Planning healthy diet

The statement “eat a balanced diet” important for all ages.

A balanced diet: includes all six classes of nutrients and calories in amounts that preserve and
promote good health.

Dietary Guidelines for Americans:

General goals for optimal nutrient intake. The “Dietary Guidelines for Americans 2005” are science-based advice and suggestions for improving **health and reduce the risk of chronic diseases** through **diet and physical activity.**

These guidelines serve as helpful reminders to many Americans, especially those who are **overweight or obese, eat too much fat, and no longer think exercise is important.** The Dietary Guidelines **encourage a healthy diet, which means individuals should choose**

• Fruits, vegetables, whole grains, and fat-free or low fat milk and milk products.

• Lean meats, poultry, fish, beans, eggs, and nuts.
• Foods low in saturated fats, trans fats, cholesterol, salt (sodium), and added sugars.

Recommended Dietary Allowances (RDA), the daily dietary intake level of a nutrient considered sufficient by the Food and Nutrition Board of the Institute of Medicine to meet the requirements of 97.5% of healthy individuals in each life-stage and sex group. The definition implies that the intake level would cause a harmful nutrient deficiency in just 2.5%.

RENI – Recommended Energy Nutrient Intake - A new standard replacing RDA, emphasizing on recommending on the nutrients rather than food or diet.

Exchange lists provide detailed information about the nutrients in many foods and beverages. They are designed to help manage diabetes, weight management, cardiovascular risk reduction and general healthy eating. When used knowledgeably, exchange lists help to ensure balance and moderation. There are three main groups of foods and beverages in the exchange lists: carbohydrates, proteins (meats and meat substitutes) and fats. Within these groups, there is nutrient information about carbohydrates (dairy products, fruits, starches and starchy vegetables, no starchy vegetables, sweets, desserts and other carbohydrates); proteins (meats and meat substitutes); and fats. There are also exchange lists for "free foods" with few calories, combination foods, fast foods and alcohol.

The Dietary Guidelines form an integrated set of key recommendations:

1. Adequate nutrients within calorie needs.

Foods contain not only the vitamins and minerals, but substances, including, carotenoids, flavonoids and isoflavones, that may protect against chronic diseases.

2. Weight management

Overweight and obesity of both adults and children cause excess body fat leads to a higher risk of premature death, type 2 diabetes, hypertension, dyslipidemia, cardiovascular disease, stroke, gallbladder disease, and other chronic diseases.

3. Physical activity:

Defined as any bodily movement produced by skeletal muscles resulting in energy expenditure. Regular physical activity and physical fitness make sense of well-being, and maintenance of a healthy body weight.

4. Food groups encourage

Increased intakes of fruits, vegetables, whole grains, and fat-free or low-fat milk products will have important health benefits.

A. Fruits and vegetables as part of a healthful diet may reduce the risk of chronic diseases, including stroke and other cardiovascular diseases, type 2 diabetes, and cancers in certain Sites (oral cavity and pharynx, larynx, lung, esophagus, stomach, and colon-rectum).

B. whole grains are an important source of fiber and other nutrients.

Consuming at least three or more ounce-equivalents of whole grains per day can reduce the risk several chronic diseases and help weight maintenance.

5. Fats and oils

The type of fat makes a difference to heart health, and the total amount of fat consumed is also important. High intake of saturated fats, Trans fats, and cholesterol increases the risk of coronary heart disease due to high blood lipid levels.

Intake Fats essential fatty acids, carrier for the absorption of the fat-soluble vitamins A, D, E, K and carotenoids (they have a wealth of health benefits, such as giving us vitamin A. This provides our bodies with antioxidants

6. Carbohydrates

Carbohydrates are part of a healthful diet, found in:

a. Fruits, vegetables, grains, and milk—are important sources of many nutrients.

b. Dietary fiber is composed of non digestible carbohydrates.

c. Sugars and starches supply energy to the body in the form of glucose. Sugars can be naturally present in foods or added to the food. The greater the consumption of foods containing large amounts of added sugars, leads to gaining weight.

