Pakistan School
Kingdom of Bahrain

Pakistan School, Kingdom of Bahrain.

Welcome to

Grade 11

Rules of the class

1) Be on time for all your classes.
2) Respect all the participants of the class.
3) Do not create any disturbance.
4) Pay attention to your teacher.
5) Raise hand if you have a question.
6) Enter into the class with your actual name and CPR number.

Chapter 2

Biological Molecules

OBJECTIVES:

At the end of this lesson students will be able to:

- Describe the approximate chemical composition of protoplasm.
- Distinguish carbohydrates, proteins and lipids as four biological molecules
- Describe and draw sketches of dehydration-synthesis and hydrolysis for making and breaking of macromolecules polymers

Biological Molecules in Protoplasm

- 25 / 92 biogenic or bio-elements
- 16 in human body

Based on proportion

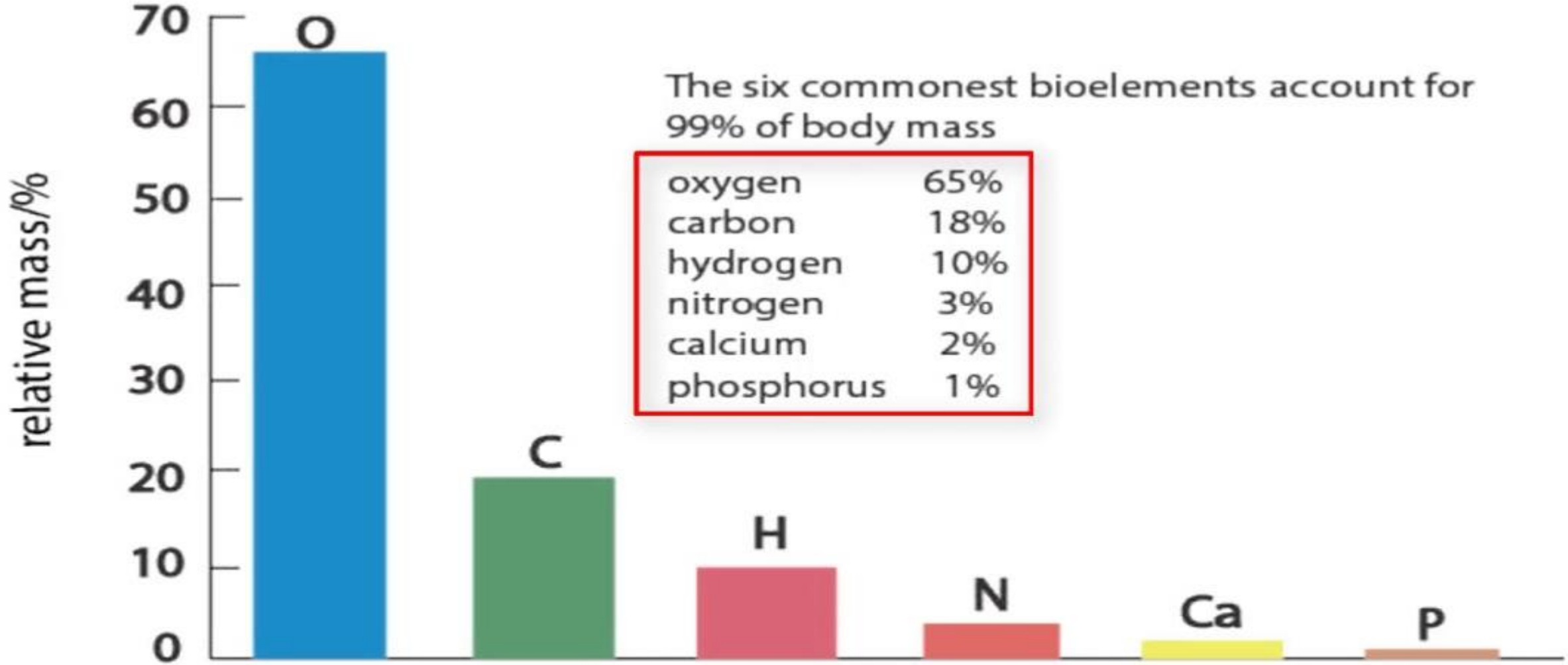
1. **Major elements:** 6 → 99 % of protoplasm
2. **Minor elements**: 5 → 1 % of protoplasm
3. **Trace elements :** **5** → less than 0.01 %

