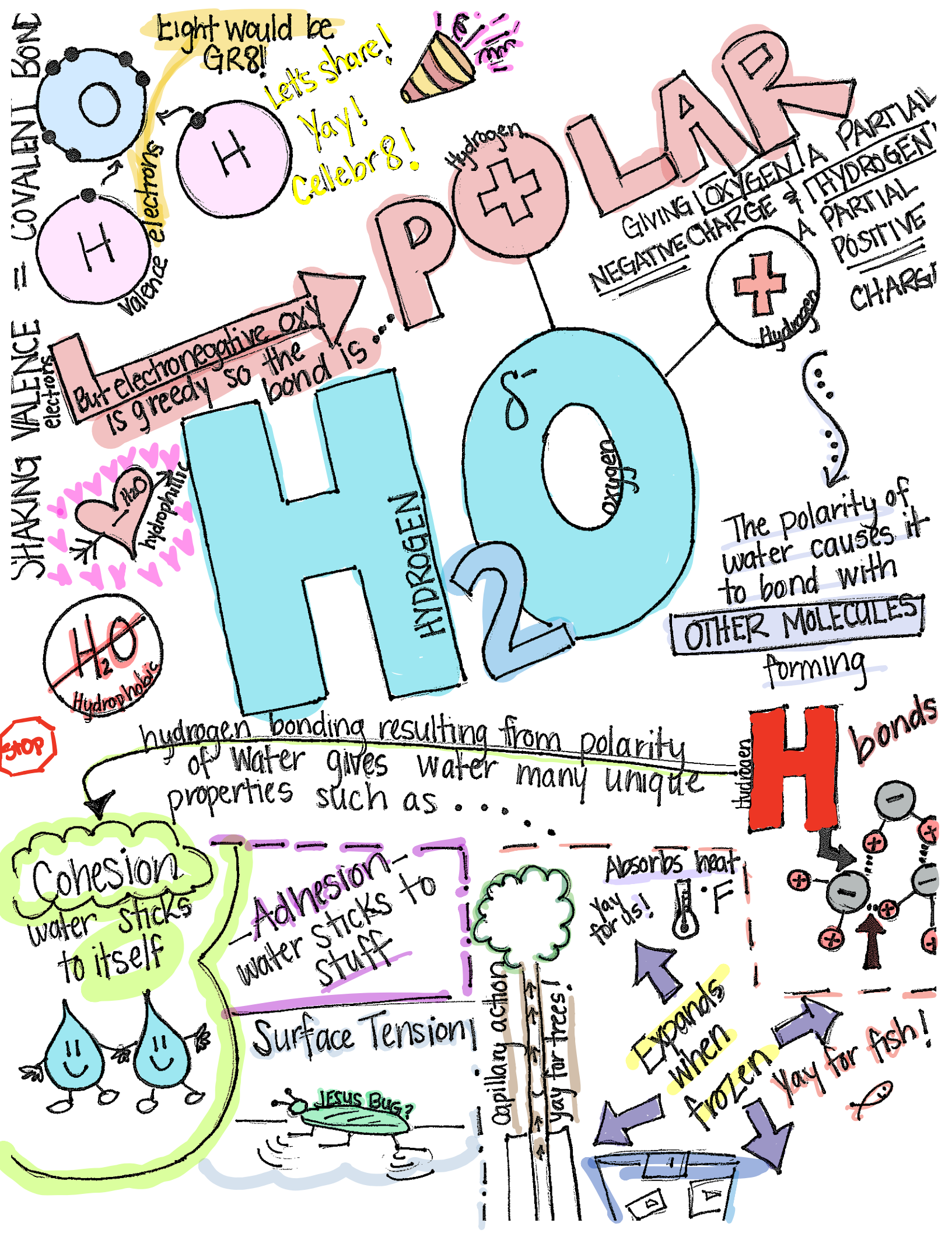
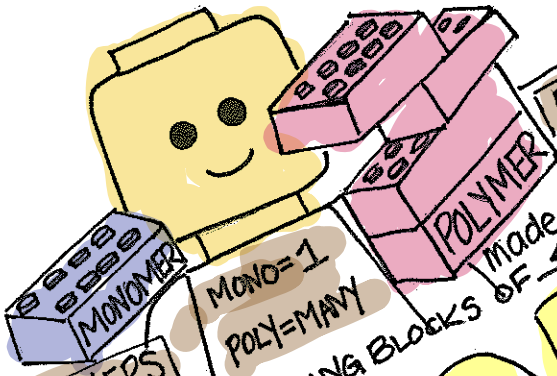

