Tishk International University
Faculty of Applied Science
Department of Nutrition & Dietetics

Nutritional Biochemistry I/ NUT 207

TOPIC: Role of Nutrients and Malnutrition (Week2)

2nd Grade- Fall Semester 2025-2026

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Learning objectives

- Types of nutrients
- Malnutrition
- Role of nutrition
- Energy expenditure
- Dietary guidelines
- Daily calorie requirements
- Pharmacological effects of Nutrients

Nutrient

- Substance that an organism must obtain from it's surroundings for growth and the sustenance of life.

Essential

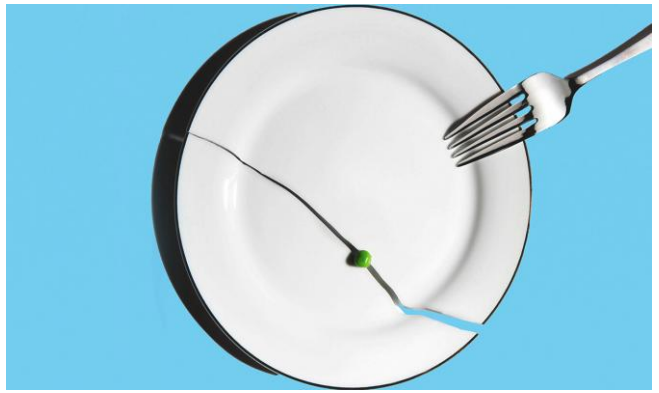
Non-essential

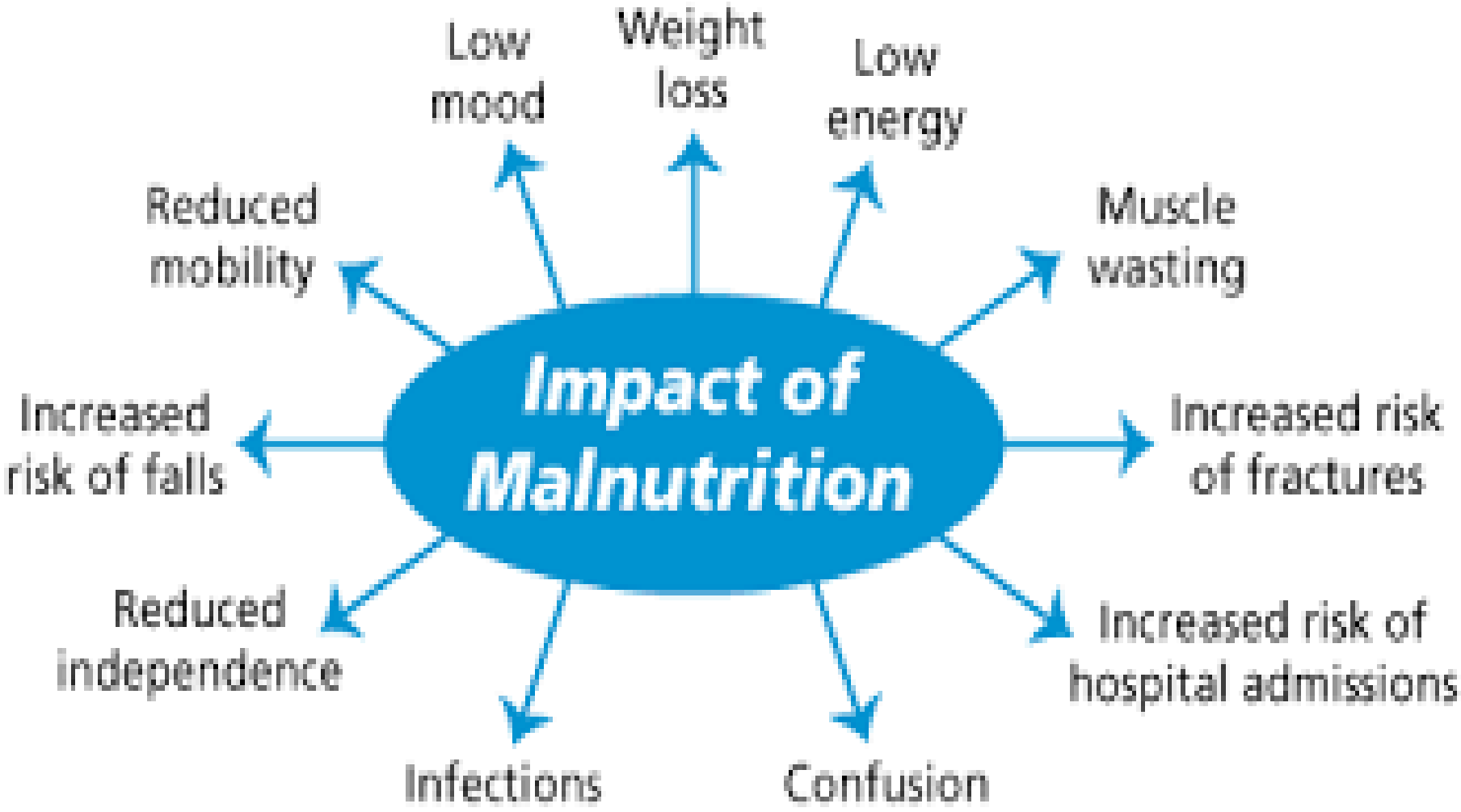
- ***Essential nutrients*** *cannot* be synthesized within the cell and must be present in the food.

