Science Study Guide #4

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THE FOUNTAIN OF ENERGY (Glucose)

- Glucose, C6H12O6
- What is the mass of one molecule of Glucose? **180 amu | 180 g/mol**
- How many atoms are in one molecule of glucose? **24 atoms**
- If Glucose is the energy source for animals, what is the energy source in our solar system? **The Sun**
- We eat to consume sugar.
- And we **store** that energy in the form of ATP (Adenosine Triphosphate)

ADENOSINE TRIPHOSPHATE, ATP

- ATP
- Adenosine
- Made up of a 5 carbon sugar, *ribose*
- And *Adenine*, a base
- TP
- Triphosphate

[A]-[P]-[P]-[P]
|
| enzymes
|
V
[A]-[P]-[P] + [P] + **ENERGY**
(ADP) (inorganic phosphate, Pi)

Why was the third bond broken? Because it's the easiest to break and it has the most energy

- All this generation of energy is happening in what organelle? **1-29-19**
- What specific area of the mitochondria? Cristae

- This cellular process is called cellular respiration
- It's how the cell *generates* energy

Cellular Respiration

Enzyme (animals)

ATP <=> ADP+pi+Energy

Enzyme (plants) (reversible)

- Breaking bonds (catabolic reaction)
- Creating bonds (anabolic reaction)
- Breaking and form bonds=*metabolism*
- Plants (producers) obtain their energy from the sun
- Animals (consumers) obtain their energy from food
- Autotrophs- make their own food; Auto- self
- Heterotrophs- consume food; troph- food; hetero- other
- Which humans are humans? Heterotroph and animals
- **REVIEW**: what's the difference between physical change and a chemical change?

MITOCHONDRIA & CHLOROPLAST

LIGHT DEPENDENT VS. LIGHT INDEPENDENT REACTIONS

- Light dependent require light, independent dont require light
- Light dependent reaction (in thylakoids/grana)
  Light + H2O ---> O2 + ATP +H+
  Proton
- Light independent reaction (in stoma) "gell"
  ATP+CO2 ----> Glucose+H2O
- We use this reaction so the plant can continue to work in the absence of light
- Both reactions are happening in the chloroplast

PHOTOSYNTHESIS

- Combine *light dependent* and *Independent reactions*
- photo=?
- synthesis=?
- Photo im *light dependent* reactions and synthesis in light independent reaction
- CO2 + H2O ------> C6H12O6 + O2 ANSWER **6CO2 + 6H2O -----> C6H12O6 + 6O2**

Energy cycle

- Plants: Energy + CO2 + H2O ---> O2 + C6H12O6
- Animals: Energy + CO2 + H2O ← O2 + C6H12O6

Greenhouse and green house effect

REVIEW

- What do we breath? Air
- Of what is the air mostly made of? Nitrogen
- Are we aerobic or anaerobic organisms?

FERMENTATION

- It is another way to generate energy
- It is a very primitive method of generation ATP
- Question: why do we use it? When we dont need oxygen
- Method of generating energy in case of making “emergency”
- Doesn't last long, produces lactic acid
- Fermentation happens in the cytoplasm

2 FORMS OF FERMENTATION

- c6H12O6 ------> 2C3H6O3 + 2ATP

ANOTHER FORM OF FERMENTATION

- Alcoholic fermentation
- C6H12O6 ------> 2C2H5OH + CO2 + 2ATP
- Ethyl alcohol is the form of alcohol you can drink safely
- Occurs in anaerobic environment