= COVALENT BOND
Valence electrons
O
H
H
Light would be GR8!
Let's share!
Yay!
Cellebr8!
POLAR
Hydrogen
GIVING OXYGEN A PARTIAL NEGATIVE CHARGE & HYDROGEN A PARTIAL POSITIVE CHARGE
Hydrogen
SHAKING VALENCE electrons
But electronegative oxy is greedy so the bond is...
H2O
HYDROGEN
δ-
oxygen
H2O hydrophilic
H2O Hydrophobic
The polarity of water causes it to bond with OTHER MOLECULES forming
STOP
hydrogen bonding resulting from polarity of water gives water many unique properties such as...
hydrogen H bonds
Cohesion water sticks to itself
Adhesion- water sticks to stuff
Surface Tension
Jesus Bug?
Capillary action
Yay for trees!
Absorbs heat
Yay for us!
F
Expands when frozen
Yay for fish!

MACROMOLECULES



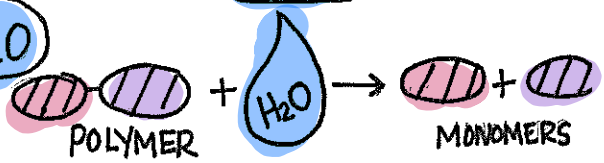
MONOMERS are repeating subunits → BUILDING BLOCKS OF

MONO = 1
POLY = MANY

POLYMERS are long chain molecules made of monomers

DEHYDRATION
LOSING H_2O MAKES A POLYMER

HYDROLYSIS – ADDING H_2O BREAKS A POLYMER



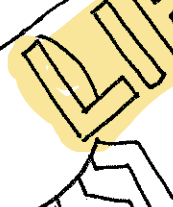
4 CATEGORIES OF MACROMOLECULES ARE...

CARBOHYDRATES

FOUND IN SUGARS & STARCH

LIPIDS

Fats, oils, Waxes, Cell Membran

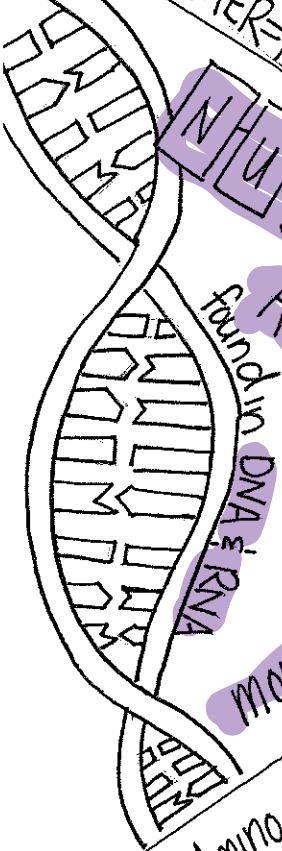


MADE UP OF: GLYCEROL + FATTY ACID

NUCLEIC ACIDS

MONOMER = monosaccharide!