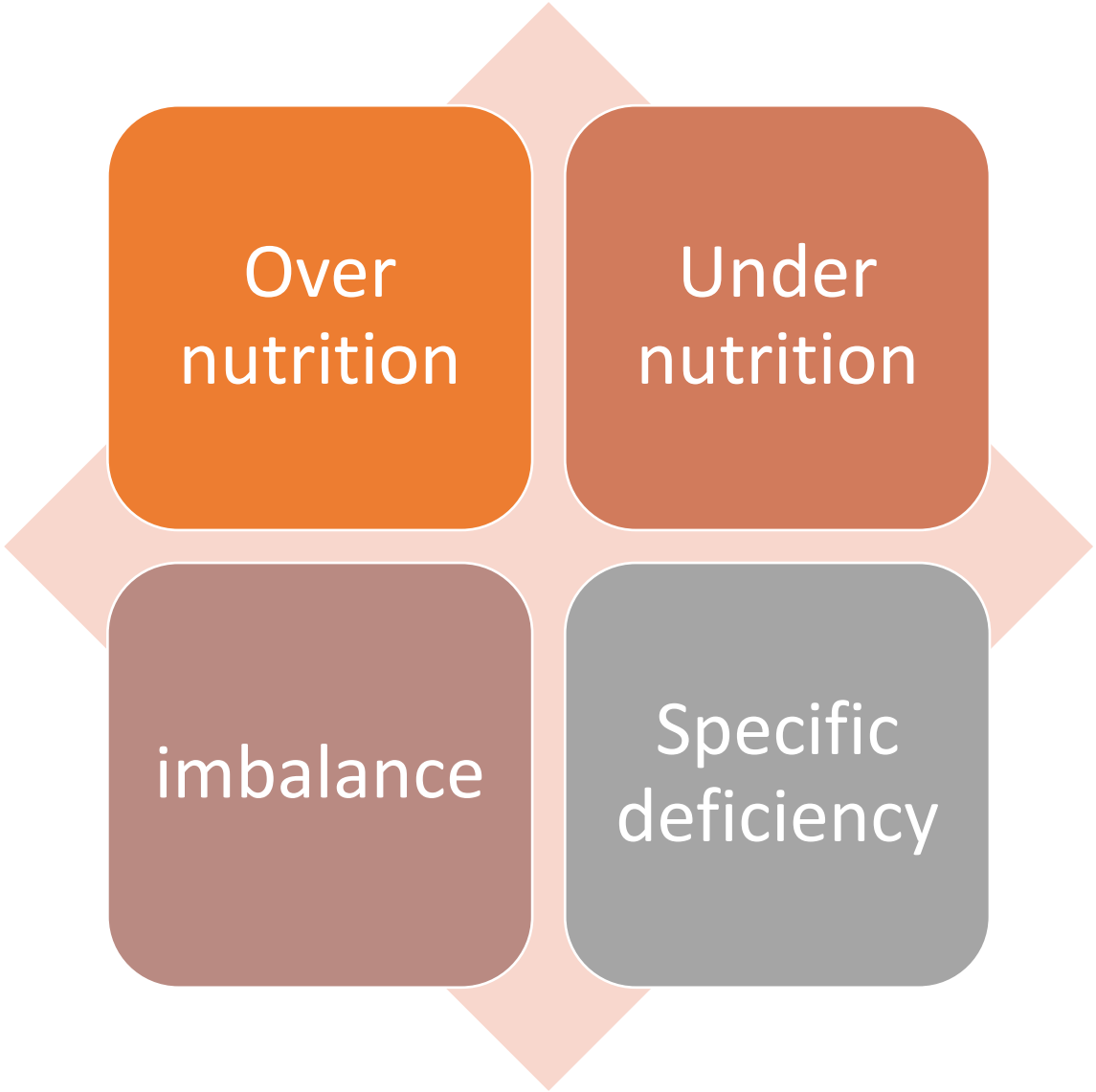
- ***Non-essential nutrients*** are those that *can* be synthesized by the cell (if they are absent from the food).

