

# **SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES**

*Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai*

*Approved by Pharmacy Council of India, New Delhi.*

**Coimbatore -641035**

**COURSE NAME :BIOCHEMISTRY AND CLINICAL PATHOLOGY**

**D.PHARM/ II YEAR**

**TOPIC:MONOSACCHARIDES**

## DESIGN THINKING STAGES IN CLASSIFICATION

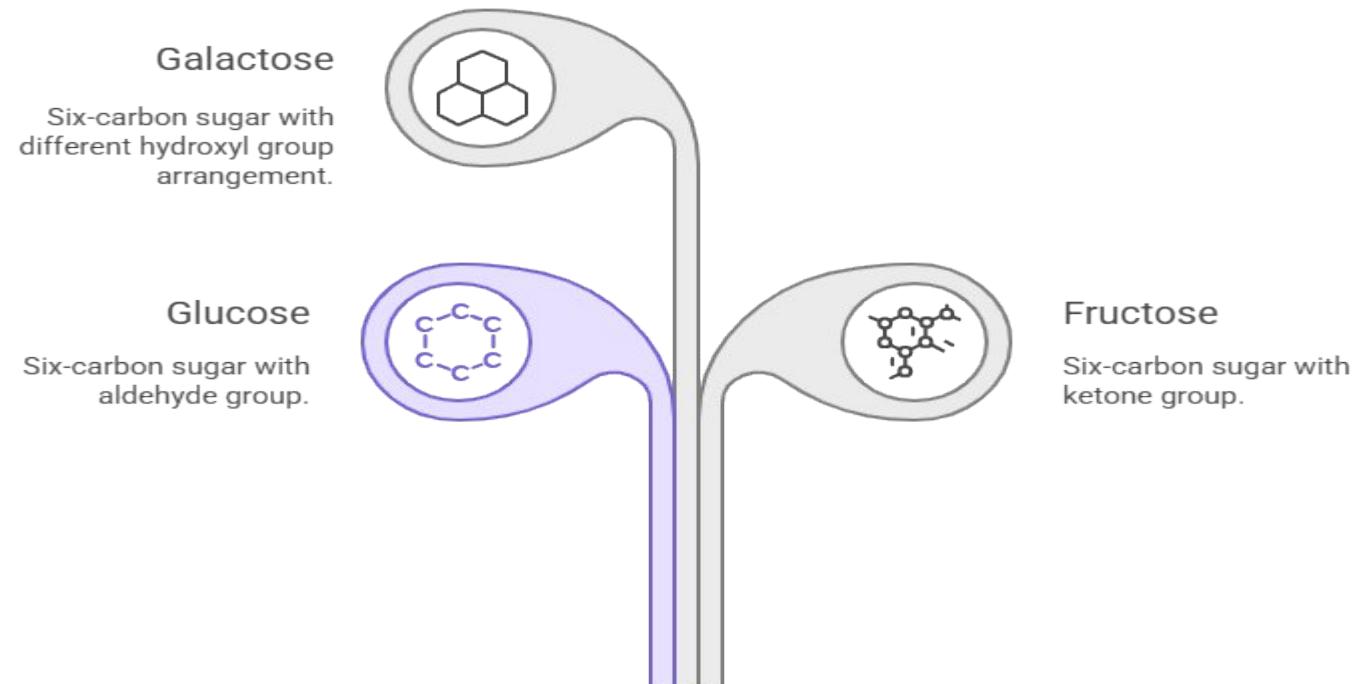
**Empathize:** Understand the users — in this case, students, pharmacists, or researchers who use the alphabetical classification system.

