SURVEY OF BIOLOGY

Wk. 4

THRIPP

MON:

2009-09-21: Saturated fats — solid at room temp. — bad

CHON = top 4 elements in body — 96%

a y x i
r d y t
b r g r
o e o
g n g
e e
n n

Only proteins have sulfur (S).
Only nucleic acids have phosphorous.

DNA: codes for proteins [blueprint].

Monomer: ○ 1 UNIT

millions of nucleotides in DNA

mono = 1
di/bi = 2
poly = 3

dimer ○—○ 2 UNITS : covalent bond
2 atoms share electrons

polymer ○—○—○ 3 OR MORE UNITS

monosaccharide = 1 sugar OR simple sugars
glucose, found in sports drinks
fructose, found in fruit
Honey has glucose AND fructose

NOT testing on slide 30: which are glucose, which are fructose

DNA codes for protein

MARKER: 820 AM

Fructose is more rapidly converted to fat
glucose is different: body turns to glycogen for energy

represents glucose
simplified

Bind 2 monosaccharides covalently = disaccharide

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2009-09-21 pg. 2: Dehydration synthesis
↓ water removal ↓ to make

→ Removal of water from the molecule of two monosaccharides.

REVERSE: hydrolysis = adding water
↓ to break :: later: lysozome splits disac. into two monosacc.

H goes to 1
OH goes to the other

Macromolecule == polymer
large molecule

Enzymes retain shape → enzymes retain function
otherwise: mutation — changed function

SUCROSE == glucose + fructose [TABLE SUGAR]
↓
a diner and a disaccharide ← more accurate, more specific

☺ Avg. American eats 140 lb. of sugar yearly.

galactose + glucose = lactose => from dairy
glucose × 2 = maltose => found in animals

lactase is the enzyme

MARKER: 8:35 AM: Polysaccharides = covalently bonded monosaccharides

T/F: Animals make starch FALSE → plants do
Starch = polysaccharide of glucose
plants store energy in starch

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Survey

2009-09-21 pg. 3: polyse examples:
1) starch : plants store energy in starch
2) cellulose : plants make cell walls
3) glycogen : animals store energy in glycogen
→ polyse of glucose
Athletes eat starch after training to replenish glycogen for sustained energy.

cellulose: * polyse. of glucose,
* forms cell walls of plants
* found in wood
* a.k.a. dietary fiber
☺ don't eat wood
* most abundant product on Earth
* cows don't digest it — their bacteria do!
"chewing cud"

☺ cockroaches like cellulose in paper and glue — food source for them

We can't digest cellulose. We can digest starch and glycogen.

w/ charge — Simple sugars dissolve in water.
They are hydrophilic
↓ water ↓ love [Greek]

opposite: hydrophobic [oil]

w/out charge — Lipids do NOT dissolve in water.
They are hydrophobic
↓ water ↓ fear [i.e., phobia]

Lipid = fats and steroids

hard to remember

Fat in body does this:
* energy storage
* cushioning
* insulation => fat people are good in cold (warm)

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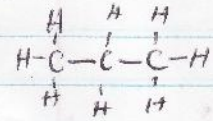
Survey

2009-09-21: pg. 4: Most eaten fat is triglyceride

Triglyceride: a glycerol molecule
3 fatty acids

MARKER: 8:55 AM

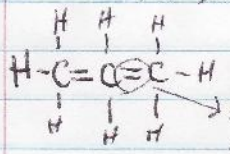
Saturated fats have max # of hydrogen molecules bonded to carbon. (usually)



fact ↙
check: are they molecules?

Sat. fats are SOLID at room temp.: whole milk, butter, cream, lard, bacon
☺ coconut / palm oil
☺ raise LDL ("bad" cholesterol)
☺ lowy → low density
☺ HDL ("good" cholesterol)
☺ high density
healthy ☺ clogs arteries

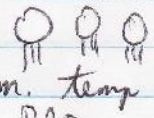
Unsaturated fats have fewer than the max # of hydrogen bonded to carbon



→ double covel bond kink carbon chain → good

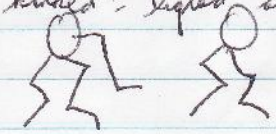
Trans fats: DANGEROUS because enzymes can't recognize

straight = solid at rm. temp



BAD
sat.
solid

kinked = liquid at rm. temp.