Malnutrition

A pathological state resulting from a relative or absolute *deficiency* or *excess* of one or more essential nutrients.




Impact of Malnutrition
Low mood
Weight loss
Low energy
Reduced mobility
Muscle wasting
Increased risk of falls
Increased risk of fractures
Reduced independence
Increased risk of hospital admissions
Infections
Confusion


Over nutrition
Under nutrition
imbalance
Specific deficiency

Over nutrition

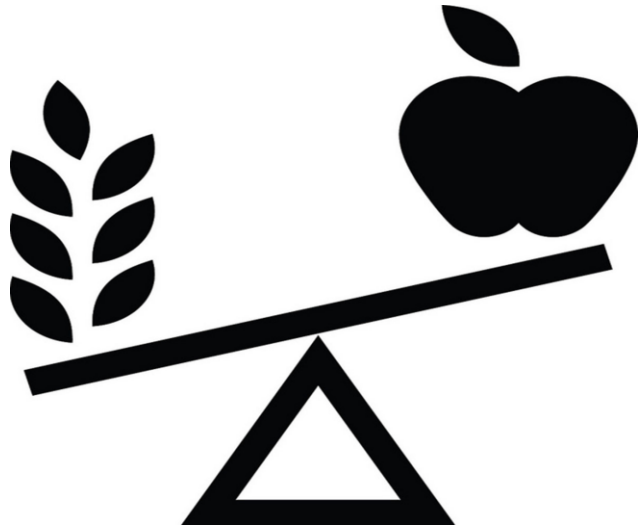
- Pathological state resulting from the consumption of excessive quantity of food over an extended period of time.
- E.g. Obesity, atheroma and diabetes.

Under nutrition

- A condition which results when insufficient food is eaten over an extended period of time.
- In extreme cases it's called starvation.

Imbalance

- Pathological state resulting from a disproportion among essential nutrients without the absolute deficiency of any nutrients.



Specific deficiency

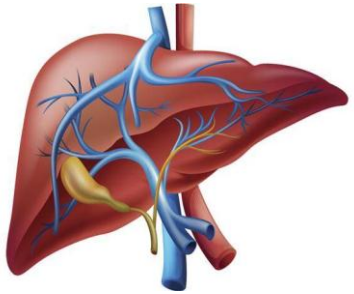
- A pathological state resulting from a relative or absolute lack of an individual nutrient.