**Define:** Clearly define the problem based on the insights from the empathize stage.

**Ideate:** Generate possible solutions or improvements. **Prototype:** Create a

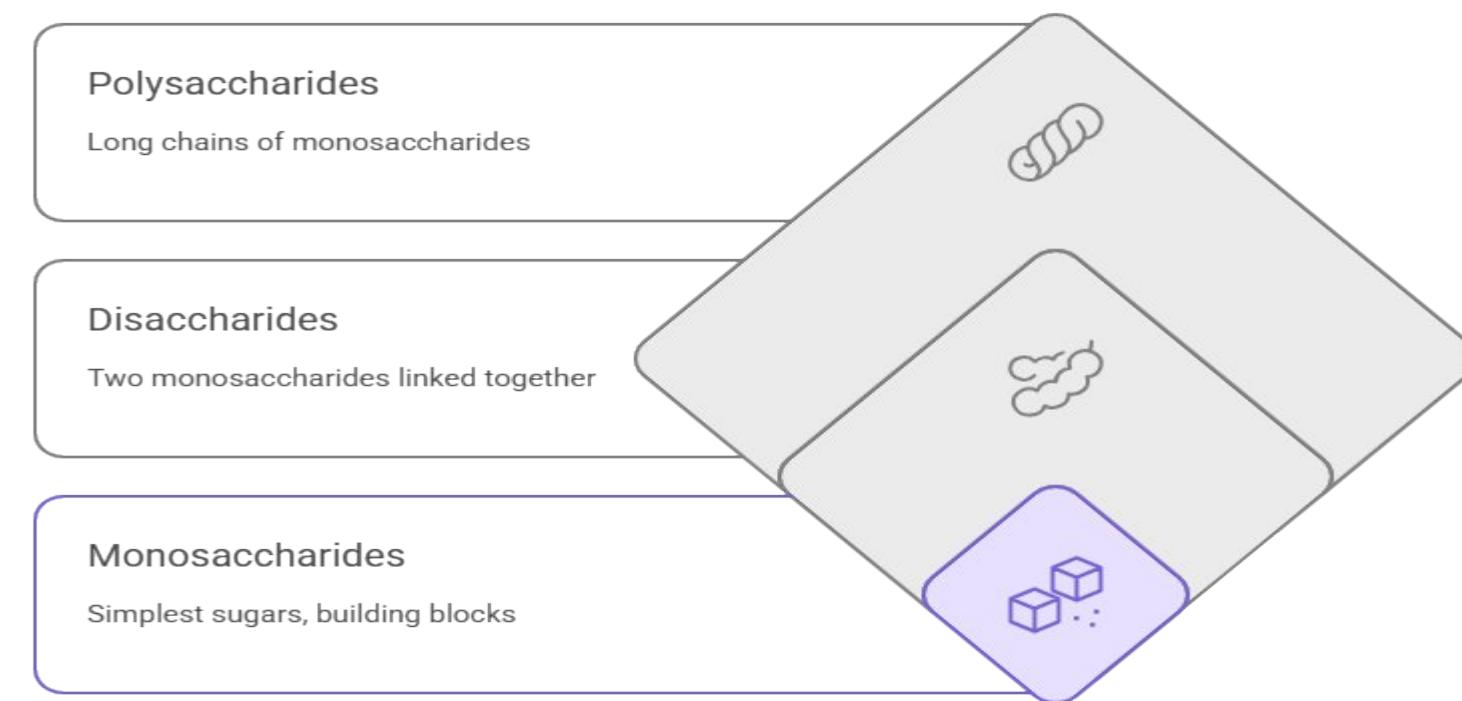
tangible version of your solution **Test:** Evaluate the prototype with real users.

