Class Notes 1-25-13

FEMALE SELECTING FOR NOVELTY

* IS A VISUAL THAT THIS MALE HAS UNIQUE GENES (POSSIBILITY AT BETTER SURVIVAL FOR OFFSPRING

WHAT ABOUT US?

* WE DO SEE WGB AFFECTING HUMANS
* BUT
* IT IS INTERTWINED WITH SOCIAL BEHAVIORS AND NORMS ( MIKE LA PUTT / TRACKDAY.NET)

STILL NOT CONVINCED THAT HUMAN BEHAVIORS ARE DRIVIEN BY WGOB?

Bio Primer on FAT!

Fat has 3x as any calories as an equal weight of sugar

So that mean you store energy using fat

That fat was important for survival

So fat storage is an indication of health and ability to find food and efficiently use calories

Jin fact those that did not store fat well – they often died – lost the game of biology

Fat Storage

Humans require fat: vitamin delivery, protection, long term energy storage

Females need it

* Support the growth of a fetus
* Males need it
* For hunting and gathering
* So: it becomes a selected for characteristic! It’s valuable
* Essentially selection for those best able to store fat directly
* And that’s easy to select for – just look

Evolution booboo!

Evolution is not a directed process

* Does not make “perfect organisms”

Unfortunately

231,404 death in 2007

2 to 4 x’s more likely to have heart disease

Stroke

High blood pressured

Human nature

Bigger is better

* Subconscious decisions
* So now there is a multibillion dollor econonmy that is built around bigger is better

Chapter 2 Objectives

Understand Water’s features that help it support all life.

Describe carbohydrates- their structiur and function

Proteins- their structure / function

Nucleic acids – their structure / function

Lipids- their structure/function

Everything is made of atoms

An element is a substance that cannot be

Atom is bit of matter

Big 4 elements in your body

Oxygen

Carbon

Hydrogen

Nitrogen

WATER

Water has features that enable it to support all life.

2.6 Water has unusual properties that make critical to life.

COHESION & ADHESION

* Water sticks to itself

LARGE HEAT CAPACITY

* Heat from the sun disrupts some of the hydrogen Bonds between water and molecules
* New hydrogen bonds are formed almost as quickly as they are disrupted
* Because heat energy from the sun is used up breaking and re-forming hydrogen bonds, the water temperature doesn’t increase by much
* Molecules that make up sand, on the other hand, don’t have so many hydrogen bonds, so the heat of the sun just increase the temp.
* 60% of your body is water. This helps you to maintain a relatively constant body temperature.

LOW DENSITY AS A SOLID

* FROZEN WATER: Hydrogen bonding arranges water molecules into a crystalline lattice, keeping them slightly farther apart and, therefore, less dense.
* LIQUID WATER: Water molecules move about freely, allowing them to be closer to one another.

GOOD SOLVENT

* When placed in water, ionic compounds such as NaCl are broken down into separate Na+ and Cl-ions. Positively charged Na+ ions are attracted to the negatively charged side of the H20 molecule while negatively charged Cl-ions are attracted to the positively charged side.

2.7

Bood ph

Buffer

Can quicly absorb excess h+ ions to keep a solution from becoming too acidic,

Learning objectives

Understand water’s features that help it support all life

Describe carbohydrates

Four type of macromolecules

Sugars / carbs

Lipids – fats & oils

Amino acids / proteins

Nucleic acids – DNA

Carbs are fuel for living machines.

* C,H, and O
* Primary fuel for organisms
* Cell structure

Photosynthesis & cellular respiration

* Sun energy stores in chloroplast and in the presence of water and carbon dioxide and produces oxygen and sugar.

Glucose

* Most carbs - ultimately converted into glucose
* BLOOD SUGAR

Dieters lose large amounts of water weight during the first few days of a diet.

* Pulls water out of glycogen storage.

Starch

* 100’s of glucose molecules joined together
* Barley, wheat, rye, corn and rice
* Glycogen – “animal starch”

Complex Carbohydrates

* “Time-release” fuel pellets

2.1 Not all carbohydrates are digestible

 - Chitin

- Cellulose

Fiber

* “Roughage
* Colon Cancer prevention recution
* Termites ecological role

Lipids store energy for a rainy day.

