



## cellular respiration

*the process by which cells  
in plants and animals  
break down sugar and  
turn it into energy*

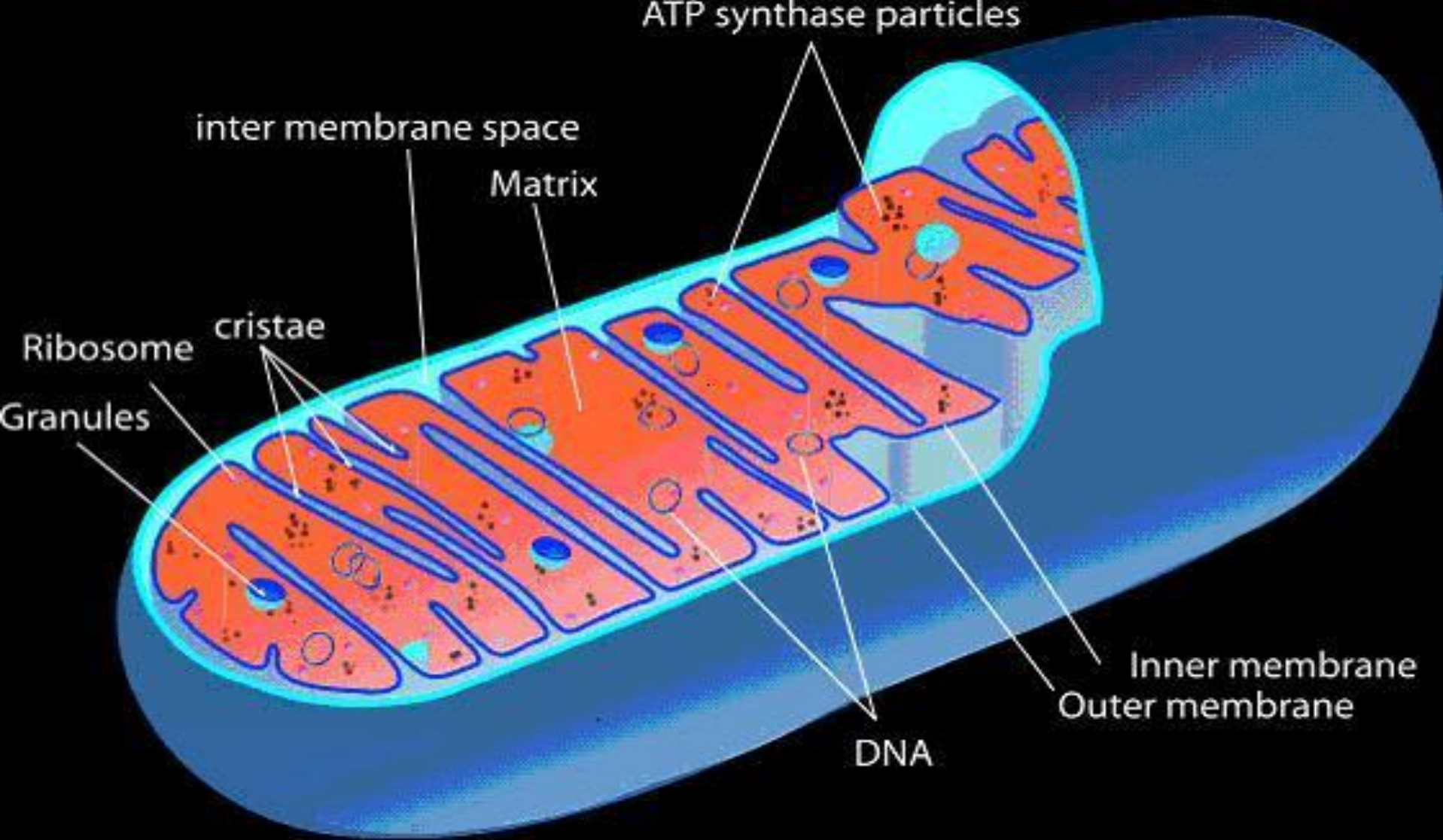
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## CELLULAR RESPIRATION

