

# BASICS OF NUTRITION



**Centurion**  
**UNIVERSITY**

*Shaping Lives...*  
*Empowering Communities...*

**Suman Kumar Meikap**  
**Assistant Professor (Pharmacology)**  
**CUTM, Bhubaneswar**

## What is Nutrition?

- *Nutrition: the study of food, including*
  - *How food nourishes our bodies*
  - *How food influences our health*
  
- *Nutrition is a relatively new discipline of science.*

## *Why is Nutrition Important?*

- *Nutrition contributes to wellness.*
- *Wellness: the absence of disease*
  - *Physical, emotional, and spiritual health*
- *Critical components of wellness:*
  - *Nutrition*
  - *Physical activity*

# Why is Nutrition Important?

- *Nutrition can prevent disease.*
  - *Nutrient deficiency diseases*
    - *Scurvy*
      - *Vitamin C deficiency which causes general weakness, anemia, gum disease, and skin hemorrhages.*
    - *Goiter*
      - *Iodine deficiency which causes an enlargement of the thyroid gland*
    - *Rickets*
      - *Deficiencies of vitamin D, calcium, or phosphate which leads to softening & weakening of the bones*
  - *Diseases influenced by nutrition: chronic diseases such as heart disease*
  - *Diseases in which nutrition plays a role: osteoarthritis, osteoporosis*

## Why is Nutrition Important?

- *Nutrition can prevent disease.*
  - *Diseases influenced by nutrition:  
chronic diseases such as heart disease*
  - *Diseases in which nutrition plays a role*
    - *Osteoporosis*
      - *Weakening of the bones*
      - *Can be caused by long-term deficiencies of  
calcium, magnesium and vitamin D*

## *Why is Nutrition Important?*

- *Nutrition is so important it has become a national goal.*
- *Goals of Healthy People 2010*
  1. *Increase quality and years of healthy life*
  2. *Eliminate health disparities*

# What Are Nutrients?

- **Nutrients**

- *The chemicals in foods that are critical to human growth and function.*

- **Essential Nutrients** *are critical to the body for the body to function properly:*

- carbohydrates*

- fats and oils*

- proteins*

- vitamins*

- minerals*

- water*



## Energy From Nutrients

- We measure energy in kilocalories (kcal).
- *Kilocalorie*: amount of energy required to raise the temperature of 1g of water by 1°C.
- On food labels **“calorie”** actually refers to kilocalories.



# Essential Nutrients

- Carbohydrates
- Vitamins
- Fats and oils
- Minerals
- Proteins
- Water

# Carbohydrate

- Primary source of readily usable fuel for the body, especially for the brain.
  - ✓ Known as starches or sugars
  - ✓ Cheap
  - ✓ Plant-based
    - ✓ Grains (wheat, rice), vegetables, fruits & legumes
  - ✓ Easily digested
  - ✓ Grow in most climates
  - ✓ Store well with refrigeration
  - ✓ Provide 4 kcal per gram.

## Fats and Oils

- Composed of **lipids**, molecules that are insoluble in water
  - ✓ Most concentrated form of energy but more expensive than carbohydrates
  - ✓ Main sources (provide flavor to food)
    - ✓ Butter, margarine, vegetable and other oils, creams, fatty meats, cheeses and egg yolk
  - ✓ Maintain body temp (insulation) & cushion organs & bones
  - ✓ Aid in the absorption of fat-soluble vitamins

## Fats and Oils, continued

- ✓ **Saturated fats**

- ✓ *Soild at room temperature*

- ✓ *Meat, cheese, eggs, whole milk, cream, butter*

- ✓ **Polyunsaturated fats**

- ✓ *Soft or oily at room temperature*

- ✓ *Vegetable oils, margarine & products made from these or fish & peanuts*

- ✓ *Provide 7 kcal per gram.*

# Fats and Oils

## ◦ Cholesterol

- ✓ Lipid used in the production of hormones, vitamin D and bile acids
- ✓ Common sources
  - ✓ Egg yolk, fatty meats, shellfish, butter, cream, cheese, whole milk and organ meats
- ✓ Two types
  - ✓ HDL ("Good" cholesterol)
    - ✓ Tends to transport cholesterol back to liver & prevents accumulation on blood vessels – "plaque" = BLOCKAGE
  - ✓ LDL ("Bad" cholesterol)
    - ✓ Tends to contribute to plaque buildup in blood vessels leading to atherosclerosis

