LAB 5: HUMAN NUTRITION

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Nutrition is:

- **Obtaining organic substances and mineral ions from which organisms obtain their energy and raw materials for growth and tissue repair.**

7 Types of Nutrients

- Carbohydrates
- Proteins

4 calories/gram

- Fats: 9calories/gram
- Fiber
- Water

Macronutrients

- Vitamins
- Inorganic Ions ("Minerals")

Micronutrients

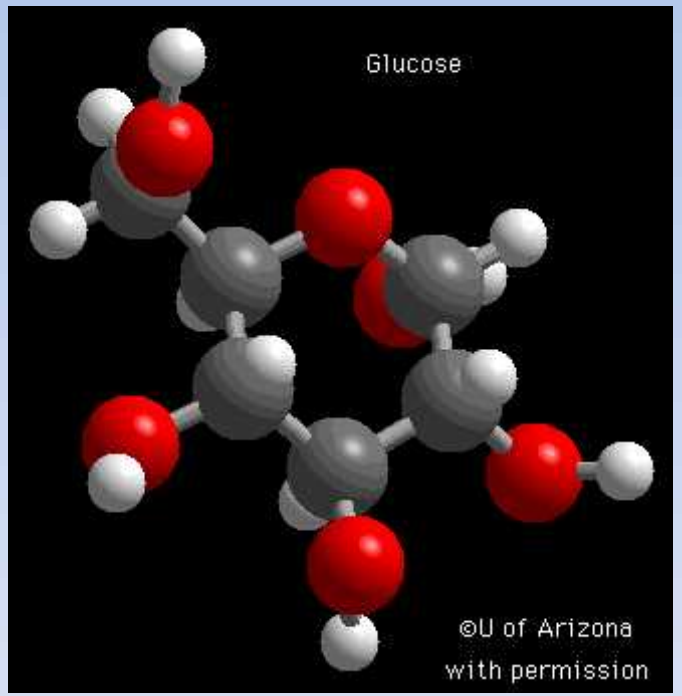
Carbohydrates

- **Monosaccharides: "one sugar"**
  - Simple sugars (**Glucose** ,**Fructose**, **Galactose**).
  - Building block of more complex carbohydrates
  - Glucose - the most abundant
- **Disaccharides: "two sugars"**
- **Sucrose** - most common (**glucose** +**fructose**)
- **Lactose** - milk sugar (**glucose** + **galactose**)
- **Polysaccharides: "many sugars"**
  - starch, glycogen
  - cellulose

