Food and Nutrition

MMHS Anatomy

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Nutrition

- **Food** = nutritive substances taken in for growth, repair, and maintenance of life processes.

Two Types of Nutrition

Organic = those compounds composed of carbon and hydrogen

- **Carbohydrates**
- **Lipids**
- **Proteins**
- **Vitamins**

Inorganic = those compounds **NOT** composed of carbon and hydrogen

- **Water**
- **Electrolytes**
- **Minerals**

Organic Nutrients

1. **Carbohydrates**

a. Primary use is to supply energy for cellular processes.

b. Sources include starch from grains and vegetables, glycogen from meats, disachs and monosachs.

c. Liver converts these to glycogen and excess carbs stored as lipids.

Organic Nutrients

1. **Carbohydrates**

d. Too many carbs = excess adipose (fat tissue), hyperactivity, nervousness, and tooth decay.

e. Too few carbs = liver may break down proteins to maintain cell processes.

f. Depending on weight: 125g-175g of carbs required per day.

Organic Food

2. **Lipids**

a. Primary use is to supply energy for cellular processses and for building structures like cell membranes and myelin sheath of neurons.

b. Sources include oil, butter, nuts, eggs, and meat.

Organic Food

2. **Lipids**

c. Lipids broken down into fatty acids and glycerol (=metabolism of fats controlled by the liver)

d. Provides 3x as much energy as carbs, so no more than 10% should make up your diet.

Organic Food

3. **Proteins**

a. Primary uses are as energy from amino acids, growth and repair of cell parts, enzymes for chemical reactions, muscle components, and hormone building.

b. Sources include: meats, legumes (beans), milk, eggs.

c. Digestive enzymes break them down into 20 different amino acids.

Organic Food

3. **Proteins**

d. Protein synthesis cannot occur if even one amino acid is missing from diet.

e. 0.8 grams required per Kg of body weight.

80 kg man x 0.8g = <u>64g of protein / day</u>

f. Pregnant (+7.1g) or nursing women (+18.9g) require extra daily protein.

Organic

4. **Vitamins**

a. Substances in small amounts necessary for cell processes but which the body cells can't synthesize in adequate amounts.

*Exceptions: Vitamin D, B6 and Folic Acid.

b. essential, but not an energy source.

Organic

4. **Vitamins**

c. Necessary to prevent deficiency syndromes:

- Vitamin C deficiency: creates ***Scurvy*** → lose teeth, wounds won't heal, fragile blood vessels.
- Vitamin D deficiency: creates ***Rickets*** → brittle bone disease.
- Vitamin B deficiency: creates ***Beri Beri*** → paralysis of smooth muscle in the GI tract and skeletal muscle.

Organic

4. **Vitamins**

d. Water Soluble Vitamins = include B complex vitamins, C, Folic Acid, Niacin, and Biotin.
   - Enter the body dissolved in water.
   - Excess and unused vitamins exit the body through urine.

e. Fat Soluble Vitamins = include A, D, E, K.
   - Enter the body and are stored in fat tissues.
   - Can overdose on these (=Hypervitaminosis)

Inorganic Nutrients

=Compounds NOT composed of carbon and hydrogen.

1. **Water**

a. No energy but absolutely essential.

b. Body is 70% water and blood plasma made up of 92% water.

c. Primary use is for cytoplasm, interstitial spaces, fluid for transport of food from blood to cytoplasm, and removal of waste.

Inorganic Nutrients

1. **Water**

d. Water from sweat regulates body heat.

e. Water is the great dissolver.

f. Water is temperature stable.

g. Loss of water from cell spaces = DEHYDRATION.

Inorganic Nutrients

2. **Minerals and Electrolytes**

a. Salt (NaCl) = retains water lost through sweat and urine.

b. Calcium (Ca)= component of teeth, bones, and muscle and nerve action.

c. Phosphorous (P)= component of DNA/RNA, teeth and bones, and ATP.

Inorganic Nutrients

2. **Minerals and Electrolytes**

d. Iron (Fe)= needed for blood formation and part of hemoglobin (gas transport protein).

e. Potassium (K) = needed for muscle and nerve action.

f. Iodine (I) = necessary for proper thyroid gland secretion. Poisonous if pure, so must be obtained in a compound like iodized salt.