

Tishk International University
Faculty of Applied Sciences
Nutrition and Dietetics Department
Principles of Food Science



Carbohydrate Structure and Functions in Food



Outlines

Previous Lecture

Introduction to Carbohydrates

Structure of Carbohydrates

Functions of Carbohydrates in Food

Nutritional Perspective

Challenges and Innovations



Learning Outcome

Understand Carbohydrate Structures



Analyze the Functions of Carbohydrates in Food



Evaluate the Nutritional and Industrial Applications



What's Food?

- **Foods:** products derived from **plants or animals** that can be taken into the body to give in energy for the maintenance of life & the growth & repair of tissues.
- **Foods** substance consisting essentially of **protein, carbohydrate, fat, and other nutrients** used in the body of an organism to **sustain growth and vital processes.**

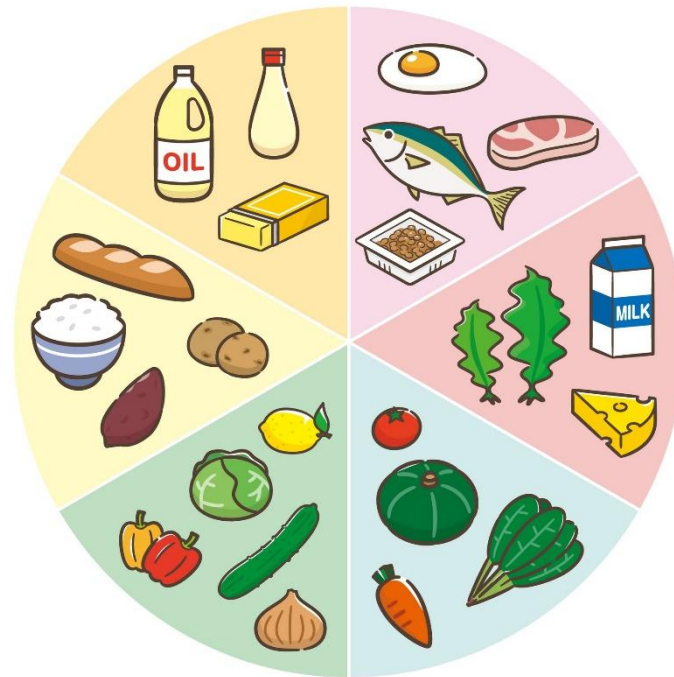


What's Food?

- **Importance of the Food Consumption?**
 - Nutrient Supply
 - Energy Source
 - Physical Health
 - Growth and Development
 - Mental Well-being
 - Emotional Well-being

Essential Nutrients

Essential nutrients are ones that cannot be synthesized by the body and, therefore, must be supplied from foods. These nutrients are essential for **normal body function and for growth.**



SIX ESSENTIAL NUTRIENTS

Carbs



Protein



Fats



Water



Vitamins



Minerals



Macronutrients



Micronutrients

Macronutrients and Micronutrients

	Macronutrients	Micronutrients
Quantity Needed	Required in larger amounts	Required in smaller amounts
Categories	Carbohydrates, Proteins, Fats	Vitamins, Minerals
Primary Function	Provide energy and support functions	Facilitate biochemical processes
Examples	- Carbohydrates: Bread, pasta, fruits	- Vitamins: Vitamin C in fruits
	- Proteins: Meat, beans, dairy products	- Minerals: Calcium in dairy products
	- Fats: Avocado, nuts, olive oil	- Iron in spinach

Calories

- A calorie is a unit of measurement for energy.
- In nutrition, it quantifies the energy released when the body metabolizes food.
- Proteins and carbohydrates provide 4 calories per gram.
- Fats provide 9 calories per gram.