7. Sodium and potassium

a. The higher one's salt (sodium chloride) intake, the higher one's blood pressure.

b. Keeping blood pressure in the normal range reduces one's risk of coronary heart disease, stroke, congestive heart failure, and kidney disease.

c. When reading labels, look for the sodium content; foods that are low in sodium (less than 140 mg) are low in salt.

8. Alcoholic Beverages

a. Alcoholic beverages supply calories but few essential nutrients.

b. Excessive alcohol consumption makes it difficult to eat sufficient nutrients and to maintain a healthy weight.

c. Alcoholic beverages are harmful when consumed in excess.

9. Food Safety

a. A voiding foods that are contaminated with harmful bacteria, viruses, parasites, toxins, and chemical and physical contaminants is vital for healthful eating.

b. It is estimated that every year about 76 million people in the United States become ill from pathogens in food.

Lifestyle changes including:

1. Reducing salt (sodium) intake.

2. Increasing potassium intake

3. Losing excess body weight

4. Increasing physical activity

5. Eating healthy diet can prevent or delay the onset of high blood pressure and can lower elevated blood pressure.

Health Benefits of Regular Physical Activity

• Increase physical fitness.

• Helps build and maintain healthy bones, muscles, and joints.

• Builds endurance and muscular strength.

• Helps manage weight.

• Lowers risk factors for cardiovascular disease, colon cancer, and type 2 diabetes and osteoporosis.

• Helps control blood pressure.

• Promotes psychological well-being and self-esteem.

• Reduces feelings of depression and anxiety.

Therefore, it is recommended that adults playing sports in at least 30 minutes on most days of the week.

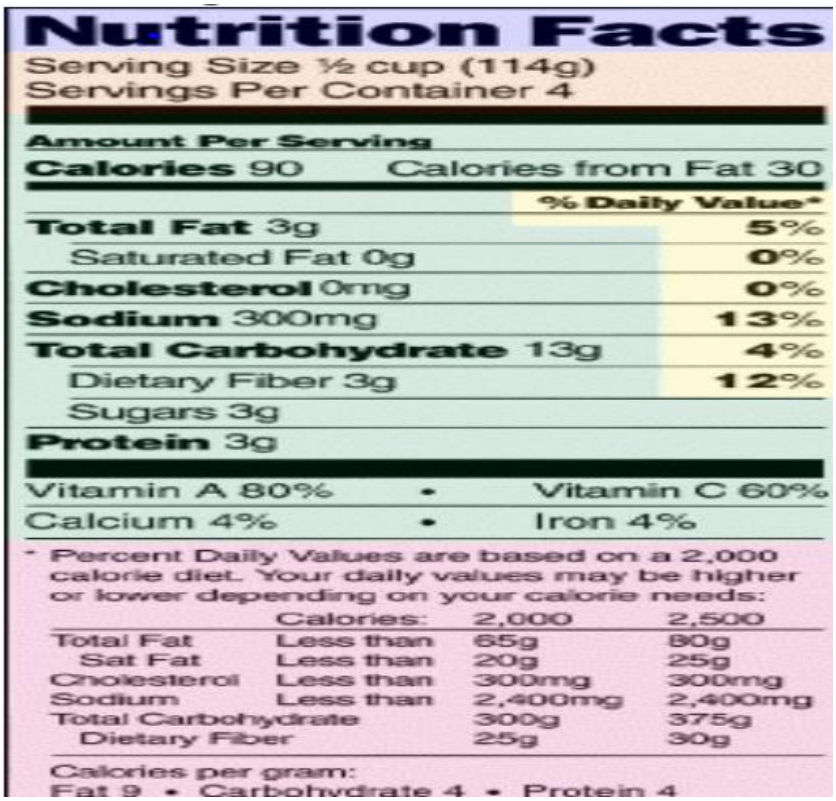
Nutritional Labeling

- Primary means of communication between the producer or manufacturer and the consumer.

