

H bonds - Water Properties

1) temperature stability

- heat regulation: absorb heat (1cal/g/°C)
(high heat capacity)
- coolant: releases heat (perspiration)
(high heat of vaporization)

2) cohesion

- surface tension: suspending medium (supports weight)
 - diving vs “cannon ball”; branch vs leaf
 - eg cytoplasm supports cell organelles
- lubrication: films, moistens moving parts
eg digestion, joint movements
- transportation: moves thru very small channels
eg capillaries

3) solvent - dissolves substances (water soluble, eg salt (NaCl))

- increases rate of chem. reactions (metabolism)

note: each H bond is weak, but many H bonds create a strong "strength in numbers" type of bond.

Acid-base Imbalance

acidosis (pH < 7):

- 1) **respiratory acidosis: hypoventilation ($\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3$)**
(too much CO_2 in body)
- 2) **metabolic acidosis:**
 - a) **excess alcohol (acetaldehyde \rightarrow acetic acid)**
 - b) **diarrhea (excess loss of HCO_3^- ; unable to absorb acids)**
 - c) **excess diet/starvation (accum. fatty acid)**
 - d) **excess exercise (accum. lactic acid)**
 - e) **kidney failure (excess acid not removed in urine)**

alkalosis (pH > 7):

- 1) **respiratory alkalosis: hyperventilation (too little CO_2 in body)**
- 2) **metabolic alkalosis:**
 - a) **vomit (lose acidic gastric juices)**
 - b) **excess antacids consumption**
 - c) **constipation (excess reabsorption of HCO_3^-)**

Carbohydrates

basic unit: saccharides (sugar)

function: energy, structural material

types:

1) simple sugars

a) monosaccharides: glucose

b) disaccharides: sucrose, lactose, maltose

2) complex carbohydrates (polysaccharides)

a) plant starch (rice, wheat, oat)

b) animal starch (glycogen - liver, muscles)

c) cellulose (fibers, indig. plant material)

Lipids

basic unit: glycerol, fatty acid

function: stored energy, structural material

types:

1) insoluble

(triglyceride = glycerol + fatty acid)

a) phospholipids: cell membrane

b) waxes: waterproof, lubricate skin

c) glycerides (fats = stored energy)

(con't)

Protein - fibrous

basic unit: amino acids (20+)

**function: energy, structural material, defence (WBC),
metabolism (enzymes), transport (blood)
movement (muscles)**

types:

1) fibrous proteins

- tough, water-insol., structural

a) keratin - hair, nails, skin waterproofing

b) collagen - skin, cartilage, bone

c) actin & myosin - muscle

Nucleic Acids

Type:

- 2) nucleic acids = chain of nucleotides**
 - a) RNA - protein synthesis**
 - b) DNA - heredity**

Feature	RNA	DNA
1) sugar	ribose	deoxyribose
2) phosphate	same	same
3) nitrogenous base	U, A, C, G	T, A, C, G
4) arrangement	a) non-helical b) single strand c) short	helical double strand very long
5) function	synthesize protein	inheritance