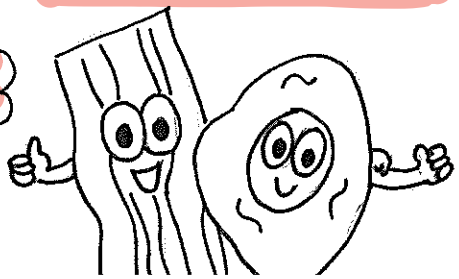
found in DNA & RNA



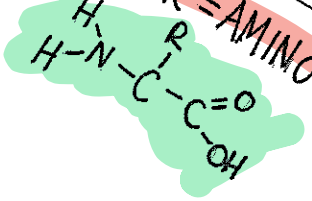
monomer = nucleotide!

PROTEINS

Amino acids are linked together by peptide bonds



MONOMER = AMINO ACIDS



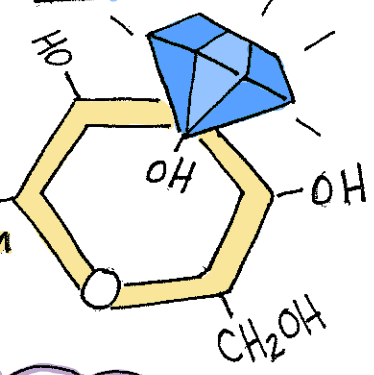
The most delicious macromolecule!

CARBOHYDRATES

C 6 12.01 · O 8 16.0 · H 1 1.008

exist in Ratio 1 carbon : 2 Hydrogen : 1 oxygen

Ex: GLUCOSE → $C_6H_{12}O_6$

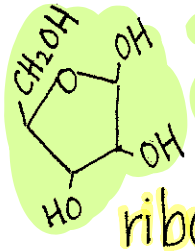


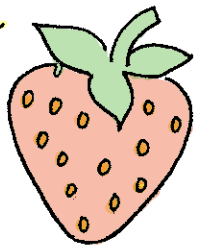
forms rings

glycosidic linkage

monosaccharides

- monomers of carbs
- Ex: fructose, ribose, galactose
- GLUCOSE





LOSE H_2O

disaccharides

- di = two
- two monosaccharides
- Ex: Sucrose

2 SUGARS

GLUCOSE + FRUCTOSE = "table sugar"

yumm!

100's - 1,000's monomers = POLYSACCHARIDES

STRUCTURE = FUNCTION

STORAGE

starch

- Storage in plants; digestible
- hydrolyzed as needed to provide energy for cells