Components of Nutritional Labeling: \

1. Nutrient Declaration – a standardized statement or listing of the nutrient content of food.

2. Nutrition Claim – representation which states or implies that a food has some particular nutritional proponents.



Nutrition Facts

Serving Size ½ cup (114g)
Servings Per Container 4

Amount Per Serving

Calories 90	Calories from Fat 30
	% Daily Value*
Total Fat 3g	**5%**
Saturated Fat 0g	**0%**
Cholesterol 0mg	**0%**
Sodium 300mg	**13%**
Total Carbohydrate 13g	**4%**
Dietary Fiber 3g	**12%**
Sugars 3g	
Protein 3g	

Vitamin A 80% • Vitamin C 60%
Calcium 4% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Nutrient density is a measure of the nutrients a food provides compared to the calories it provides. Foods low in calories and high in nutrients are nutrient dense, while foods high in calories and low in nutrients are nutrient poor.

Serving size is a standardized amount of food. It may be used to quantify recommended amounts, as is the case with the represent quantities that people typically consume on a Nutrition Facts label.

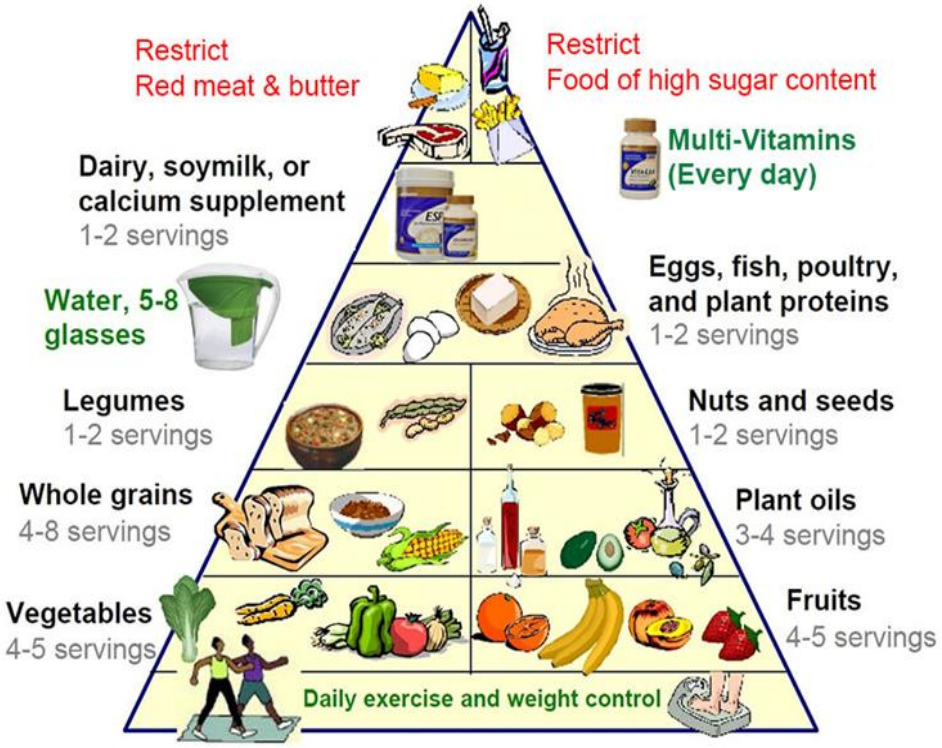
Food pyramid (Nutrition)

The food pyramid is actually a graphical representation, in the form of a triangle, of nutritional standards. It indicates the quantities and types of food needed daily to maintain the health status and to prevent or reduce the risk of development of eating disorders

- The food pyramid is designed to make healthy eating easier.

- Healthy eating is about getting the right amount of nutrients - proteins, fats, carbohydrates, vitamins and minerals that you need to maintain your

good health. Because different foods have different nutritional values, it is not possible to get all the nutrients we need from a single food



In General, the Food Pyramid Comprises the Following **5 Food Groups**, Namely

1-Bread, cereals, rice and pasta (6-11 servings per day);

2-Vegetables (3-5 servings per day);

3-Fruits (2-4 servings per day);

4-Milk and derivatives (2-3 servings per day);

5-Meat, fish, eggs (2-3 servings per day).

