



**Ministry of Higher education and  
Scientific Research  
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**BIOCHEMISTRY**

**Third Stage**

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lecture (8)**

# Overview of Carbohydrates

- **Structure, Classification, and Biological Importance**



# What are Carbohydrates?

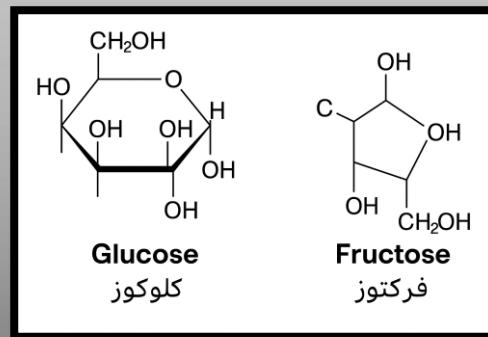
- Carbohydrates are organic compounds made of carbon (C), hydrogen (H), and oxygen (O), usually in a 1:2:1 ratio.
- General Formula:  $C_n(H_2O)_n$

## Functions:

- Primary energy source (glucose)
- Structural components (cellulose, chitin)
- Stored energy (glycogen, starch)
- Part of DNA/RNA (ribose, deoxyribose)

# Classification of Carbohydrates

- **Main Types:**
- 1. Monosaccharides – Simple sugars (glucose, fructose)



- 2. Disaccharides – Two monosaccharides (sucrose, lactose)
- 3. Oligosaccharides – 3–10 units
- 4. Polysaccharides – Many units (starch, cellulose, glycogen)

# Monosaccharides

- **Examples:**
- **Glucose:** main energy source
- **Fructose:** fruit sugar
- **Galactose:** part of lactose
- **Structures:**
- **Aldoses (e.g., glucose)**
- **Ketoses (e.g., fructose)**

# Disaccharides and Glycosidic Bonds

- **Common Disaccharides:**
- **Sucrose** = **Glucose + Fructose**
- **Lactose** = **Glucose + Galactose**
- **Maltose** = **Glucose + Glucose**
- **Glycosidic Bond:** Bond formed between two monosaccharides via dehydration.

# Polysaccharides

- **Types:**
- - **Storage: Starch (plants), Glycogen (animals)**
- - **Structural: Cellulose (plants), Chitin (insects/fungi)**

# Biological Importance of Carbohydrates

- - Main energy source in metabolism
- - Maintain blood glucose level
- - Important in cell recognition and immune response
- - Structural role in plants and exoskeletons

# Summary

- - **Carbohydrates = sugars and starches**
- - **Classified by number of sugar units**
- - **Crucial for energy, structure, and biological processes.**

# The End

# Thank you

أَلَمْ هُوَ إِنْ تَسْمُرْ غَمَ الْأَلْمِ، وَتَنْهَضْ بَعْدَ السُّقُوطِ، وَتَوْمَنْ بِأَنَّ الْغَدِ يَحْمِلُ  
مَا عَجَزَ عَنْهُ الْيَوْمِ ..

”دُعْ أَمْلَكَ لَا يَكُونَ فِي الظُّلَامِ بَلْ فِي النُّجُومِ .“

نِيلْسُونْ مَانْدِيلَ...