Role of nutrition

Nutrition is required for the following purposes:

1. Growth and development
2. Release of energy
3. Formation of organic substance
4. Regulating metabolic processes
5. Giving resistance to infection

Energy expenditure



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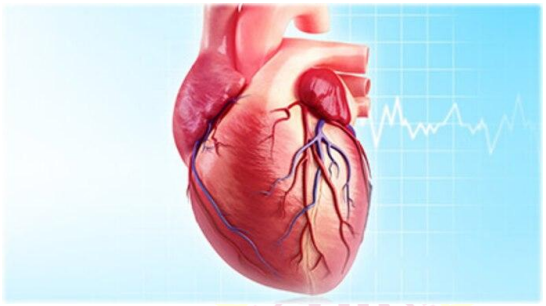

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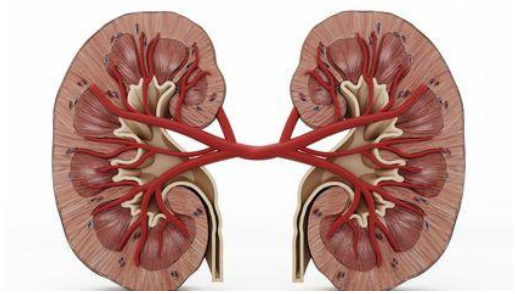

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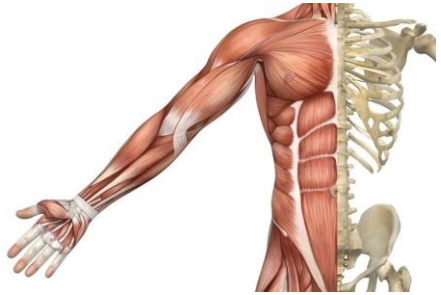

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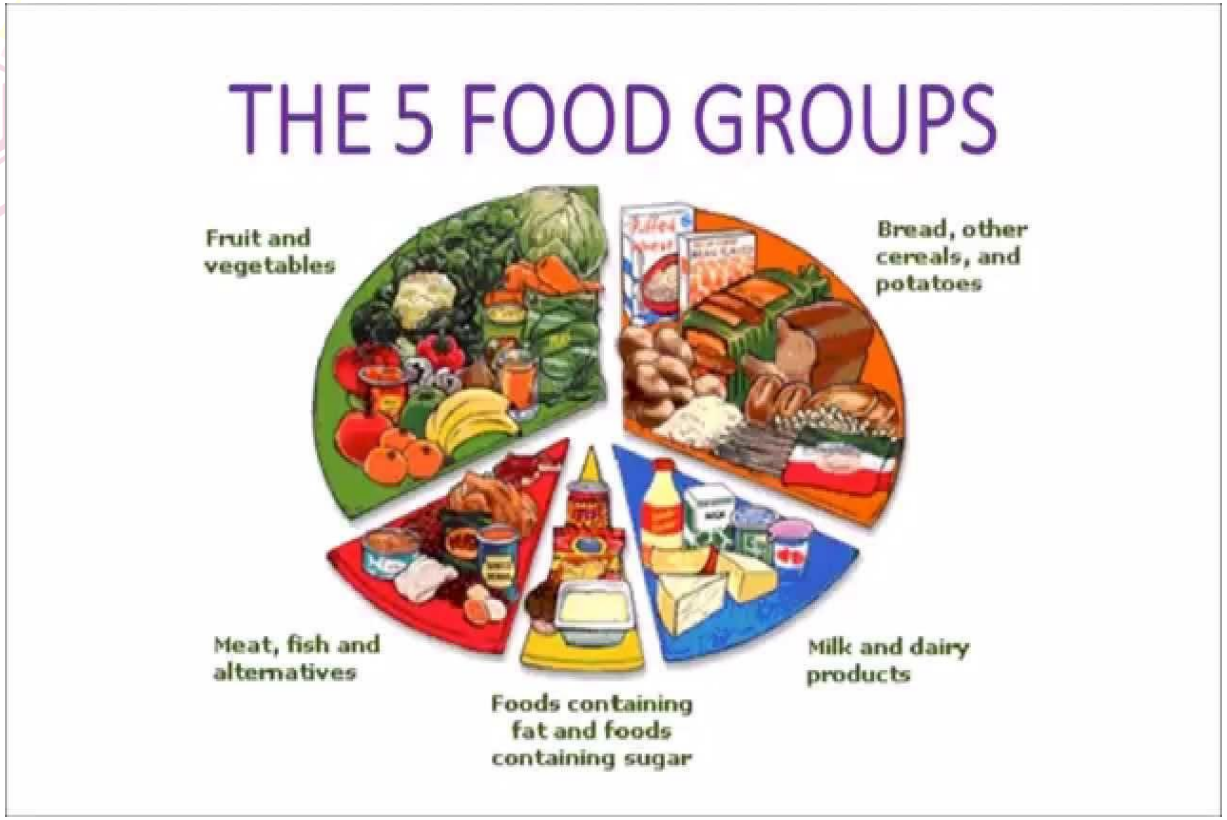
Other organs
19 %