Table 1. Food pyramid for different age categories.

Children (between 2 and 5 years old)	**Children (between 6 and 11 years old)**
Cereals: 1.5 - 3 bowls	Cereals: 3 - 4 bowls
Vegetables: at least 1.5 servings	Vegetables: at least 2 servings
Fruit: at least 1 serving	Fruit: at least 2 servings
Meat, fish, eggs and alternatives: 60 - 120 g	Meat, fish, eggs and alternatives: 120 - 200 g
Milk and alternatives: 2 servings	Milk and alternatives: 2 servings
Fat / oil, salt and sugar: very little	Fat / oil, salt and sugar: little
Liquid: 4 - 5 glasses	Liquid: 6 - 8 glasses
Teenagers (between 12 and 17 years old)	**Adults**
Cereals: 4 - 6 bowls	Cereals: 3 - 8 bowls
Vegetables: at least 3 servings	Vegetables: at least 3 servings
Fruit: at least 2 servings	Fruit: at least 2 servings
Meat, fish, eggs and alternatives: 200 - 300 g	Meat, fish, eggs and alternatives: 200- 320 g
Milk and alternatives: 2 servings	Milk and alternatives: 1 - 2 servings
Fat / oil, salt and sugar: little	Fat / oil, salt and sugar: little
Liquid: 6 - 8 glasses	Liquid: 6 - 8 glasses
The elderly	
Cereals: 3 - 5 bowls	Vegetables: at least 3 servings
Fruits: at least 2 servings	Meat, fish, eggs and alternatives: 200 - 250 g
Milk and alternatives: 1 - 2 servings	Fat / oil, salt and sugar: little
Liquid: 6 - 8 glasses	

Daily values: represent percentage per serving of each nutritional item listed on food labels based on a **daily intake of 2,000 calories.**

Estimated daily calorie needs

The following chart gives an estimate of individual calorie needs. The calorie range for each age and gender is based on physical activity level, from sedentary to active.

Sedentary means: a lifestyle that includes only the light physical activity associated with typical day-to-day life.

Active means: a lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour.

The table showing the number of calories per person of different ages

CALORIE RANGE	CALORIE RANGE	CALORIE RANGE
sedentary --- active	sedentary ---- active	sedentary ---- active
Children 2 – 3 years 1,000 - 1,400	Females 4–8 years 1,200 - 1,800	Males 4–8 year 1,400 - 2,000
	9–13 yrs 1,600 - 2,200	9–13 yrs 1,800 -- 2,600
	14–18 yrs 1,800 -- 2,400	14–18 yrs 2,200 -- 3,200
	19–30 yrs 2,000 --2,400	19–30 yrs 2,400 -- 3,000
	31–50 yrs 1,800 -- 2,200	31–50 yrs 2,200 -- 3,000
	51 + yrs 1,600 -- 2,200	51 + yrs 2,000 - 2,800

Food Customs (food habits**)**

The Pyramid and Nutrition Facts labels are useful in planning a nutritionally sound diet, but dietary and religious customs must also be taken into consideration.

Dietary laws: rules to be followed in meal planning in some religions.

Other Food Patterns

Vegetarians

There are several vegetarian diets. The common factor among them is that they do not include **red meat**. Some include eggs, some fish, some milk, and some even poultry.

Types of vegetarians:

1. Lacto - ovo vegetarians: use dairy products and eggs but no meat, poultry, or fish.

2. Lacto - vegetarians: use dairy products but no meat, poultry, or eggs.

3. Vegans: avoid all animal foods. They use soybeans, chickpeas, meat analogues, and tofu.

Vegans can show deficiencies of calcium; vitamins A, D, and B12; and, of course, proteins.

Energy

Energy is constantly needed for the

1. Maintenance of body tissue.

2. Temperature

3. Growth

It is generated by involuntary and voluntary activity.

a. Voluntary activity: include **walking, running, swimming, gardening,** and so on. Carbohydrates are should be the primary energy source.

b. Involuntary processes: includes **respiration, circulation, regulation of body temperature, and cell activity and maintenance**.