## Exploring Monosaccharide Structures



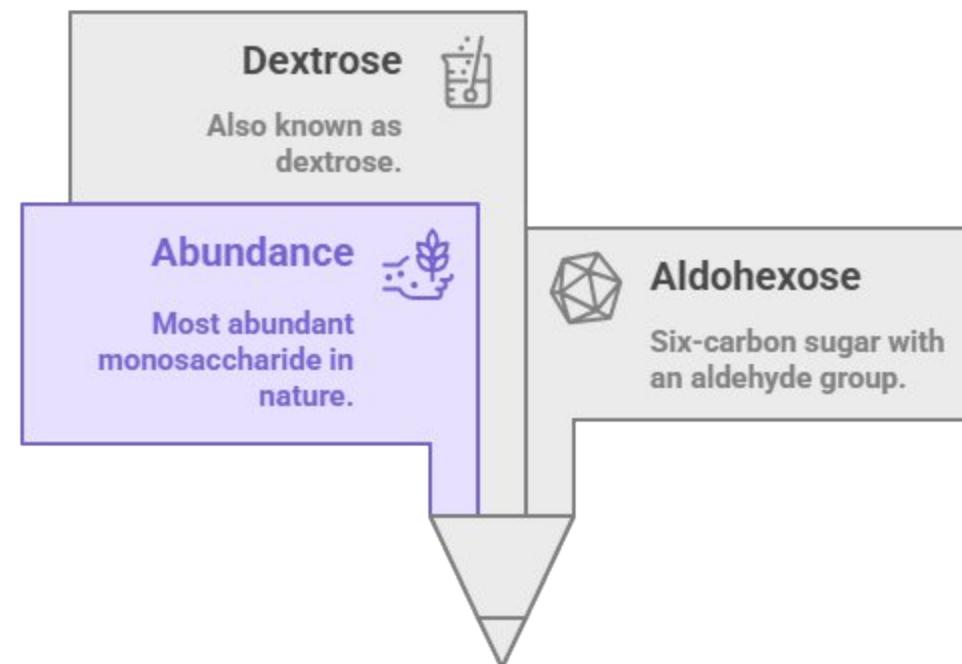
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## Carbohydrate Hierarchy



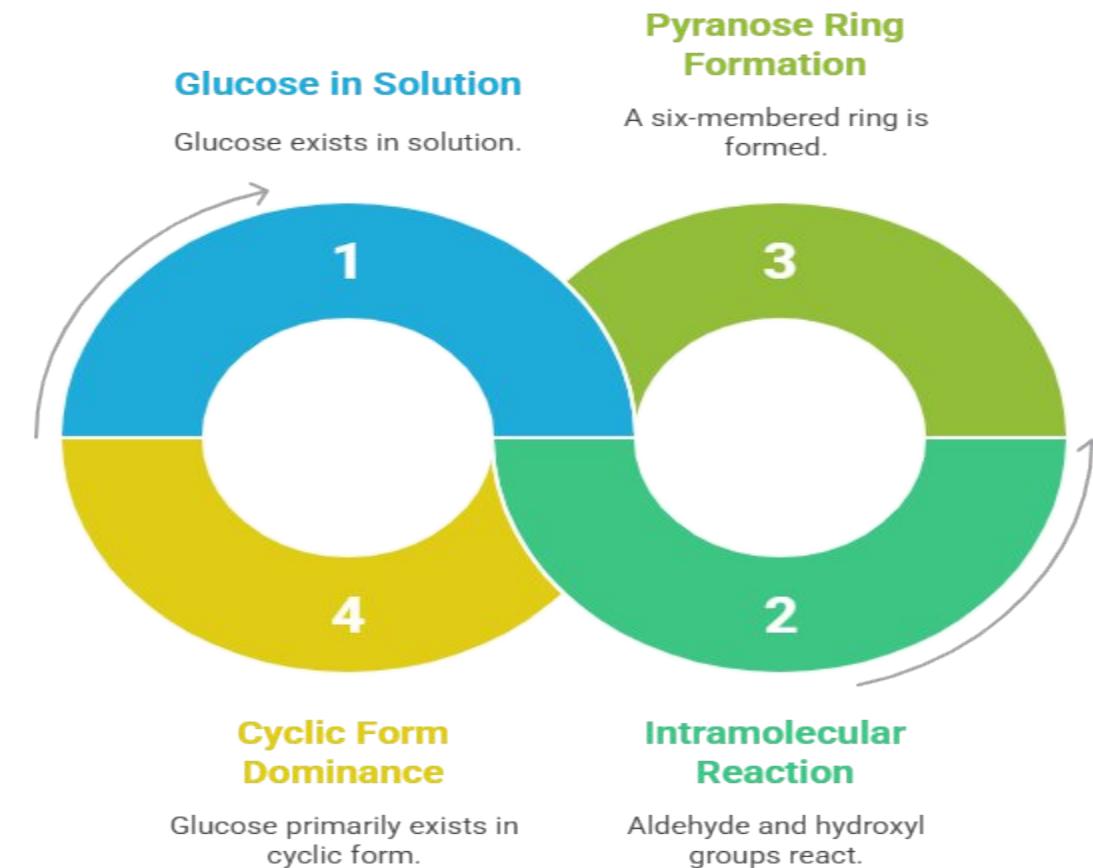
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## Glucose's Role in Energy Production



