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

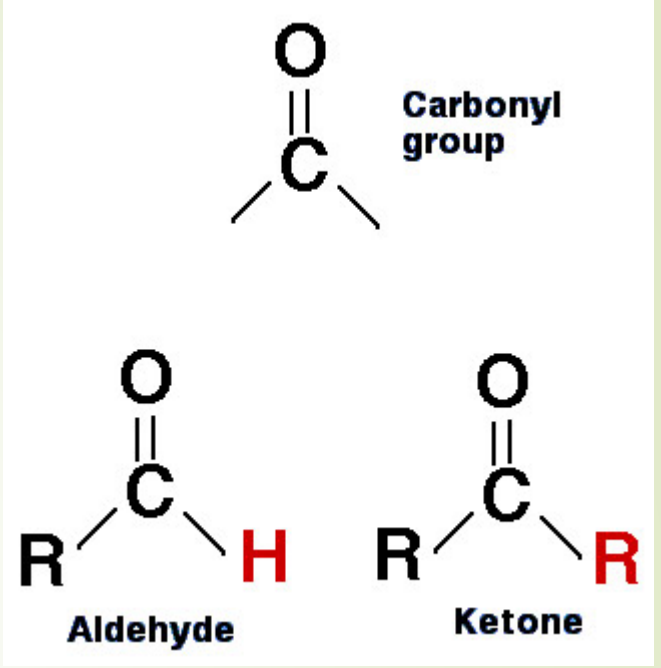
Biological molecules

OBJECTIVES:

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

- Define carbohydrates.
- Classify and compare carbohydrates.
- Explain the chemical structure & stereoisomerism in monosaccharides.

CARBOHYDRATES:



DEFINITION:

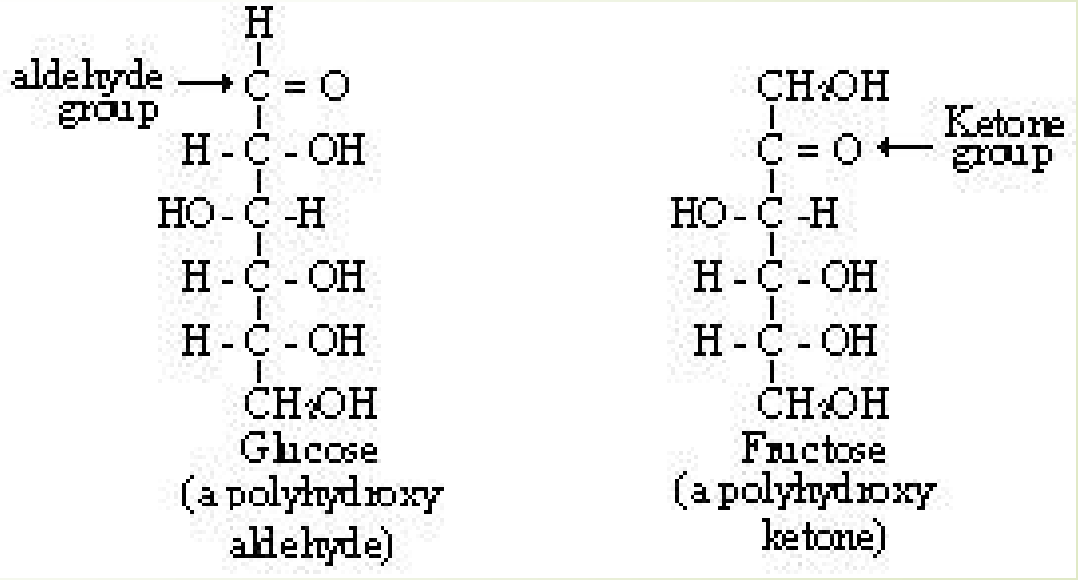
- Organic compounds that are polyhydroxy aldehydes or polyhydroxy ketones, or change to such substances on simple chemical transformations, as hydrolysis, oxidation, or reduction.

ALDEHYDE:

Is the one that has at least one "H" attached to the carbonyl group.

KETONE:

That group of compounds that has 2 carbon groups attached to carbonyl group.