Energy requirement: define as the total number of calories needed in a 24-hour period.

Energy balance: occurs when the caloric value of food ingested equals the calories expended.

Energy measurement:

The unit used to measure the energy value of foods is the **kilocalorie (kcal),** commonly known as the large calorie, or calorie.

In the metric system it is known as the **kilojoule**.

kilocalorie is equal to 4.2 kilojoules

Calorie: is the amount of heat needed to raise the temperature of 1 kilogram of water 1degree Celsius (C°).

Joule: is the work down (energy expended) when 1kg is moved 1meter by a force of 1 newton

Energy value: The number of calories in a food.

Energy values of foods vary in

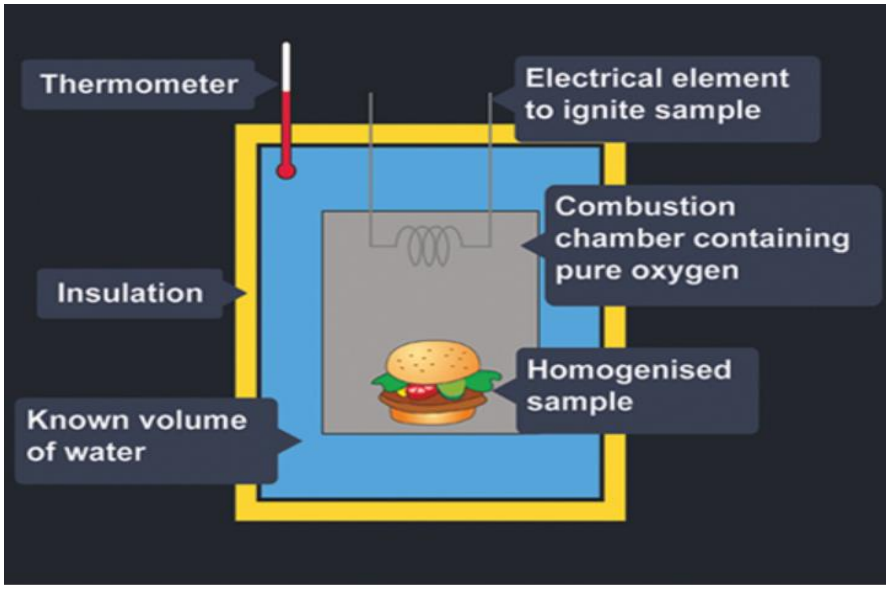
1. Types 2. Amounts of nutrients in each food.

The energy values of foods are determined by a device known as a Bomb calorimeter.

Bomb calorimeter: device used scientifically to determine the energy values of foods, compose of two parts.

1. The inner part of a calorimeter holds a measured amount of food.

2. The outer part holds water.



When the food is burned, its caloric value determined by the increase in the temperature of the surroundings water.

The amount of energy produce / gms of protein, CHOs, fats by Bomb calorimeter are.

1 gram of carbohydrate yields 4.1 kcal

1 gram of protein yields 5.65 kcal

1 gram of fat yields 9.4 kcal

From food composition table: usually the food content of CHO, protein, fat are equal to 100 gm of food.

Example 1

2 eggs = 100 gm contains, 13% protein, 12 % fat , 1% CHO , Calculate total energy.

13 % protein 13 × 4 = 52 kcal

12 % fats 12 × 9 = 108 kcal

1 % CHO 1 × 4 = 4 kcal

Total =164 kcal joule = 164 × 4.2 = 688.8 joule

Example 2: 125 gm s of bread contains 8 % proteins, 2 % fats, 58 % CHO. Calculate the total energy in kcal ?

