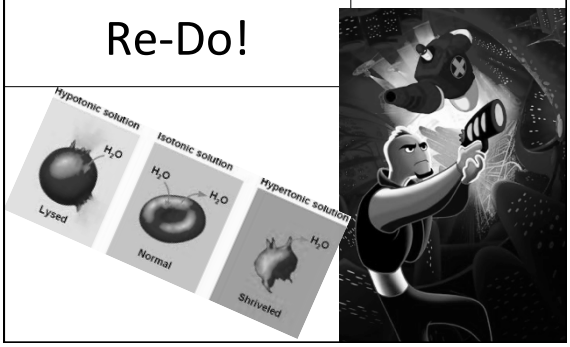
Important Latin Roots

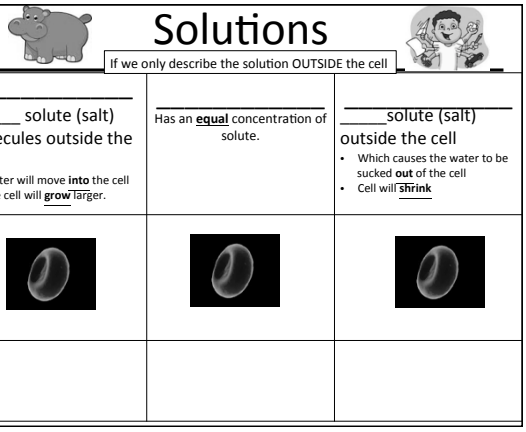
Aerobic	Anaerobic	Respire	Glyco	Lysis
• With oxygen	• Without oxygen	• Breathe out	• sweet	• Break apart

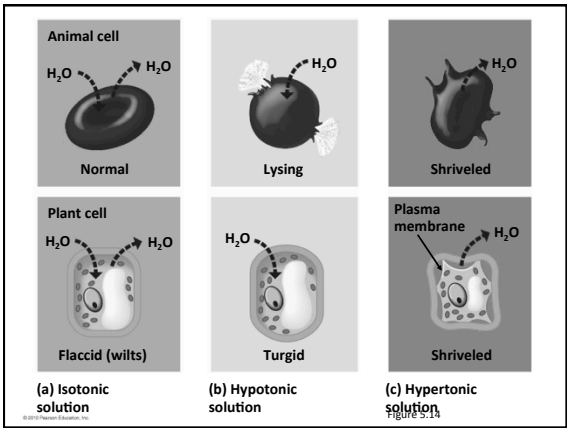
Osmosis Notes Re-Do!



Osmosis and Cells

- A simple rule to remember is: **SALT SUCKS!**
  - Salt is a **solute**, when it is concentrated inside or outside the cell, it will draw the **solvent** (water) in its direction.





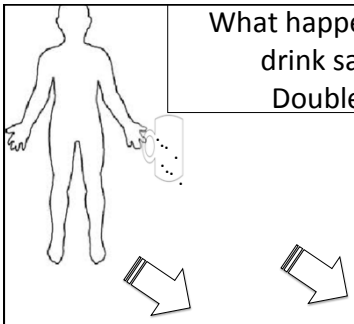
The Problem with HYPERTONIC

DANGER!

- This is why it is dangerous to drink sea water, people marooned at sea will speed up dehydration (and death) by drinking sea water.
- This is also why "salting fields" was a common tactic during war, it would kill the crops in

Its a myth that drinking sea water will cause you to go insane

What happens when you drink salt water?
Double Dragon



Before we begin, some advice

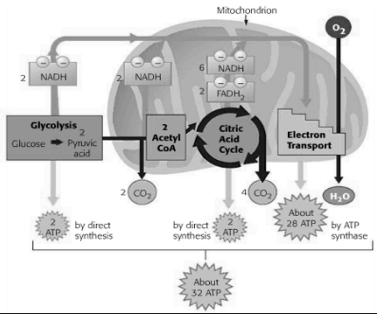
How to study this topic:

1. Memorize the summary equation
2. Memorize names of the 3 steps
3. Memorize where each step occurs in the cell
4. Describe the general function of each step in your own words
5. Memorize reactants and products for each step
6. Describe the process of each step in your own words

From your Textbook Summary

An Overview of Cellular Respiration

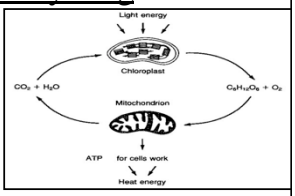
You can follow the flow of molecules through the process of cellular respiration in the following diagram:

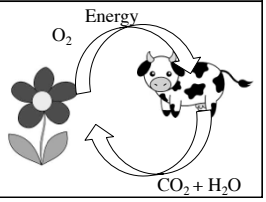


Chemical Cycling

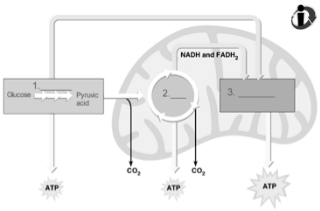
What is the connection between photosynthesis and the human population?