CLASSIFICATION OF CARBOHYDRATES:

- A polyhydroxy aldehyde or polyhydroxy ketone make single unit of saccharides
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- Commonly called sugars.
- Greek word → "sakcharon" → sugar.
- So → saccharides.
- 3- groups:

a. Monosaccharide.(unit)
b. Oligosaccharide.(2-10 units)
c. Polysaccharide.(more than ten units)

Comparison of characteristics of carbohydrates

monosaccharides

- Single Saccharide unit
- Simplest, can not be hydrolyzed
- Highly Soluble in water
- Sweetest of all Carbs

Oligosaccharides

- 2-10 saccharide units
- Complex structure. Can be hydrolyzed into 2-10 monosaccharides
- Slightly soluble in water
- Less sweet

Polysaccharides

- More than 10 monosaccharides
- Highly complex and yield at least 11 monosaccharides
- Insoluble in water
- Tasteless

MONOSACCHARIDE:

- Polyhydroxy aldehydes or polyhydroxy ketones.
- No. of carbon - 3 – 7.
- All carbon atoms (except carbonyl group) have –OH –(polyhydroxy).
- General formula $C_nH_{2n}O_n$ - → n = No. of C atoms.

CLASSIFICATION OF MONOSACCHARIDE:

- BASED UPON:

a. functional group.
b. No. of carbon atoms.

Classification of carbohydrates

a.Based upon functional group:

- Aldoses (contain aldehyde group).
- Ketoses (contain ketone group).

b. based upon No. of carbon atoms.

- Trioses (3c).
- Tetroses (4c).
- Pentoses (5c).
- Hexoses (6c).
- Heptoses (7c).

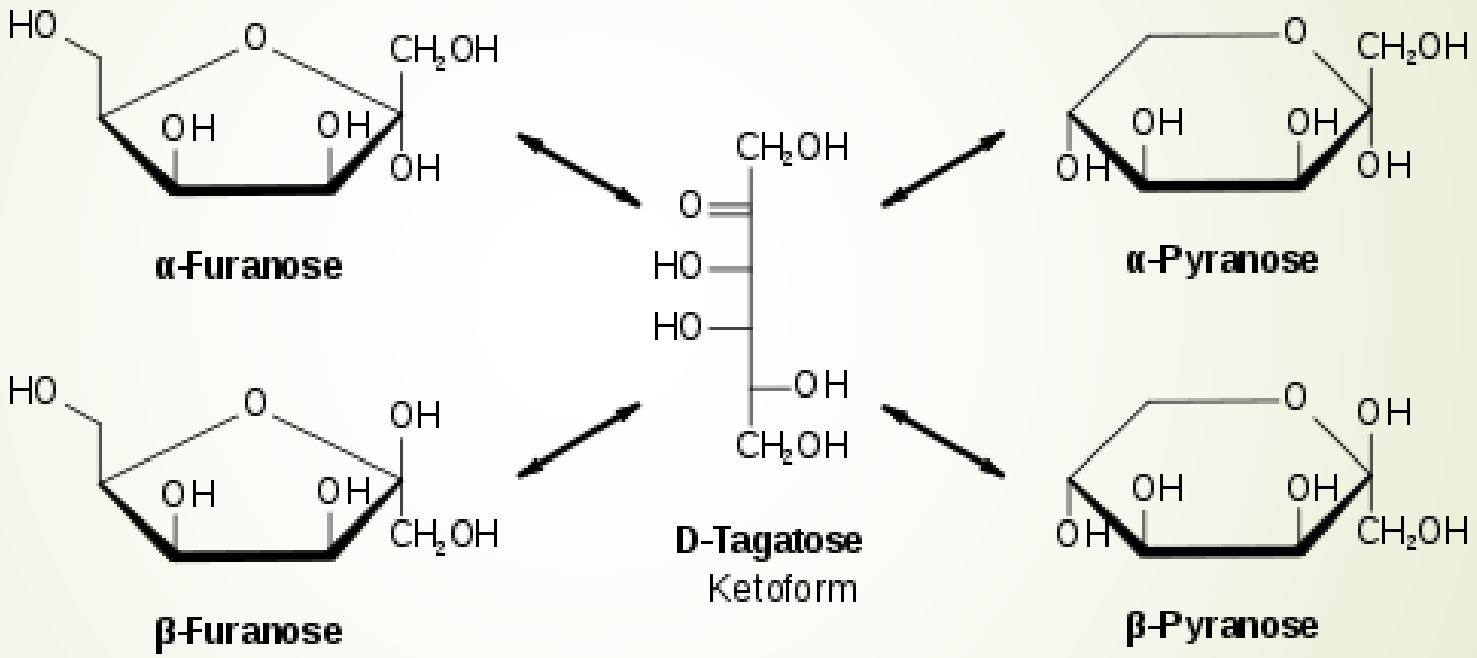
CHEMICAL STRUCTURE OF MONOSACCHARIDE:

- Crystalline form.
- In water → ring chain structure.

