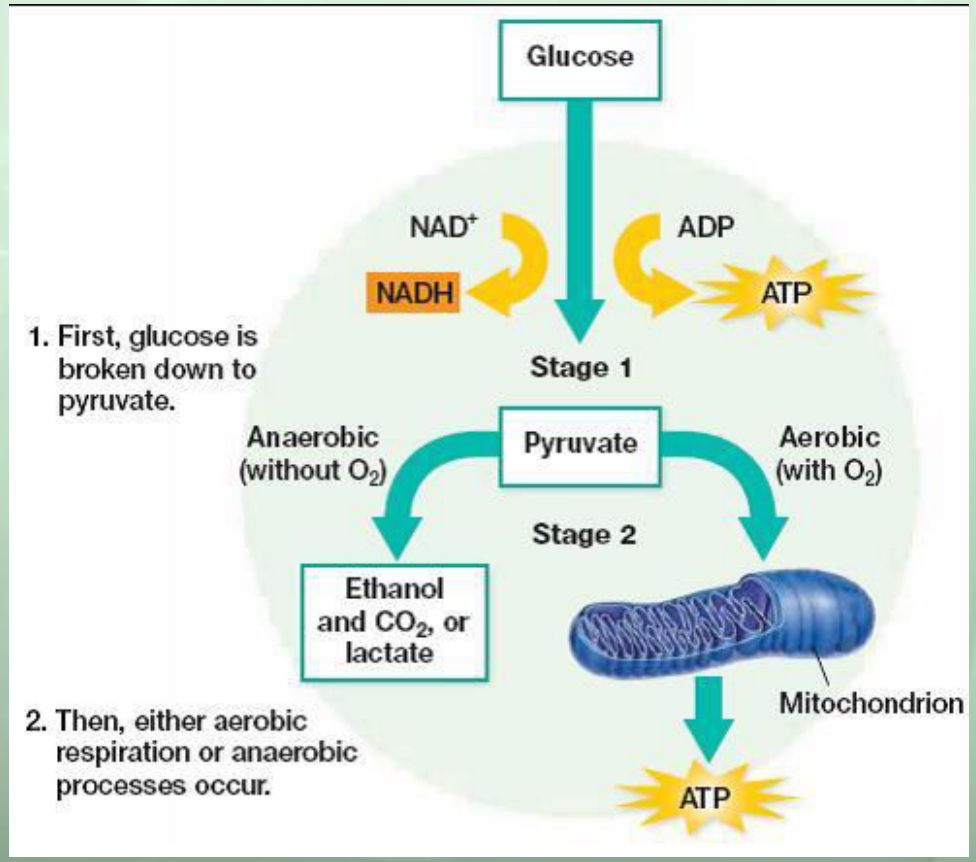
Cellular Energy

- **The Stages of Cellular Respiration** Cellular respiration has two stages.
- **Glycolysis** The first stage of cellular respiration is called glycolysis.
- **Aerobic and Anaerobic Respiration** The second stage of cellular respiration is either aerobic respiration (in the presence of oxygen) or anaerobic respiration (in the absence of oxygen). A large amount of ATP is made during aerobic respiration. NAD^+ is recycled during the anaerobic process of fermentation.