- Chemical cycling between photosynthesis and cellular respiration





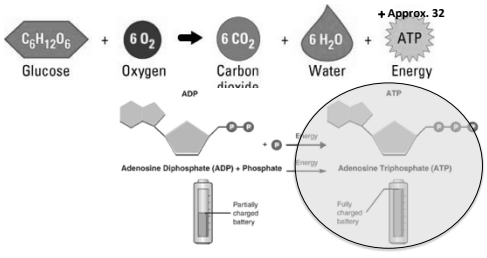
Be able to answer by the end



- The figure above represents an overview of the different processes of cellular respiration. Which of the following correctly identifies the different processes?

A. 1. glycolysis, 2. electron transport, 3. citric acid cycle
B. 1. glycolysis, 2. citric acid cycle, 3. electron transport
C. 1. citric acid cycle, 2. electron transport, 3. glycolysis
D. 1. electron transport, 2. glycolysis, 3. citric acid cycle

Cell Respiration: how do we get energy from our food?



An Overview of Cellular Respiration

Energy is transferred from food molecules to ATP in 3 stages:

1. Glycolysis
2. The citric acid cycle
3. Electron transport

Step 1: Glycolysis

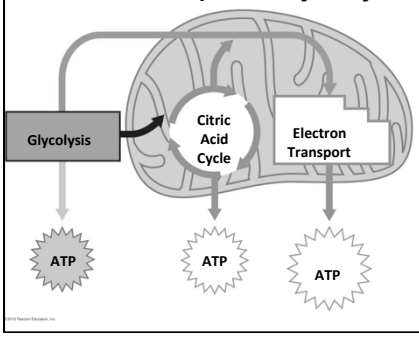
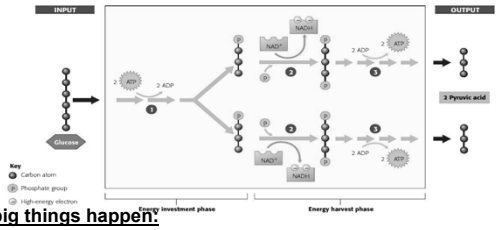


Figure 6.UN03

Step 1: Glycolysis



Two big things happen:

1. Glucose (6 carbons) gets split into 2 molecules of pyruvate (3 carbons each)
   - This releases enough energy to make 2ATP (net)
2. Hydrogen and electrons are stripped from glucose and picked up by NAD+, becoming NADH

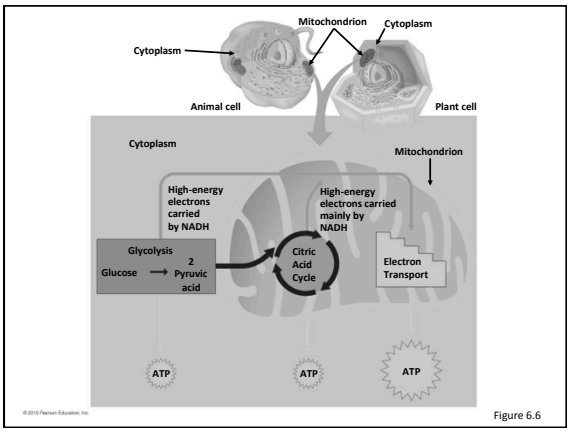
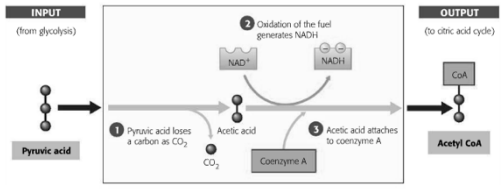


Figure 6.6

There is a prep step between glycolysis and citric acid cycle, for simplification I'm including it in the citric acid cycle step.



Step 2: Citric Acid Cycle
(aka: Kreb's Cycle)

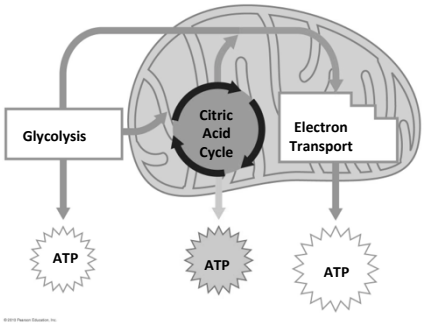
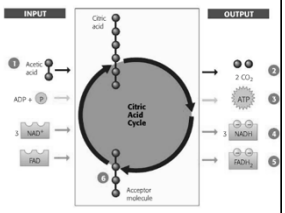


Figure 6.UN04

Step 2. Citric Acid Cycle

- Completes the breakdown of sugar:
  - Enough energy is released to regenerate 2 more ATP
  - The rest of the hydrogen are stripped from pyruvate and picked up by carriers FAD or NAD+ which become FADH2 and NADH



Stage 3: Electron Transport

Electron transport releases the energy your cells need to make most of their ATP.