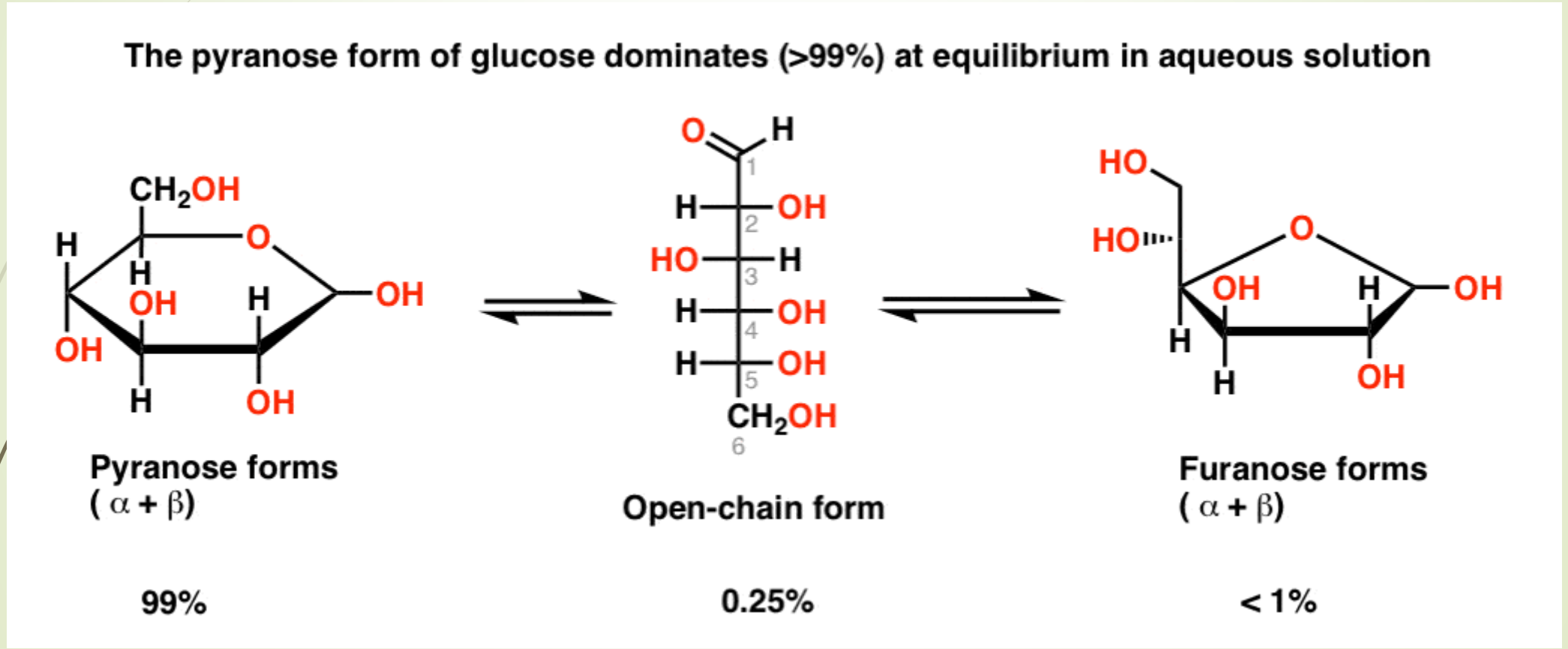
2- types of rings:

- Furanose – 5 membered –(4C, 1O)
- Pyranose – 6 membered ring Oxygen links → C1 & C5.

Furanose and Pyranose rings



Conversion of open chain into ring chain



PLENARY:

State what you have understood in this lesson


STAY
HOME
STAY SAFE

Allah Hafiz