* Non-Polar molecules that do not dissolve in water
* Greasy to the touch
* Significant source of energy storage
* Most energy for the lightest weight

FATS & OILS

* Lipids are non-soluble in water and greasy to the touch
* They are valuable to organisms in long-term energy storage and insulation, membrane formation, and hormones

DIFFERENCE BETWEEN FAT AND OIL

* State at room temperature
* So most animal lipids are fat
* And plant lipids are oils (liquids)

2.13 Fats are tasty molecules too plentiful in our diets

- Glycerol: “head region

- Fatty acid “Tails

- Triglycerides

Fat molecules contain much more stored energy than carbohydrate molecule

Saturated and Unsaturated Fats

* # of bond in the hydrocarbon chain in a fatty acid
* Health considerations

Many snack foods contain “partially hydrogenated” vegetable oils.

Why might it be desirable to add hydrogen atoms to vegetable oil?

What are trans fats? Turning oils into fats (hydrogenated oils)

Olestra is a recently developed “fake fat” chemical that gives foods the taste of fat, without adding the calories of fats.

What chemical structure might make this possible?

2.14 Cholesterol and phospholipids are used to build sex hormones and membranes.

 CHOLESTEROL

Important component of most cell membranes

Can attach to blood vessel wall and cause them to thicken.

Cells in our liver produce almost 90% of the circulating cholesterol.

* SUGAR IS SUGAR
* CARBOHYDRAES ARE SUGAR
* FATS BECOME SUGAR
* OILS BECOME SUGAR

**5. Proteins are body-building molecules**

Different kinds of proteins:

* Structural - hair, fingernails, feathers, horns, cartilage, tendons
* Protective – help fight invading microorganisms, coagulate blood
* Regulatory – control cell activity, constitute some hormones
* Contractile – allow muscles to contract, heart to pump, sperm to swim
* Transport – Carry molecules such as oxygen around your body

**Essential Amino Acids**

* Eight of the 20 amino acids are essential amino acids and cannot be made by the body so must be consumed in the diet.
* Complete proteins contain all eight essential amino acids, while incomplete proteins do not.

**Complete Proteins**

* Have all essential amino acids
* Incomplete proteins
* Complementary proteins

2.17 Protein functions are influence by their three-dimensional shape.

2.16 Proteins are an essential dietary component

**TAKE HOME MESSAGE 2.17**

The particular amino acid sequence of a protein determines how it folds into a particular shape.

This shape determines many of the proteins features, such as which molecules it will interact with.

When a protein’s shape is deformed, the protein usually loses its ability to function

**2.18 Enzymes are proteins that initiate and speed up chemical reactions.**

**“Misspelled” Proteins**

* **Incorrect amino acid sequence**
* **Active site disruptions**
* **Phenylketonuria**

**2.19 Nucleic acids are macromolecules that store information.**

**- adenine**

**- Thymine**

**- Guanine**

**- Cytosine**

**Information Storage**

* **The information in a olecule of DNA is determined by its sequence of bases.**
* **- Adenin, guanine, cyosine, and thymine**

**Take-home message**

* **The nucleic adis DNA and RNA are moacromolecules that store information by having uniqu seq. of molecule**
* **Both play role in directing protein**

**9 important landmarks distinguish eukaryotic cells**

* **Nucleus: the cell’s genetic control center**
* **The nucleus is the largest and most prominent organelle in most eukaryotic cdells**
* **The nucleus has two primary genetic control center**
* **Storehouse for hereditary**

**Mitochondria**

* **Act as all purpose energy converters**
* **Harvest energy to be used for cellular functions**
* **Sugar/oxygen to atp**

 **Lysosomes: the cells garbage disposal**

* **Act as a floating garbage disposals for the cells digesting and recycling cellular waste products and consumed material**

**The endomembrane system**

* **Functions**
* **Produces and modifies molecules to be exported to other parts of the organism (rough er)**
* **Breaks down toxic chemicals and cellular by-products (smooth er)**
* **Smooth er makes the plasma membrane**

**Golgi Apparatus: where the cell processes products for delivery throughout the body**

**Chloroplasts: Power Plant**

* **Photosynthesis – light into energy through water and oxygen makes sugar and carbon.**

**END OF CH. 3 GREAT CHART**

**TWO CHEMICAL REACTIONS**

**PHOTOSYNTHESIS**

* **Occurs in chloroplast**
* **Needs sunlight, water and Co2**
* **Produces oxygen and sugar**

**CELLULAR RESPIRATION**

* **Occurs in the mitochonrian**
* **Needs sugar and oxygen and produces ATP, Water**

**C3 photosynthesis**

* **Good w/ light**
* **Waste a lot of water**

**C4 – CAM photosynthesis**

* **Efficient with water**
* **In-efficient with light**

**Fermentations**

* **Lactic Acid**
* **m**