Simple Sugars: Monosaccharides

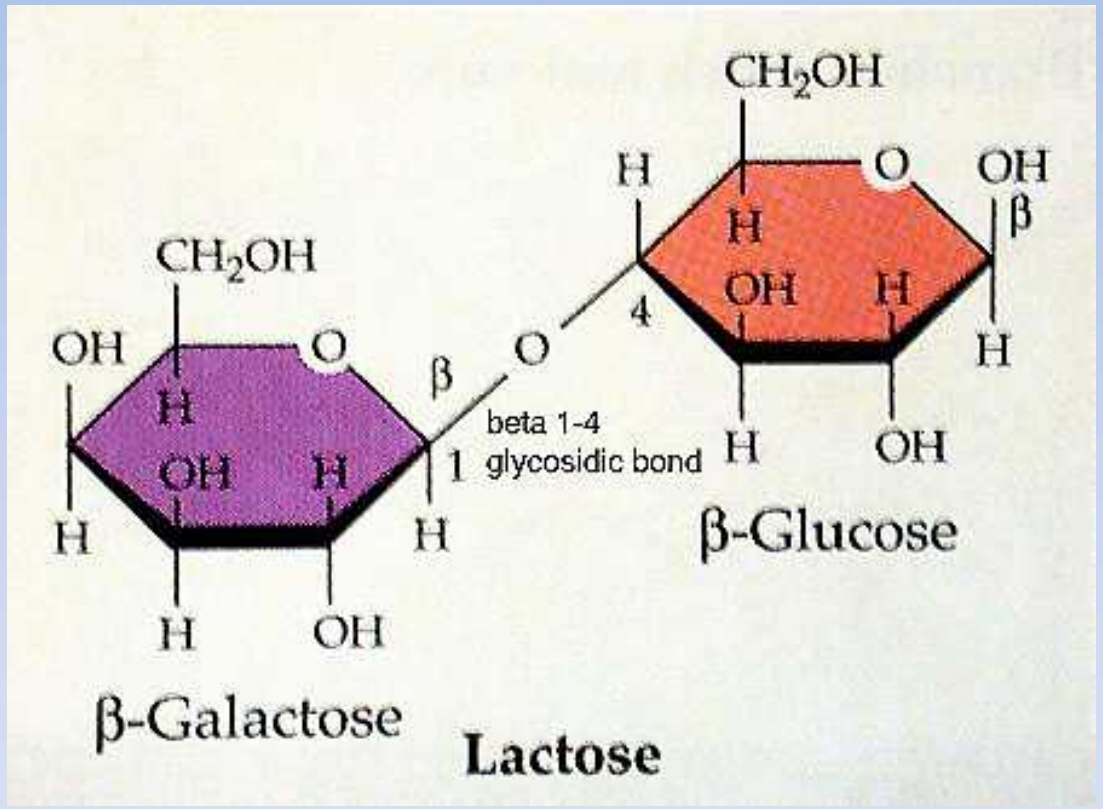
- **A single ring of C, O, and H.**

- **Glucose**
- **Fructose**
- **Galactose**



Disaccharides

- **Two sugar rings linked together.**
- **Glucose +**
- **Galactose =**
- **Lactose**



Complex Sugars: Polysaccharides

- Hundreds to thousands of sugar units
- **3 Types:**
  - **Cellulose**
- Makes up plant cell walls
  - **Starch**
    - Stored as food reserve in plant cells, broken down into glucose by enzymes
  - **Glycogen**
    - Stored as food reserve in animal liver and muscle cells

Glycogen (in liver cells)

Proteins

- A long molecule made of smaller molecules called amino acids.
- **20 naturally occurring amino acids**
- Human body can synthesize 11 amino acids
- Other nine cannot be made by the body and must come from the diet
- These nine are called **essential amino acids**
- **lack of these essential amino acids results in: protein deficiency**

Functions of Proteins

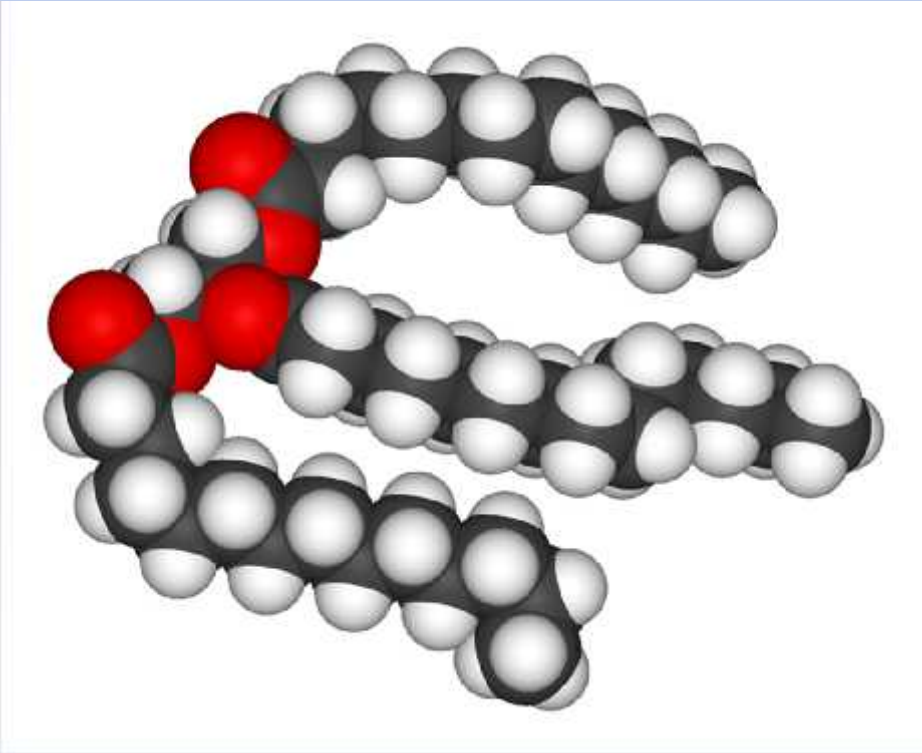
Type Protein	Function	Examples
Structural	Support	Collagen and keratin
Enzymes	Catalysts	Digestive enzymes
Hormones	Regulation	Insulin
Transport	Transport substances	Hemoglobin
Storage	Storage of amino acids	Ovalbumin in egg white Casein in milk
Contractile	Movement	Actin, myosin - muscles
Defensive	Protection	Antibodies

protein deficiency

- **Malnutrition:**
- Chronic hunger and malnutrition are problems in many developing nations
- Malnutrition is a quality deficiency in which one or more essential nutrients is lacking even though enough calories
- **Marasmus:** results from starvation
- Diet is low in calories and protein
- Sufferers extremely thin and shriveled (literally skin and bones)

Fat

- **One Fat molecule is made of:**
  - **1 molecule of Glycerol**
  - **3 fatty acids**