GOOD
unsat.
liquid

→ exception to solidity: whole milk

Exception: corn oil, plant oils are often unsaturated
→ probably not on test

"KNOW THIS WORD" = review all instances in notes

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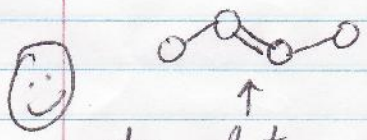
2009-09-21 pg. 5: ☺ partially hydrogenated oils = could be trans fat = danger!
"0" trans fat could mean 0.4 grams!
→ might lower serving size



trans fat, up-down, bad for us

MARKER: 9:10 AM enzymes make & break covalent bonds

Steroids are lipids = differ from fats in structure and function
cholesterol is the "base steroid"
sex hormones, testosterone & estrogen

* enzymes regulate almost all chemical reactions in cells

similar steroids

we all have both
men have more testosterone
women have more estrogen

structural protein — hair
storage protein — in seeds for plant growth
contractile protein — muscle
transport protein — hemoglobin moves oxygen

main function of proteins

defensive prots = antibodies
receptor prots = bind chemical to send signal

enzymes are proteins

genes code for proteins

Amino acids are linked by dehydration synthesis
covalent bond

LAB: Biuret test

20 amino acids
some hydrophilic some hydrophobic
then some proteins dissolve in water

END

SUPPLEMENTAL

THRIPP Survey

2009-09-22 Pg. 6

Di = 2

hydrolayse

enzyme

↓

shaped to fit organic molecule

Joining together of monomers by dehydr. syn.

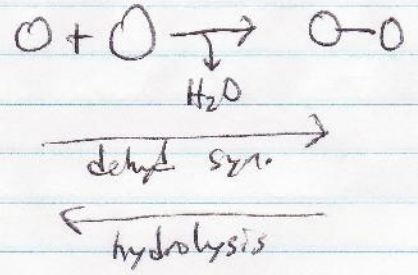
sucrose = disac. of glucose & fructose

honey isn't disac. cuz glu. & fruc. are mixed but NOT covalently bonded

Digestion of starch in seed or our stomachs (or other animals) makes maltose
2 glucose

poly saccharide

link monomers into polymer = covalent bond
dehydration synthesis



plants make starch
animals do not, although they may digest it

dietary fiber goes out with feces
helps elimination

glycogen & starch have same shape

cellulose forms cell walls in plants
→ dietary fiber

bacteria helps cows digest cellulose

"water-loving" = dissolves in water

SUPPLEMENTAL

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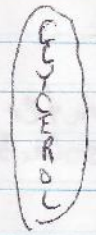
2009-09-22 Pg. 7: fats in our body
energy storage, cushioning, insulation

glycerol = 15 bonds, only ends have water!
not water soluble

most dietary fat is triglyceride

make a disac, protein, polysac DNA by
dehyd. syn.



triglyceride = 3 fatty acids
" "
" sat. fats have max # of H's

saturated fat is saturated in the hydrogens
in animals

salmon & other fish = unsat. fat source

sat. fat = C_4H_{10} unsat. fat = C_4H_8
less than max of hydrogen OR
a 2x covalent bond
(double)

sat. fats = bad for you
kinked chain
good cholesterol
a fat
spread out

carbon-carbon double covalent bond

LDL bad chol.: lousy
HDL good: ~~hydro~~ healthy

saturated chain
clumped
bad

corn oil
unsat. fat

transfat is man made → H up H down
bad

hydrogenation for ∅ margins
partially hydrogenated vegetable oils
have some transfat 0.4g gets rounded to 0
on labels

good for us in carbon chains

SUPPLEMENTAL

THRIFF
Survey

2009-09-22 Pg. 8: cholesterol
lipid cuz one hydroxyl (water soluble) but
TONS of non-water-soluble carbon

anabolic steroids build muscle quickly

MARKER: 10:25 AM

T/F: All hormone are protein?
FALSE —— Some are lipids.

albumen comes from egg white => for developing chick

type 1 diabetes

Starch = polymer
food storage for plants

rheumatoid arthritis = body attacks its own white blood cells

glycogen = food storage for animals

most protein are 100-300 amino acids long
10-600 is about range 300 avg.

20 amino acids

glycogen = food storage for animals

shape has function

enzymes = shape tied to function

hydrophobic = no charges group together

sucrose = glu + fru

primary structure of protein = lin. seq. of amino aa
3 others
1 to last

In S2 to my left & right: Jim & Jasmine
S1: I took course CBAAA
macromolecules = molecules in chains
S1 is focused on group work
Talk about 1st session
sucrose, lactose, maltose = disac

REAL END ☺