Dietary Guidelines

- Eat a wide variety of foods.
- Maintain healthy weight.
- Choose a diet low in fat, saturated fat and cholesterol.
- Choose a diet with plenty amount of vegetable, fruits and grain products.
- Moderately use sugar, salt and sodium.

Food Groups

- ✓ Milk , cheese, yoghurt.
- ✓ Meat , poultry, fish and alternates.
- ✓ Fruits and vegetables.
- ✓ Bread and cereals.
- ✓ Fats and sweets.



The energy requirements of individuals depend on:

- Physical activities.
- Body size and composition.
- Age may affect requirements.
- Climate

Daily calorie requirements of individuals:

- Infants 1-3 years need 1,000 cal/day.
- Children 5y. need 1,500 cal/day.
- Children 5-8 y. need 1,800 cal/day.
- Children 10-12y. need 2,000 cal/day.
- For adolescents and adult's calorie requirements depend on the degree of physical activities.

- From 13-20 of age;

  Office worker — 2,800 cal/day

  Heavy work — 3,500 cal/day

- Adults

  2,300 cal/day — 2,700 cal/day

- Very heavy work — up to 4,000 cal/day

What is a healthy diet

- Fulfills energy needs (macronutrients).
- Provides sufficient amounts of essential nutrients (micronutrients)
- Reduces risk of disease.
- Is safe to consume (low contaminants or potentially harmful added substances).

Some definitions

Requirement: Minimum amount of a nutrient needed to sustain a physiological state, function or structure in an individual.

Recommendation: Normalized estimate of nutrient needed to cover most individuals in a population group.

Guideline: Advice on diet composition to population groups, aimed at maintaining health and preventing diseases.

Essential Nutrients

- Chemical substances found in food.
- Necessary for life, growth and tissue repair.
- Cannot be synthesized.

Recommended Dietary Allowance RDA

- Average daily level of intake sufficient to meet the nutrient requirements of nearly all (97% - 98%) healthy people.

- They are mentioned on food labels to provide information about the nutritional quality of the food product.

Pharmacological effects of Nutrients

- Doses for therapeutic effect exceed levels in food.
- Pharmacological action different from physiological function.
- Chemical analogs more effective therapeutically but have no nutrient activity.

https://extension.colostate.edu/docs/pubs/foodnut/09361.pdf

Thermogenic effect

- The thermic effect of food is the energy required for digestion, absorption and disposal of ingested nutrients.
- Its magnitude depends on the consumption of the food consumed.