Vitamins

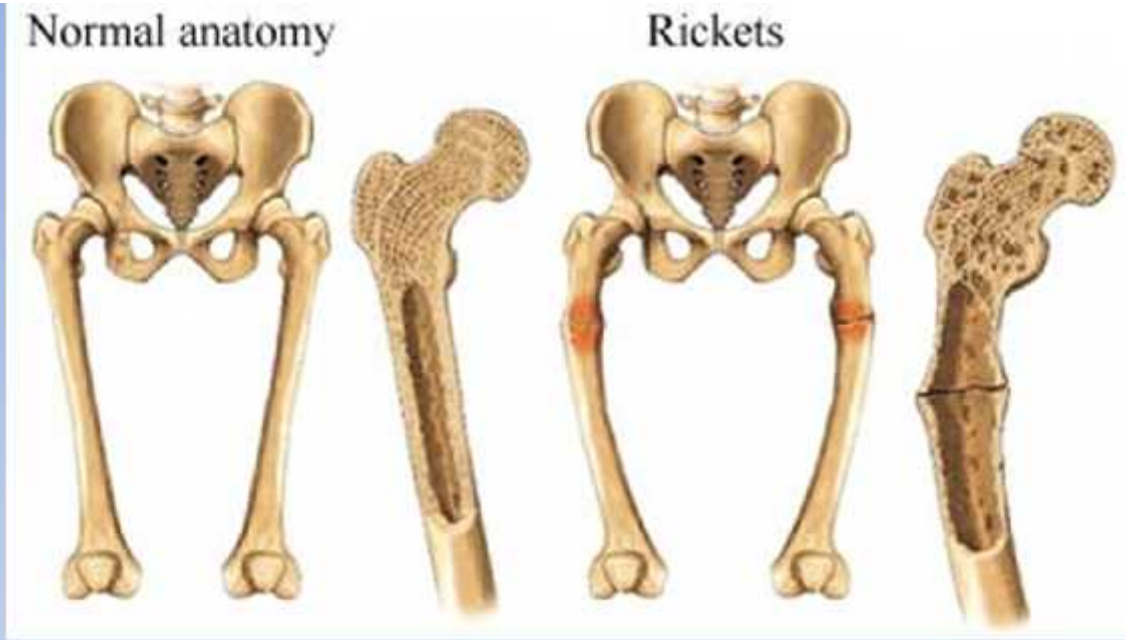
- **Organic substances that we only need in very small amounts in our diet, but essential amounts**
- **Thirteen known vitamins.**

1. **Water-Soluble Vitamins (B1, B2, B6, B12, C, etc.)**
2. **Fat-soluble Vitamins (A, D, E & K).**

Vitamin C

- Helps make the protein Collagen.
- Collagen is part of bones, skin, and blood vessels.
- Without Vitamin C, skin and blood vessels become weak due to lack of Collagen.
- Without enough Vitamin C, you can get a disease called **Scurvy**
  - Bruises and ulcers on skin; weak gums

Vitamin D



- Helps us absorb Calcium from food to make bones and teeth.
- We can eat it from both plants and animals.
- Without enough Vitamin D, you can get a disease called **Rickets**
  - Bone is soft and grows into bent shapes

Vitamin A

- Helps with a LOT of functions in the body.
- Without enough Vitamin A, **impaired vision or blindness** can occur.