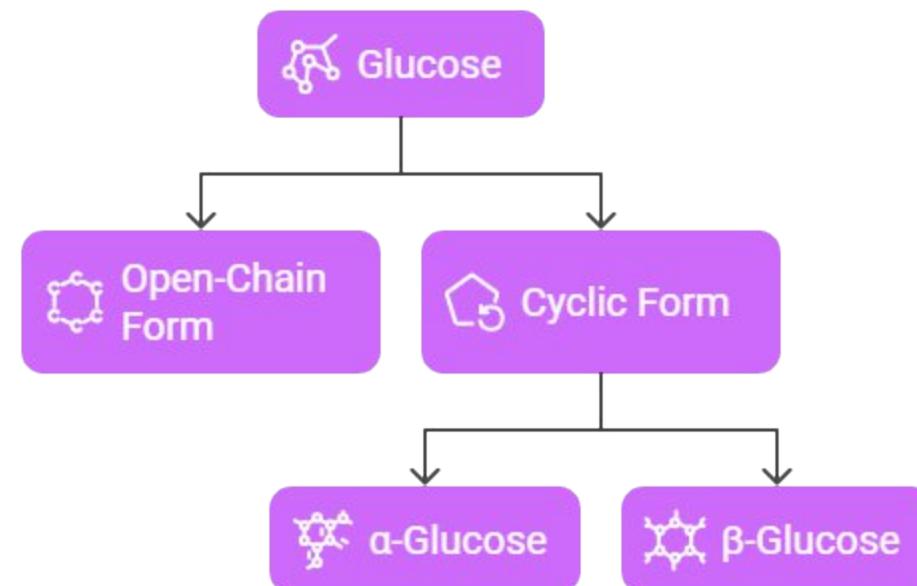
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## Glucose Transformation Cycle