# Proteins

- Basic components of all body cells
  - ✓ Essential for building & repairing tissue
  - ✓ Regulates body functions
  - ✓ Provides energy & heat
  - ✓ Made of 22 building blocks knowns as **amino acids**.
    - ✓ 9 are essential to life = complete proteins
      - ✓ Animal foods: meat, fish, milk, cheese and eggs
    - ✓ Incomplete proteins
      - ✓ Vegetable foods: cereals, soybeans, dry beans, peas, corn & nuts
    - ✓ Proteins can supply 4 kcal of energy per gram, but are not a primary energy source.
    - ✓ Proteins are an important source of nitrogen



# Vitamins

- Organic compounds that are essential to life
  - ✓ Metabolism
  - ✓ Tissue building
  - ✓ Regulation of body processes
    - ✓ Allow the body to use the energy provided by carbs, fats & proteins
  - ✓ Excess or deficits can cause decreased health
  - ✓ Two types
    - ✓ Fat-soluble vitamins
    - ✓ Water-soluble vitamins



# Vitamins

- **Fat-soluble vitamins**

- ✓ *Vitamins A, D, E and K*
- ✓ *Dissolve easily in fats and oils*
- ✓ *Can be stored in the body*
- ✓ *Not easily destroyed by cooking, air or light*

# Vitamins

## ◦ **Water-soluble vitamins**

- ✓ *Vitamin C, the B vitamins & folic acid*
- ✓ *Remain dissolved in water*
- ✓ *Excess are eliminated by the kidneys*
- ✓ *Cannot be stored in our bodies*
- ✓ *Easily destroyed by cooking, air or light*

## Minerals

- *Inorganic substances found in all body tissues*
  - ✓ *Regulate body fluids*
  - ✓ *Assist in body functions*
  - ✓ *Contribute to growth*
  - ✓ *Aid in building tissues*
  - ✓ *Examples include sodium, calcium, iron, potassium, and magnesium*

## Minerals

- Our bodies require at least 100 mg per day of the *major minerals* such as calcium, phosphorus, magnesium, sodium, potassium, and chloride.
- We require less than 100 mg per day of the *trace minerals* such as iron, zinc, copper, iodine, and fluoride.