Basal Metabolic Rate (BMR): The rate at which energy is needed for body maintenance; also referred to as Resting Energy Expenditure (REE); and also referred to Basal Energy Requirement

Basal metabolism is the energy necessary to carry on all **involuntary** vital processes while the body is at rest. These processes are:

1. Respiration

2. Circulation

3. Regulation of body temperature

4. Activity of heart

5. Cell activity and maintenance

6. Reabsorption in the kidney

7. Conduction of nerve impulses

8. Contraction of muscle

Measurement of Basal metabolism

1. Direct Calorimetry: by measuring the heat dissipated under basal metabolism

2. Indirect Calorimetry: Food (organic compounds) needs O_2 to burn and release CO2

Respiratory quotient (RQ) = is the ratio of volume of CO2 eliminated to the volume of O2 utilized

RQ for CHO = 1

RQ for fat = 0.7

RQ for protein = 0.8

RQ for mixed diet = 0.85

Clinical condition:

1. RQ increase in acidosis and fever
2. RQ decrease in uncontrolled diabetes mellitus, starvation

Significance of RQ: denoted the type of food burning in the body.

Calculation of BMR:

1. **BMR for male =** Kg of body weight × 1 Kcal × 1 hr

   Kg × 1 × 24 (for 1 day)

2. BMR for female = Kg of body weight × 0.9 K cal × 1hr

Kg × 0.9 × 24 (for 1 day)

Factors Affecting BMR:

1. Lean body mass: (which is the content of the body minus fat or percentage of muscle tissue). Because metabolic activity is more in muscle tissue than in fat or bone tissue, so muscle tissue requires more calories than doe's fat or bone tissue.

2. Body size: People with large body frames require more calories than do people with small frames

3. Sex: Men usually require more energy than women. They tend to be larger and to have more lean body mass than women do.

4. Age: Children require more calories per Kg of body weight than adults because they are growing.

5. As people age, the lean body mass declines, and the basal metabolic rate declines accordingly.

6. Heredity is also a determining factor. One's BMR may resemble one's parents.

7. Physical condition also affects the BMR.

8. Climate: in colder climate BMR is higher, while in tropical climate BMR is low. In stress, anxiety, disease states, infections, fever, burns and cancer, **increase BMR.**

9. Drugs: smoking (nicotine), coffee (caffeine), tea (theophylline) **increase BMR**, whereas B-blockers decrease energy expenditure.

Condition to measure BMR:

1. at complete physical and mental rest.

2. Relaxed but not sleep.

3. At least 12 hrs after last meal.

4. In comfortable temperature and environment.

Specific Dynamic Action of Food SDA:

Also known as **Thermic Effect of Food (TEF)** or **Dietary Induced Thermogenesis (DIT)**, is the amount of energy expenditure above the basal metabolic rate due to the cost of processing **food** for use and storage.

1. Protein: 20 – 30 %

2. Fat: 2.5 – 4 %

3. CHO: 4 – 6

SDA = 10 / 100 × B.M

Physical activity:

Type of activity	% of calorie from B.M
Bed rest	10 /100 × B.M
Sedentary	30 / 100 × B.M
Light	50 / 100 × B.M
Moderate	75 / 100 × B.M
Super	100 / 100 × B.M

Other factors :

1. Pregnancy ⟶ 350 Kcal / day (especially in 3rd trimester)

2. Lactating ⟶ 550 Kcal / day

During sleep: 10 / 100 × kg body weight × hrs sleep

Ex: Calculate the total energy for a **pregnant women** weighing 60 kg and her physical activity is moderate.

1-BMR / day = 0.9 × weight 60 × hrs 24 = 1296 kcal

2-SDA = 10 / 100 × 1296 = 129.6 kcal

3-Physical activity = 75 / 100 × 1296 = 972 kcal

4-Total energy for pregnant = 1296 + 129.6 +972 +350 = 2747.6 kcal

Ex: Calculate the total energy / day in joule for lactating women weighing 50 kg and her physical activity Moderate. If you know that she sleep 10 hours / day.

Minerals

LECTURE.7

DR. BURHAN HADI

Mineral

- Essential inorganic (non-carbon-containing) nutrients, required in small amounts.
- Found in water and in natural foods
- Required for growth, maintenance, reproduction and lactation.

- **The Macro minerals:**

daily requirement is more than 100 mg.