α linkages

multiple glucose monomers

glycogen

- Storage in animals, muscle cells, liver cells

STRUCTURE

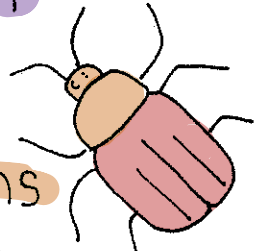
β linkages

Cellulose

- found in plants; FIBER
- not digestible by most animals

chitin

- found in exoskeletons



Jacobs 2017

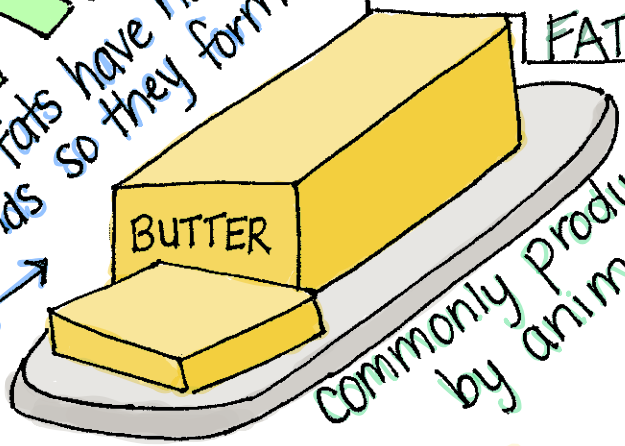
LIPIDS

All lipids are hydrophobic

FATS → TRIGLYCERIDES = Glycerol + 3 FATTY ACIDS

- SATURATED FATS
- UNSATURATED FATS

Saturated fats have no double bonds so they form solids →



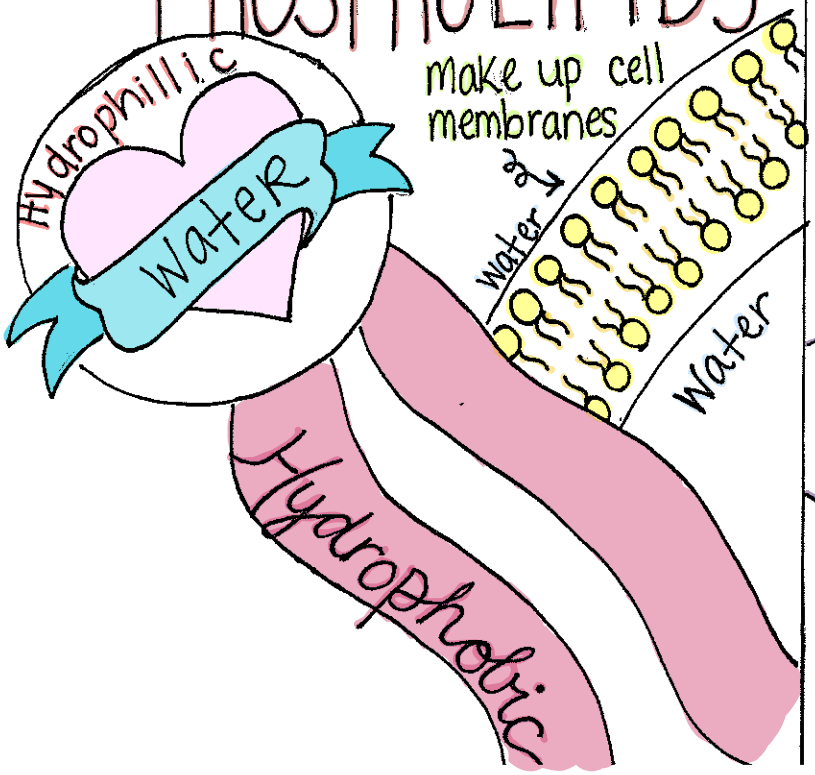
commonly produced by animals

- C=C bonds result in kinks so molecules can't pack tightly
- usually liquid
- Ex: Olive Oil