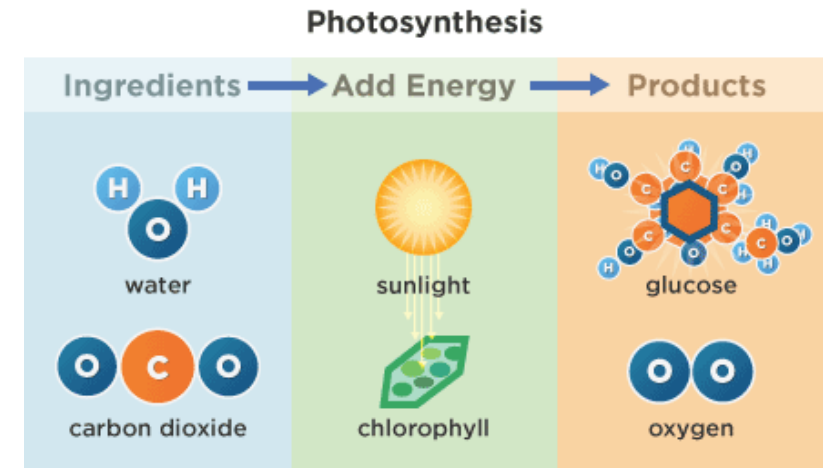
Carbohydrates

The most abundant organic molecules in nature

The empiric formula is $(\text{CH}_2\text{O})_n$, “**hydrates of carbon**”

Carbohydrates are the body's preferred source of energy, providing fuel for **muscles, brain, and other vital organs.**

They come in two main forms: **simple and complex**



Carbohydrates

Simple carbohydrates, also known as sugars such as **glucose**, are quickly absorbed by the body, leading to rapid spikes in blood sugar levels. This can provide a quick burst of energy but can also lead to crashes and cravings later.

Sources of simple carbs include:

Sugary drinks and sweets

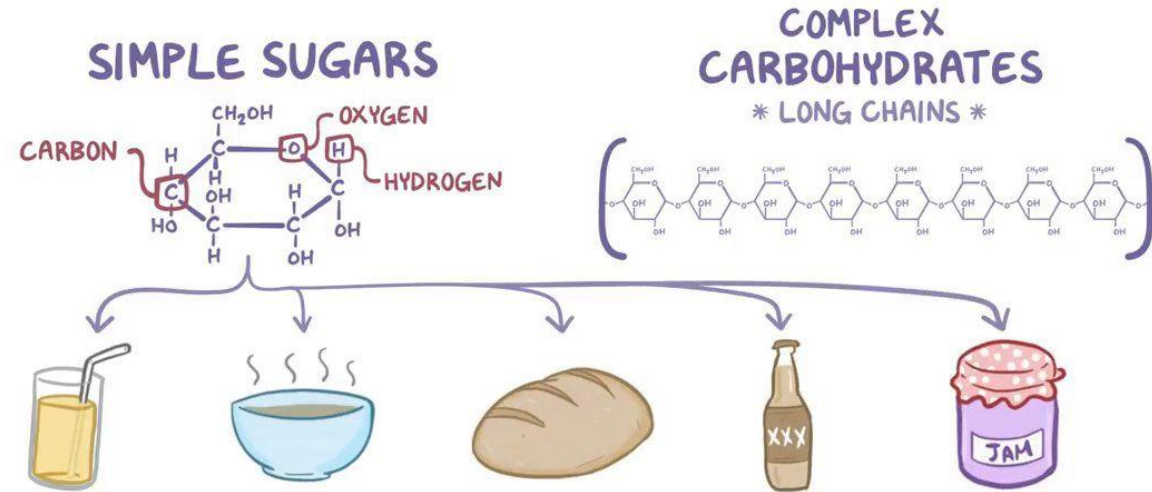
White bread, pasta, and rice

Refined grains and processed foods

Carbohydrates

CARBOHYDRATES

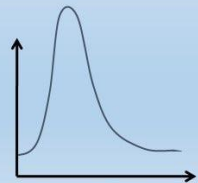
~ PROVIDE CALORIES & ENERGY ~



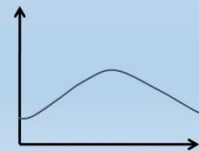
Carbohydrates

Simple/Refined

Complex



Quick spike in blood sugar



Slow, gradual ↑ in blood sugar