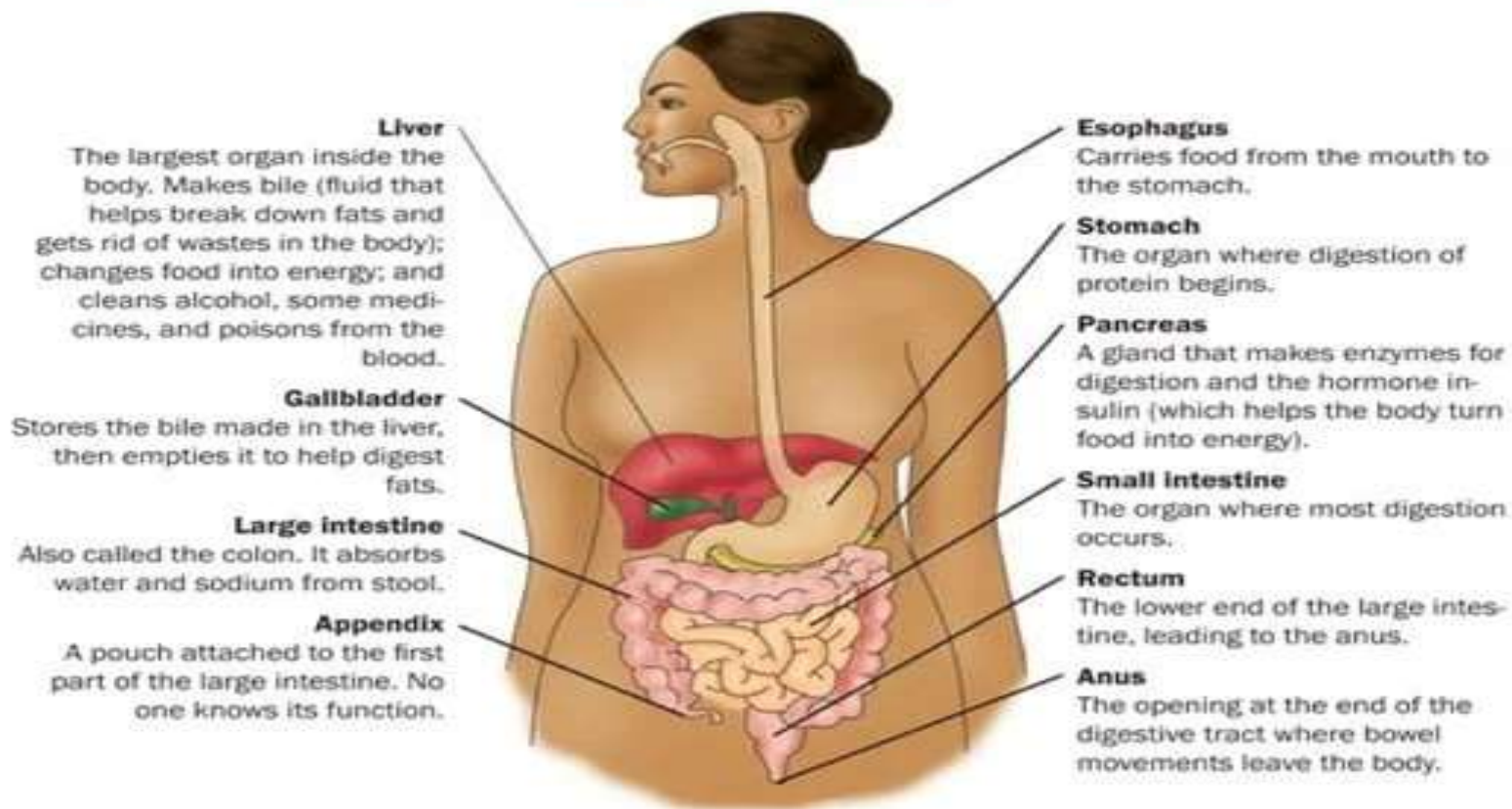
# Water

- Found in all body tissues
  - ✓ Critical nutrient for health and survival
  - ✓ Involved in many body processes
    - ✓ Fluid balance, nutrient transport, nerve impulses, removal of wastes, muscle contractions, chemical reactions, many, many more...
  - ✓ Dietary guidelines state that thirst should be the main indicator or how much water to drink
  - ✓ Average = 6 to 8 eight ounce glasses of water per day
  - ✓ 1500 cc needed daily for survival

## Utilization of Nutrients

- *The body prepares the nutrients for use through the following processes:*
  - *Digestion*
  - *Absorption*
  - *Metabolism*

## Digestive System





# Digestion

- The process in which the body breaks down food into smaller parts
  - Mechanical
    - Food is broken down by the teeth
    - Moved through the system using **peristalsis**
  - Chemical
    - Food mixed with digestive juices secreted by
      - Mouth
      - Stomach
      - Small intestine
      - Pancreas
    - Juices contain enzymes designed to break down the food chemically so nutrients can be absorbed by the blood

# Absorption

- *The process in which blood or lymph capillaries pick up the digested materials*
  - *Most absorption happens in the small intestine*
    - *Exception is water, salts & some vitamins (large intestine)*
- *Carries nutrients through the circulatory system to every cell in the body*

# Metabolism

- *The process in which nutrients are used*
  - *To build tissue*
  - *To provide energy*
    - *Voluntary*
      - *Swimming, housekeeping*
    - *Involuntary*
      - *Breathing, circulation, digestion*
  - *To regulate various body functions*
- **Basal Metabolic Rate (BMR)**
  - *The rate at which the body uses energy just to maintain its own tissue (involuntary)*