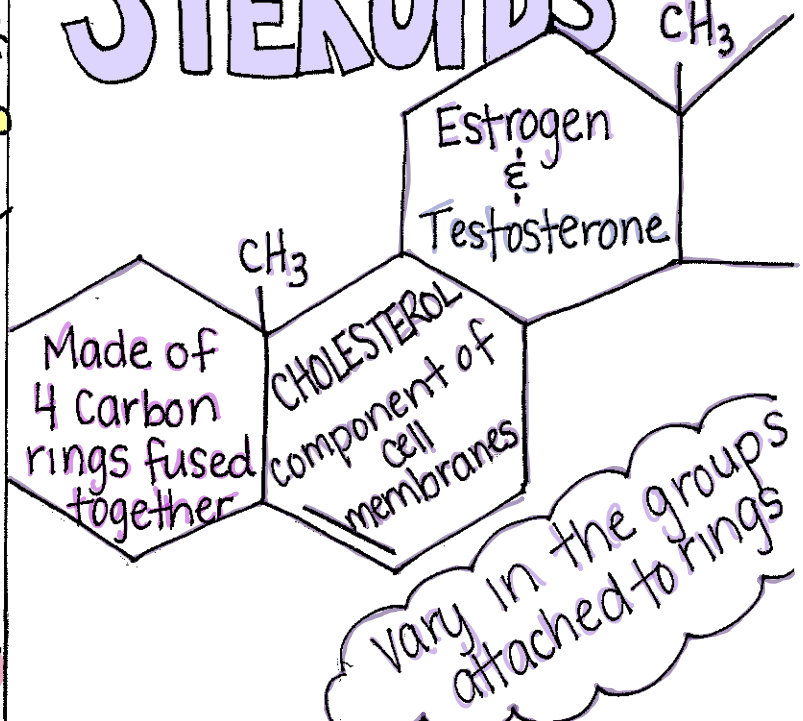
commonly produced by plants

PHOSPHOLIPIDS

make up cell membranes →



STEROIDS



Vary in the groups attached to rings

NUCLEIC ACIDS

DNA → RNA → Protein

RNA

- ribose sugar
- phosphate
- Nitrogen Base

Adenine
Uracil
Guanine
Cytosine

RNA codes for amino acid sequence which codes for proteins

single stranded

MONOMER = NUCLEOTIDES

DNA

Deoxyribonucleic Acid
~ molecule of heredity

Phosphate

SUGAR (Pentose)

Nitrogen BASE

- deoxyribose sugar
- Bases: A, T, C, G

double helix

SUGAR PHOSPHATE BACKBONE

5'
T
A
3'
3'
G
C
phosphodiester linkage
5'

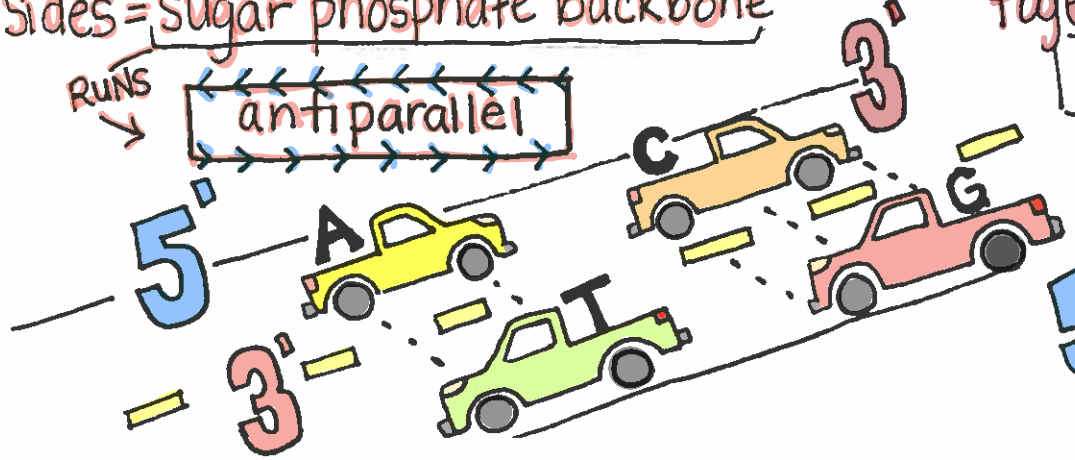
Adenine
Thymine
Guanine
Cytosine

2 RING PURINES

PYRIMIDINES

DNA LADDER:
Steps = Bases
Sides = Sugar phosphate backbone

RUNS → antiparallel



DNA Strands held together by Hydrogen bonds between complementary bases

POLYMERS MADE OF AMINO ACIDS

PROTEINS

VAL TYR HIS GLY PRO SER ALA

Linked by peptide bonds

AMINO ACID

Variable group → R

H–N–C–C–OH

H H O

amine carboxyl

1 Primary Structure

- unique sequence of amino acids
- changing one amino acid can change function

Alpha α helix

2 Secondary

- Results from Hydrogen bonding between amino and carboxyl groups of protein backbone

β pleated sheet

Polar R groups point outward

Hydrophobic groups point inward

H_2O

H_2O

3 TERTIARY STRUCTURE

- Results in complex globular shape due to interactions between R groups
  - EX: -Hydrogen bonds
  - -Disulfide bridges

STRUCTURE = FUNCTION

4 Quaternary Structure

- association of two or more proteins into one large protein

Ex: Hemoglobin

Transports O_2 in RBC's

Denaturing Proteins

Protein loses shape

- Lose shape → Lose function

Reasons: heat or pH