Cellular Respiration

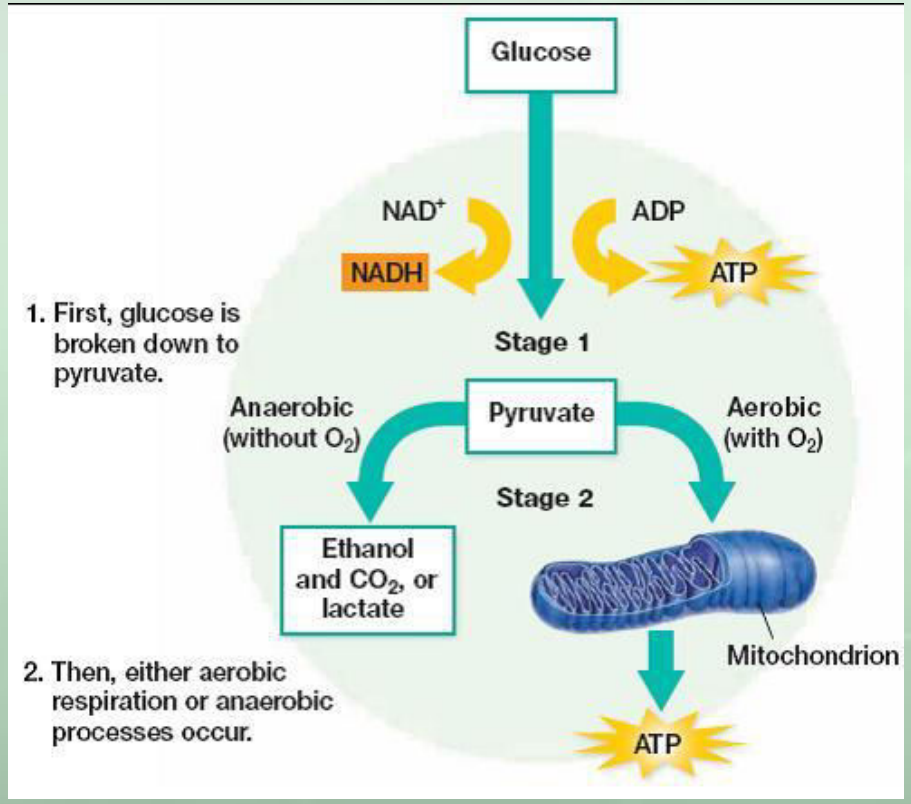
Stage One: Breakdown of Glucose

- **Glycolysis** Glucose is broken down to pyruvate during glycolysis, making some ATP.



Cellular Respiration

Stage Two: Production of ATP

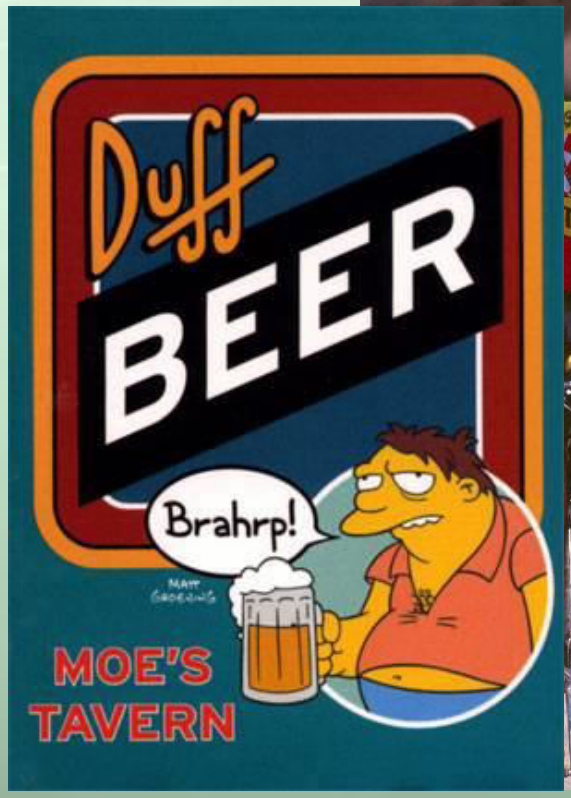


- **Krebs Cycle** The Krebs cycle is a series of reactions that produce energy-storing molecules during aerobic respiration.
- **Electron Transport Chain** During aerobic respiration, large amounts of ATP are made in an electron transport chain.

Cellular Respiration

Fermentation in the Absence of Oxygen

- **Fermentation** When oxygen is not present, fermentation follows glycolysis, regenerating NAD^+ needed for glycolysis to continue.
- **Lactic Acid Fermentation** In lactic acid fermentation, pyruvate is converted to lactate.



Cellular Respiration

- Cellular Respiration is a metabolic process like burning fuel
  - Releases much of the energy in food to make ATP
  - This ATP provides cells with the energy they need to carry out the activities of life.
    - $C_6H_{12}O_6 + O_2 \longrightarrow CO_2 + H_2O + ATP$