Bio elements combine and make molecules (organic + inorganic)

Based on Molecular weight

1. **Macromolecules:** With larger molecular weight e.g. Carbohydrates, Proteins, Lipids and nucleic acids
2. **Micromolecules:** With small molecular weight

e.g. carbon dioxide , water etc.



Other bioelements include (about 1%) - potassium (0.35%), sulphur (0.25%), chlorine (0.15%), sodium (0.15%), magnesium (0.05%), iron (0.004%), copper (trace), manganese (trace), zinc (trace), iodine (trace).

Fig 1.1 Percentage composition of bioelements by mass of a human being

Condensation and Hydrolysis

POLYMERS:

- Macromolecules of high molecular weight
- Made from repeating units → monomers (micro molecules)

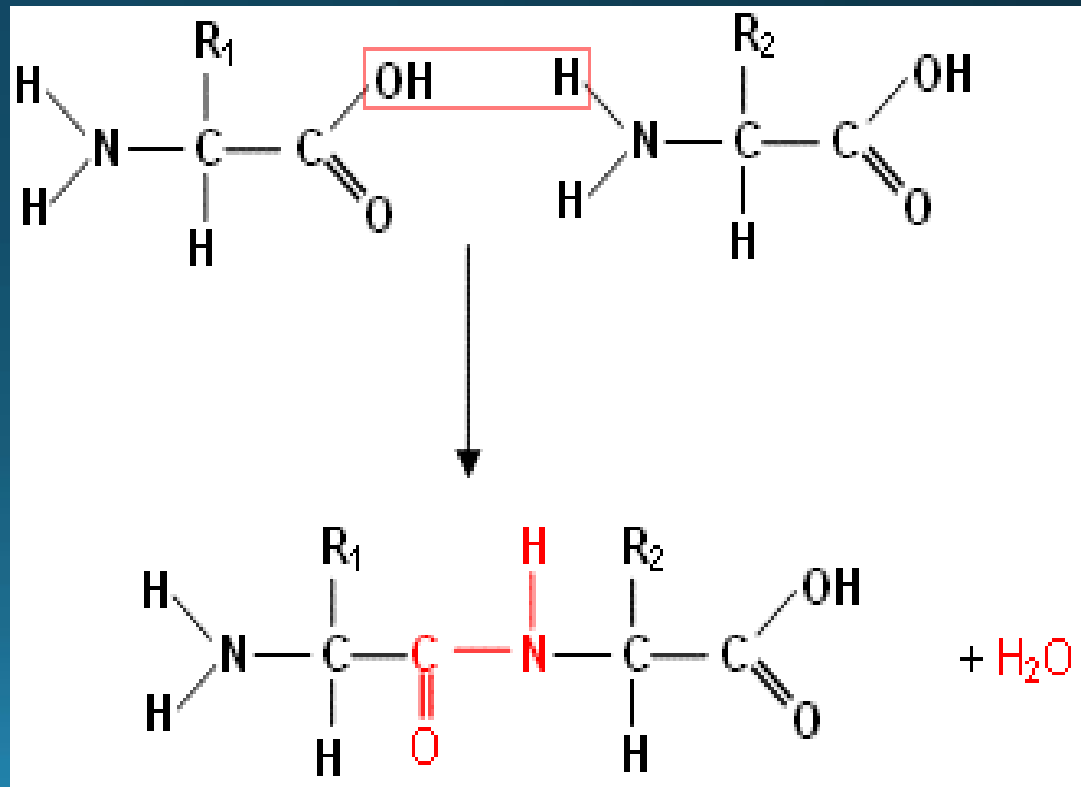
CONDENSATION :