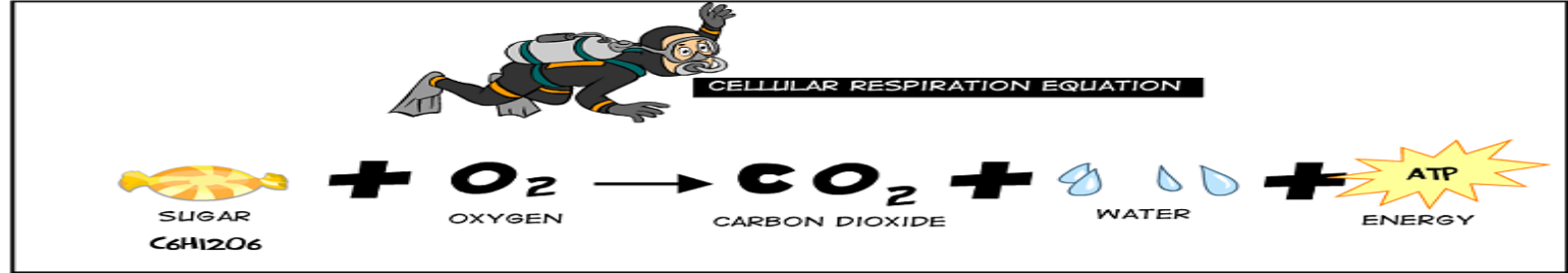
FOOD HAS BEEN MADE SMALLER.

IT HAS BEEN TRANSPORTED TO CELL.

IT MUST NOW *RELEASE* ITS ENERGY.



**MITOCHONDRION**  
**For *AEROBIC* RESPIRATION**



- Respiration takes place in the cell, not in the intestines.
- Aerobic Respiration takes place mostly in the *mitochondrion*, using **Oxygen**.
- Remember: The energy-carrier is  $ATP^*$ . To release that energy, mitochondrion breaks it down into  $ADP + P + *$ .
- 1 **glucose\*** molecule produces **38  $ATP^*$ s**.
- There are three stages in the full process of Respiration:



## STAGE 1: Glycolysis

- This happens in the cell's CytoSol / CytoPlasm.
- Glucose still has H, and is broken down.
- Its H is formed into Pyruvic Acid. (2 ATPs.)
- Pyruvic Acids move into the mitochondrion.

## STAGE 2: Krebs Cycles

- A series (OR cycle) of reactions on Pyruvic Acid occur, to produce H + CO<sub>2</sub>.
- H is kept, and CO<sub>2</sub> is sent out of the cell.

## STAGE 3: Oxidative Phosphorylation

- The energized H gives its energy to 36 ATPs.
- Now-normal H<sub>2</sub> reacts with O<sub>2</sub> to form H<sub>2</sub>O.



# AnAerobic Respiration

Picture this: There is no Oxygen to react with the glucose. But food **still** to be broken down for energy.

## In Plants and Yeasts: Alcoholic Fermentation

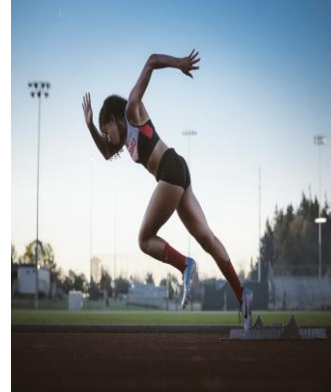


This is how Yeast makes **beer**: alcoholic and fizzy.

And bread: CO<sub>2</sub> spaces (like air spaces), any alcohol is evaporated, the yeast is heated to death.

Aerobic respiration requires oxygen, whereas anaerobic respiration takes place in the absence of oxygen.

# In Animals: Lactic Acid Fermentation



When you over-exercise, you run out of Oxygen. Your body produces energy for you through Anaerobic Respiration. The Lactic Acid stays in your muscles, and this is what causes you to wake up with sore, stiff, cramped muscles the next morning.

But as the day continues, the extra oxygen you breathe in will react with the Lactic Acid, and break it down again – thus releasing it from your muscles.