# Maintenance of Good Nutrition

- *Accomplished by eating a balanced diet*
  - *All required nutrients are included in correct amounts*
- *Simplest Guide*
  - *US Dept of Agriculture (USDA) Food Guide*
  - *5 major food groups*
    - *Fruits*
    - *Vegetables*
    - *Grains*
    - *Proteins*
    - *Dairy*

# Basic Nutritional Principles

- *Balance calories to manage weight*
  - *Calorie intake in relationship to level of physical activity during each life stage*
- *Reduce certain foods & food components*
  - *Sodium intake to less than 2300mg daily*
  - *Consume <10% of calories from saturated fats*
  - *Limit foods that contain refined grains*
  - *Reduce calories from solid fats & sugars*
  - *If consumed, alcohol should be used in moderation*



# Basic Nutritional Principles

- Increase certain foods & nutrients
  - Increase fruit & vegetable intake
    - Focus on dark green & orange vegetables, beans & peas
    - One-half grains as whole grains
    - Increase intake of fat-free or low-fat milk/milk products
    - Choose a variety of proteins, including seafood, lean meat, poultry, eggs, beans and unsalted nuts & seeds
    - Use oils to replace solid fats
    - Choose foods higher in potassium, fiber, calcium, vit D
- Build healthy eating patterns
  - Eat in a way that meets nutritional needs & appropriate calories

# Basic Nutritional Principles

- Learn to read food labels
  - Determine serving size
  - Determine servings per container
  - Evaluate number of calories per serving
  - Calculate fat
- Determine **Recommended Dietary Allowances (RDA)**
  - The average daily intake level required to meet the needs of 97 – 98% of people for a specific nutrient



## Body Mass Index (BMI)

- A calculation that measures weight in relation to height and correlates this with body fat
  - Ideal range is 18.5 – 24.9
  - $<18.5$  = underweight
  - 25 – 29.9 overweight
  - $>30$  obese

# BMI CHART



## HEIGHT

in	cm	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
5' 0"	152.4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
5' 1"	154.9	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	36	37	38	39	40
5' 2"	157.4	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	33	34	35	36	37	38	39
5' 3"	160.0	17	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	32	32	33	34	35	36	37	38
5' 4"	162.5	17	18	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	31	32	33	34	35	36	37
5' 5"	165.1	16	17	18	19	20	20	21	22	23	24	25	25	26	27	28	29	30	30	31	32	33	34	35	35
5' 6"	167.6	16	17	17	18	19	20	21	21	22	23	24	25	25	26	27	28	29	29	30	31	32	33	34	34
5' 7"	170.1	15	16	17	18	18	19	20	21	22	22	23	24	25	25	26	27	28	29	29	30	31	32	33	33
5' 8"	172.7	15	16	16	17	18	19	19	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	32	32
5' 9"	175.2	14	15	16	17	17	18	19	20	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	31
5' 10"	177.8	14	15	15	16	17	18	18	19	20	20	21	22	23	23	24	25	25	26	27	28	28	29	30	30
5' 11"	180.3	14	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25	26	27	28	28	29	30
6' 0"	182.8	13	14	14	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29
6' 1"	185.4	13	13	14	15	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28
6' 2"	187.9	12	13	14	14	15	16	16	17	18	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27
6' 3"	190.5	12	13	13	14	15	15	16	16	17	18	18	19	20	20	21	21	22	23	23	24	25	25	26	26
6' 4"	193.0	12	12	13	14	14	15	15	16	17	17	18	18	19	20	20	21	22	22	23	23	24	25	25	26

## WEIGHT

kgs	45.5	47.7	50.0	52.3	54.5	56.8	59.1	61.4	63.6	65.9	68.2	70.5	72.7	75.0	77.3	79.5	81.8	84.1	86.4	88.6	90.9	93.2	95.5	97.7
lbs	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215

**THANK YOU**