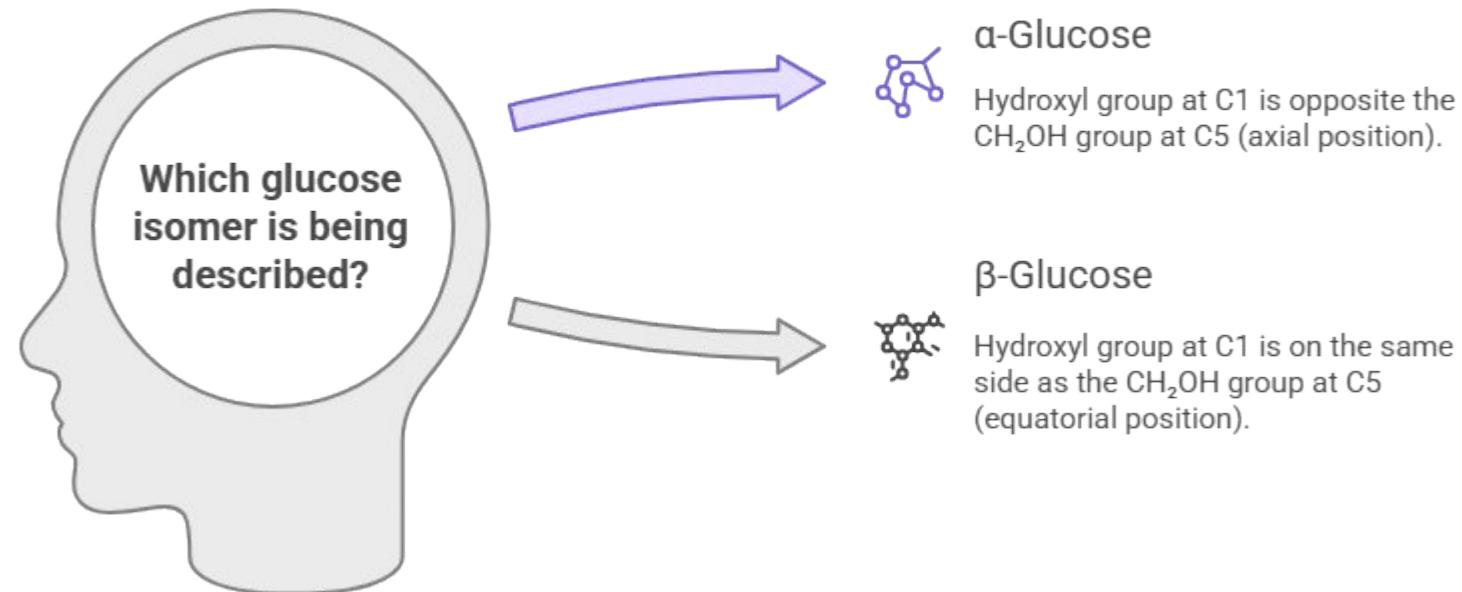


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## Glucose Forms and Isomers

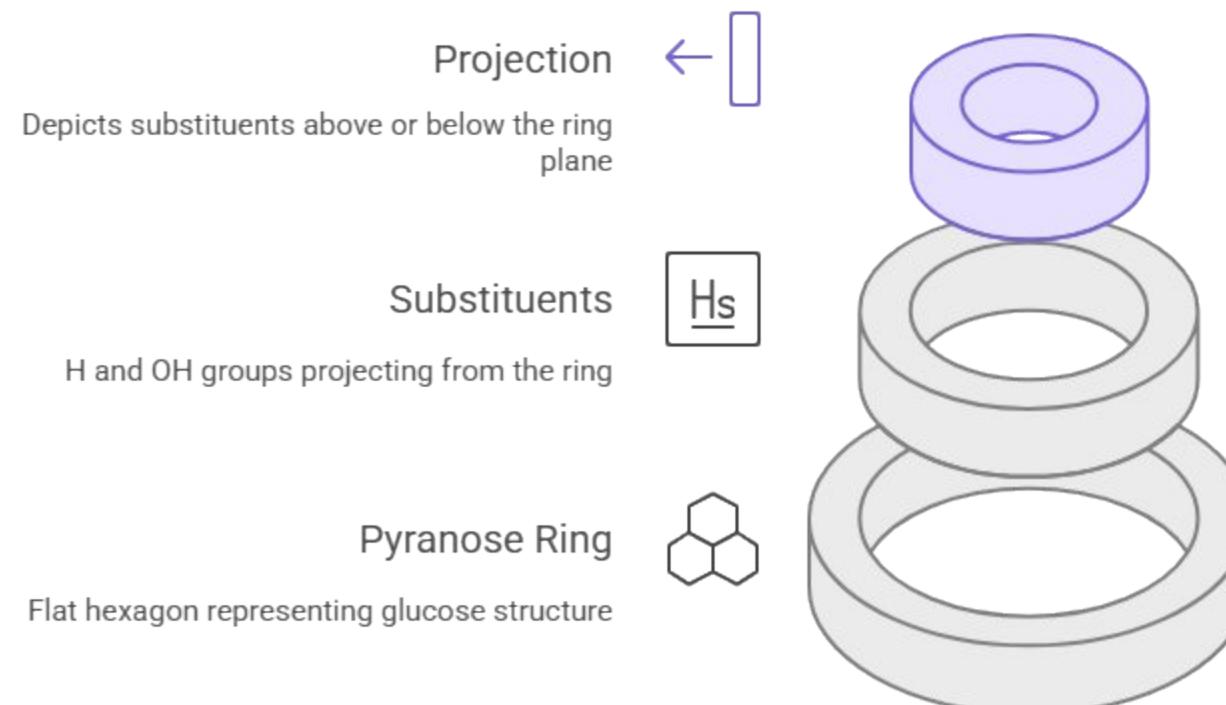


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## Haworth Projection Pyramid