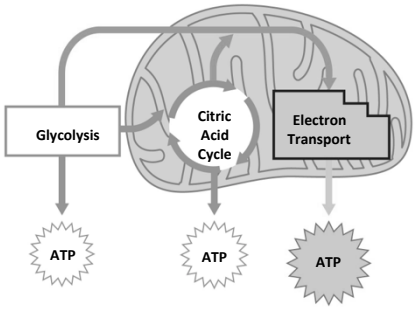


Figure 6.UN0

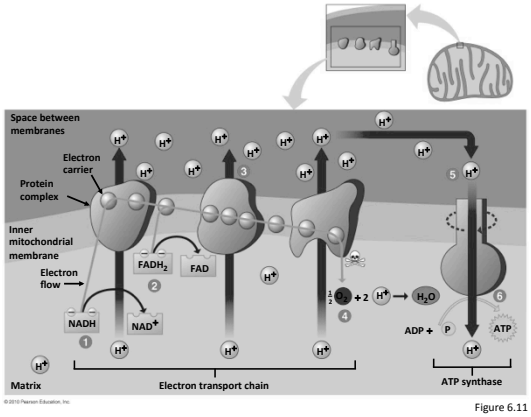
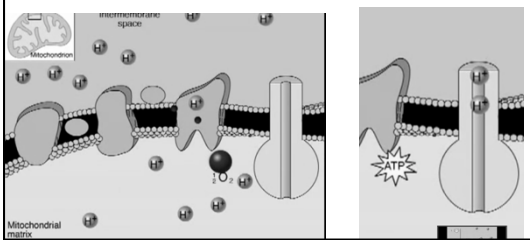


Figure 6.11

Electron Transport

Each chain functions as a chemical machine that uses the energy released by the "fall" of electrons to pump hydrogen ions (H^+) across the inner mitochondrial membrane. This pumping causes ions to become more



Is sugar the only food we get energy from??

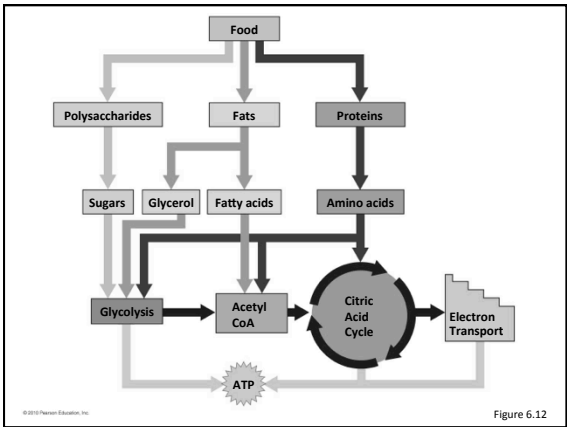


Figure 6.12

FERMENTATION: ANAEROBIC HARVEST OF FOOD ENERGY

– Some of your cells can work for short periods without oxygen.

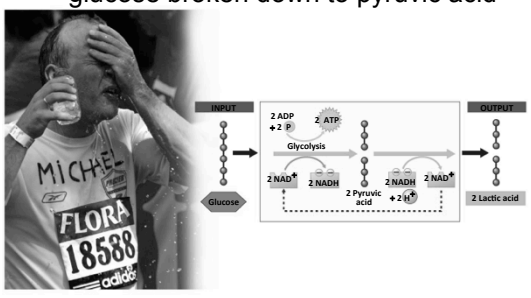
– **Fermentation** is the **anaerobic** (without oxygen) harvest of food energy.

Fermentation in Human Muscle Cells

– After functioning anaerobically for about 15 seconds:
  • Muscle cells will begin to generate ATP by the process of fermentation
– Fermentation relies on glycolysis to produce ATP.

Glycolysis:

• Does not require oxygen
• Produces two ATP molecules for each glucose broken down to pyruvic acid



Evolution Connection: Life before and after Oxygen

Glycolysis could be used by ancient bacteria to make ATP when little oxygen was available, and before organelles evolved.

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Today, glycolysis:

- Occurs in almost all organisms
- Is a metabolic heirloom of the first stage in the breakdown of organic molecules

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Helpful Review Video