- **Calcium (Ca).**
- **Phosphorous P**
- **Potassium K**
- **Sulfur S**
- **Sodium Na**
- **Chlorine Cl**
- **Magnesium Mg**

Calcium (Ca)

- Major component of bones and teeth and essential in blood coagulation, nerve and muscle function.
- **Vitamin D** helps the intestines absorb **calcium**.
- Deficiency: Children: impaired growth
  Adults: osteoporosis.
- Sources: milk, yogurt, spinach.

Sodium(Na).

- Normal 135-145 mEq/L
- A deficiency of sodium (**Hyponatremia):**

- Anorexia
- Confusion,
- Muscle weakness
- **SEIZURES**
- Hypotension

- **An excess of sodium called (Hypernatremia) causes:**

Edema

Hypertension

Red, flushed skin

Decreased urine output

Phosphorus (P)

- Together with calcium, is necessary for the formation of
  1. Strong, rigid bones and teeth.
  2. Important in the metabolism of carbohydrates, fats, and proteins.
  3. Like calcium, phosphorus is stored in bones, and its absorption is increased in the presence of vitamin D.
- **Deficiency signs:** lack of appetite, fatigue.
- Excessive use of antacids can cause deficiency.
- **Sources:** **best sources** are protein-rich foods such as milk, cheese, meats, poultry, and fish .

Potassium (K)

- Potassium is an electrolyte found primarily in **intracellular** fluid.
- Like sodium, it is essential for fluid balance.
- **Potassium** maintains the fluid level **within** the cell, and **sodium** maintains the fluid level **outside** the cell.
- Potassium is also necessary for transmission of nerve impulses and for muscle contractions.
- Normal 3.5-5.5 mEq/L

Deficiency or Excess.

- **Hypokalemia**: caused by diarrhea, vomiting, diabetic acidosis, severe malnutrition, or excessive use of laxatives or diuretics.

Symptoms of deficiency: **Hypokalemia**

- **Cardiac disturbances**
- **Muscle weakness**
- **Leg cramps**

↓ **Bowel sounds**

- **Hyperkalemia** (**high blood levels of potassium**) can be caused by: Excessive intake.

Magnesium (Mg)

- It is essential for metabolism and regulates nerve and muscle function, including the heart. Plays a role in the blood-clotting process.
- Deficiency signs: Nausea and, muscular disorders
- Sources: Milk is also a good source.
- **2 cups of fat-free milk provide about 60 mg of magnesium**

.

The Microminerals: Daily requirement is less than 100 mg.

Iron (Fe)

Iodine (I)

Zinc (Zn)

Selenium (Se)

Iron (Fe):

- **The principal role of iron is:**

  1. To deliver oxygen to body tissues.

  2. It is a component of hemoglobin, the coloring matter of red blood cells (erythrocytes).

  3. Hemoglobin allows red blood cells to combine with oxygen in the lungs and carry it to body tissues.

- Deficiency signs: Impaired immune function, lethargy, fatigue, itchy skin, pale nail beds and eye membranes, impaired wound healing,

Sources: Beef liver, red meats, fish, poultry.

Iodine

- **Found in:** seafood , cow's milk
- **Deficiency.** When the thyroid gland lacks sufficient iodine, the manufacture of thyroxine T4 and Triiodothyronine T3. In its attempt to take up more iodine, the gland grows, forming a goiter.
- The children of mothers lacking sufficient iodine may suffer from **Cretinism** (retarded physical and mental development)

Zinc (Zn)

1. Zinc is a cofactor for more than 300 enzymes.

2. It affects many body tissues, essential for growth, wound healing, taste acuity.

Sources: The best sources of zinc are **protein foods**, especially meat, fish, eggs, dairy products.

Requirements: adult males is 11 mg, and in adult females, it is 8 mg.

Selenium (Se)

Selenium is a essential of most body tissues, help to make DNA and protect against cell damage and infection.

Sources: seafood, kidney, liver, and muscle meats.

Requirements: for an adult male and female is 70 g.

Thank you