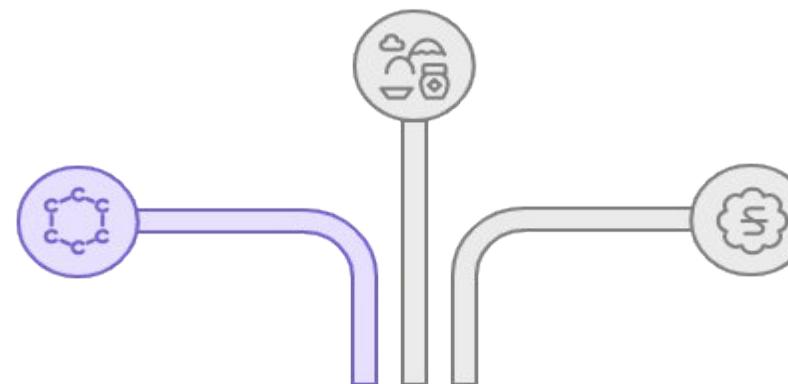


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## What type of sugar is fructose?

### Fruit Sugar

Fructose is commonly found in fruits and honey, contributing to their sweetness.



### Ketohexose

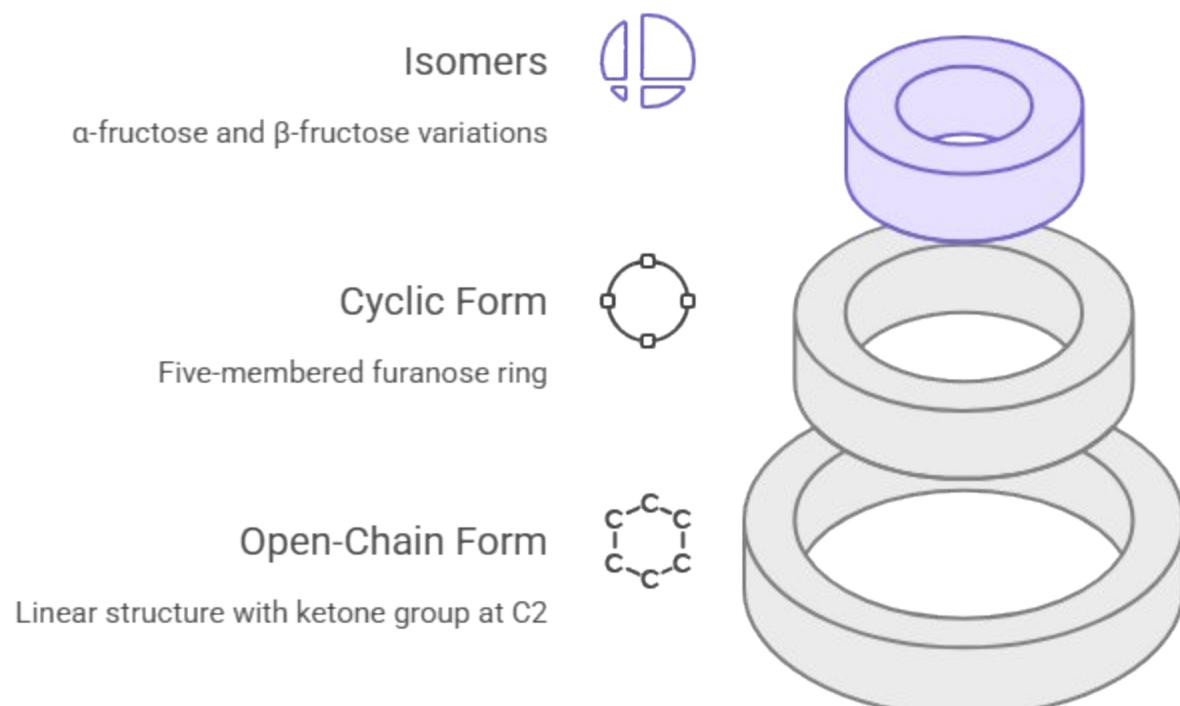
Fructose is a six-carbon sugar with a ketone group, making it distinct from other sugars.

### Sweetest Natural Sugar

Fructose is known for its high sweetness level compared to other natural sugars.