- Two monomers join
- Hydroxyl group (-OH) of one monomer and hydrogen (-H) of the other to make water
- (Dehydration synthesis)
- Two monomers join → Dimer
- Many monomers → Polymers

REQUIREMENT:

a. Proper enzyme

b. Activated monomers

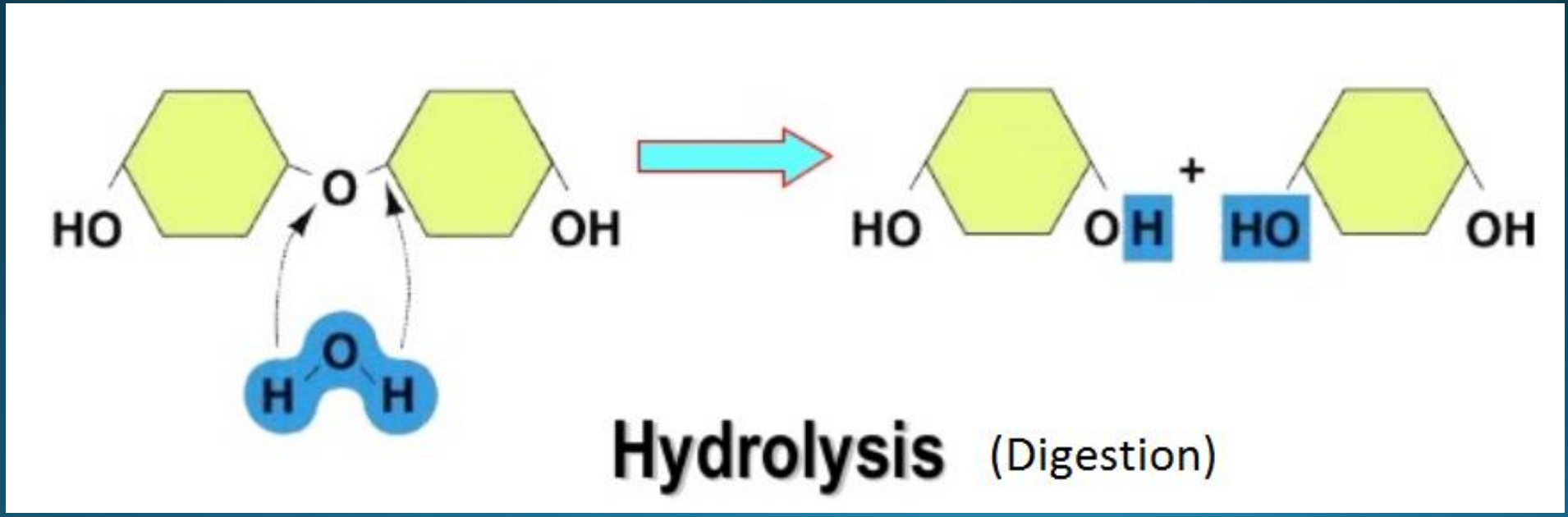


- **HYDROLYSIS:**
- Break down of polymers into monomers by the addition of water
- Hydroxyl group (-OH) of water joins one monomer and hydrogen (-H) is attached to the other.

e.g. All food digestion reactions

REQUIREMENT:

Appropriate enzymes i.e. proteases, carbohydrases, lipases, nucleases



Condensation and Hydrolysis Reactions

Monosaccharides
e.g. Glucose

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Three Fatty Acids &
a Glycerol molecule

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Amino Acids

Condensation

Hydrolysis

Disaccharide
e.g. Maltose

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Triglyceride Molecule

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Dipeptide

... opposites of each other.

PLENARY:

1. Divide the biological molecules in protoplasm based on a) molecular weight b) proportion.
2. Define condensation. What is another name for it ?
3. Explain the process of hydrolysis.


STAY
HOME
STAY SAFE

Allah Hafiz