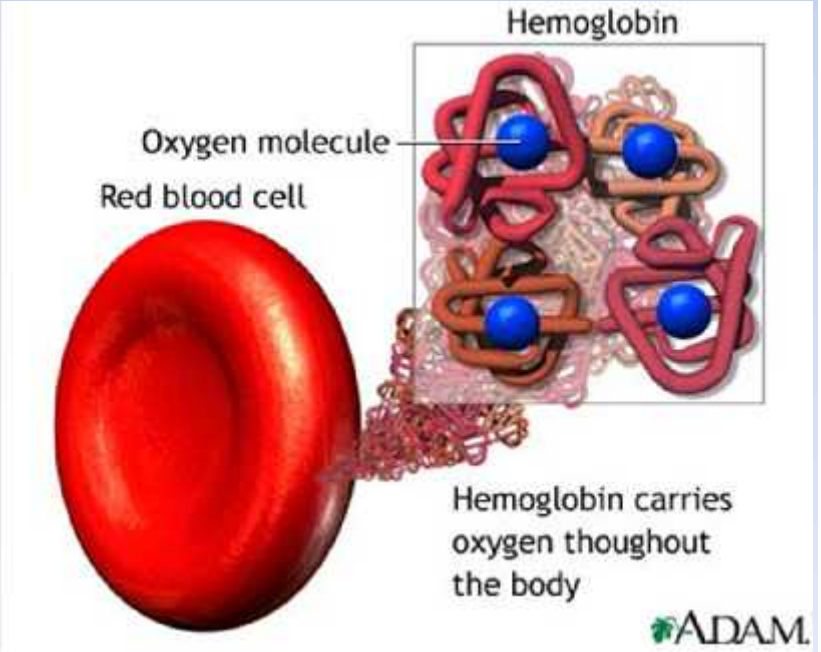
Minerals

Iron

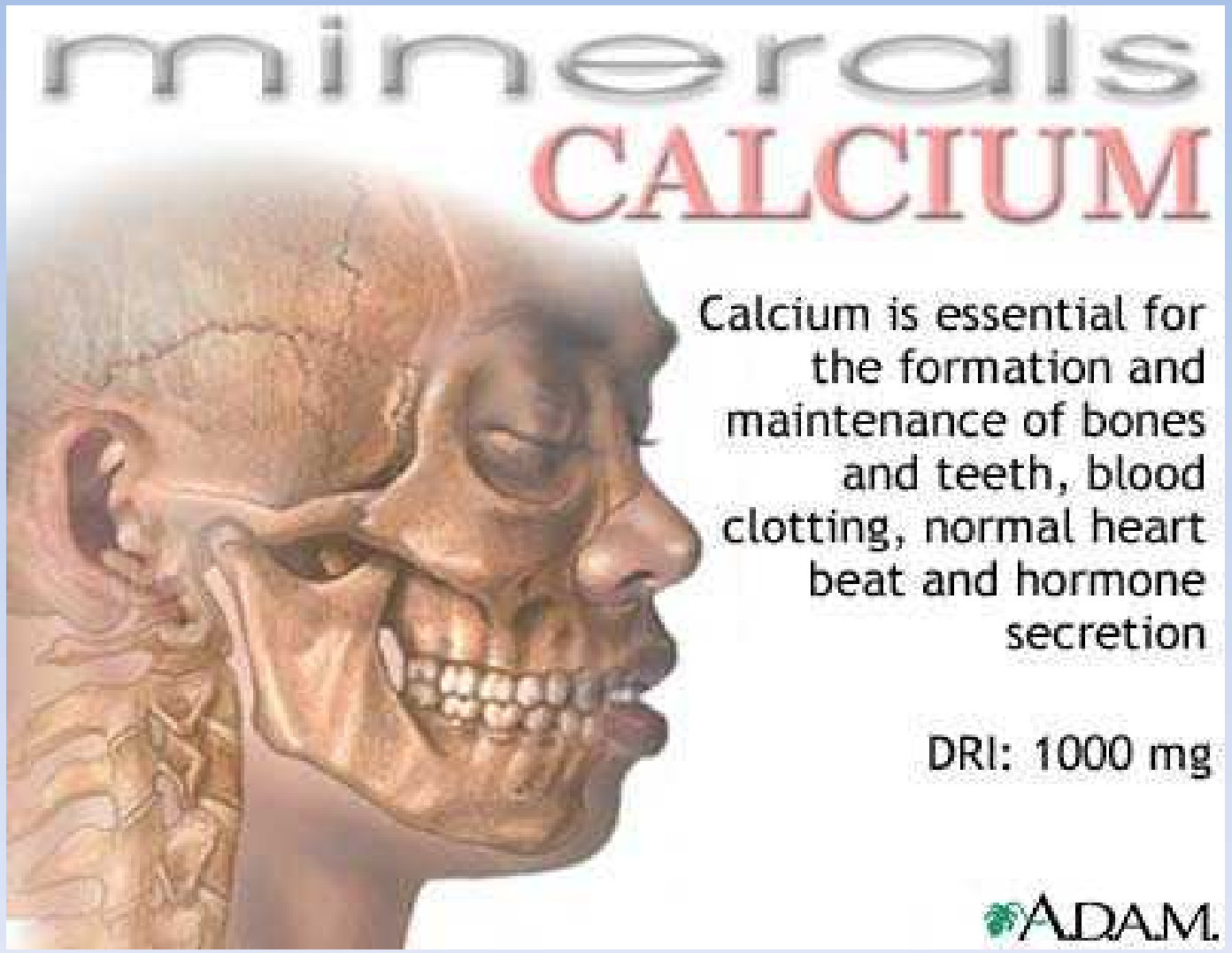
- **Helps us make Hemoglobin.**
- **Makes our blood red!**
- **Carries Oxygen in our blood.**
- **Without enough Iron, you can get a disease called**

Anemia

– **Feel tired very easily**



Calcium: Our bones and teeth are made of calcium salts



Body mass index (BMI) was calculated using the formula

BMI= weight (kg)/ height2 (m) 2

- **There are four BMI categories :**

1. BMI **fewer than 18.5** are considered **underweight.**
2. BMI values between **18.5 and 24.9** are considered **normal or healthy weight.**
3. BMI values between **25 and 29.9** are considered **overweight.**
4. **BMI 30 and above** are considered **obese.**