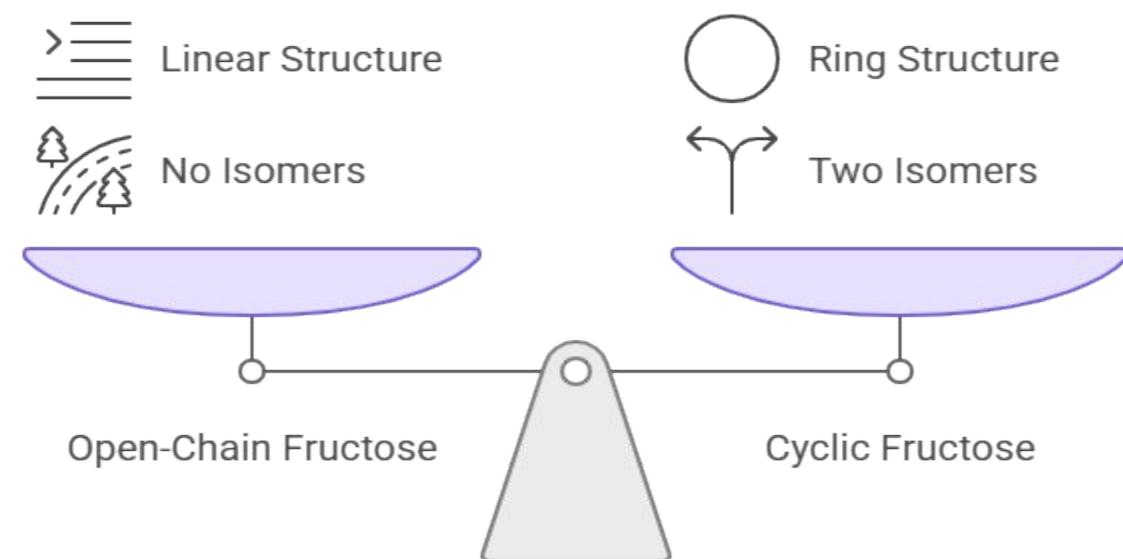
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## Fructose Structure Hierarchy

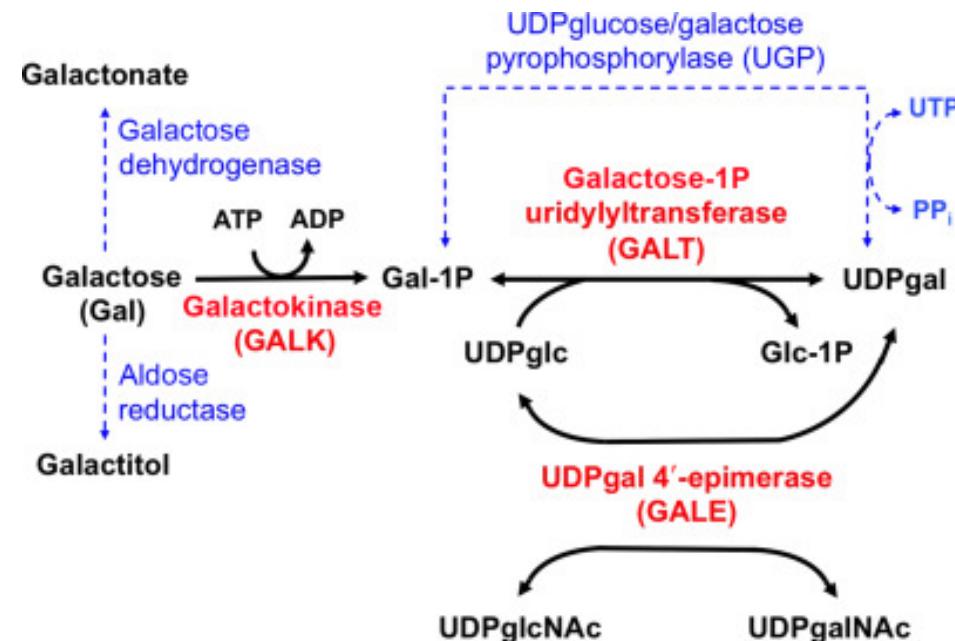


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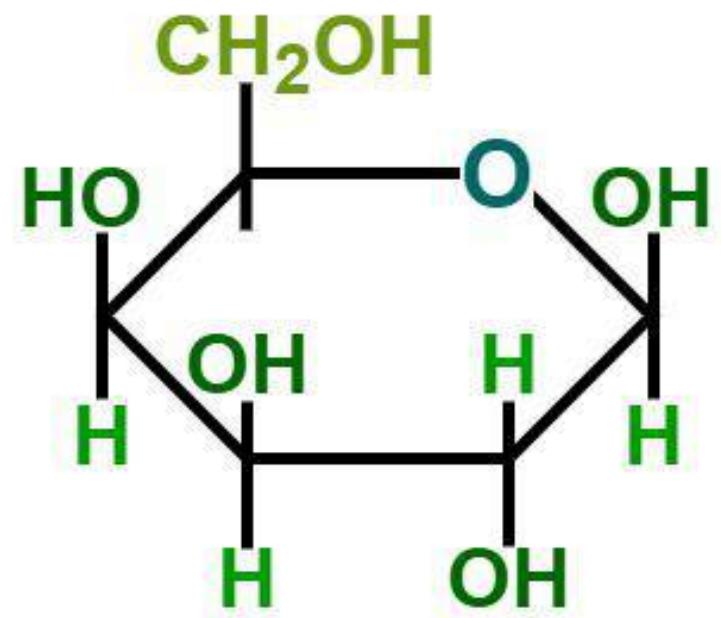
## Compare fructose's open and cyclic forms.

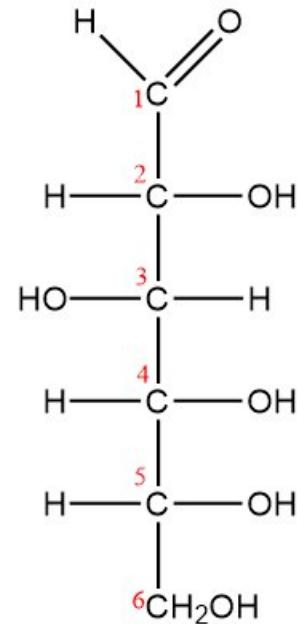


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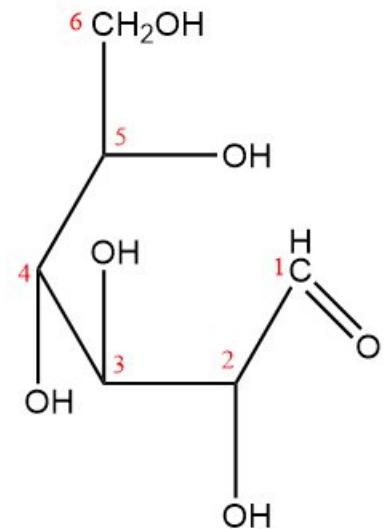


## Structure of Galactose

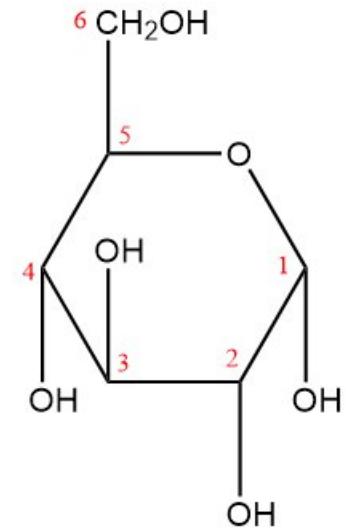




a. Straight Chain  
Monosaccharide



b. Open form of  
Monosaccharide



c. Cyclic  
Monosaccharide

# GLUCOSE

VERSUS

# FRUCTOSE

Glucose is the building block for starch, glycogen, cellulose, sucrose and lactose.

Glucose's name is 2,3,4,5,6-Pentahydroxyhexana.

Glucose is produced commercially via the enzymatic hydrolysis of starch.

Glucose is less water soluble compared to fructose.

Glucose has a high glycemic index values compared to fructose.

The sweetness of glucose is lower than that of fructose

Pediaa.com

Fructose is found in honey, tree and vine fruits, flowers, berries, and most root vegetables.

Fructose's name is 1,3,4,5,6-Pentahydroxy-2-hexanone.

Fructose is produced commercially from sugarcane, sugar beets, and corn.

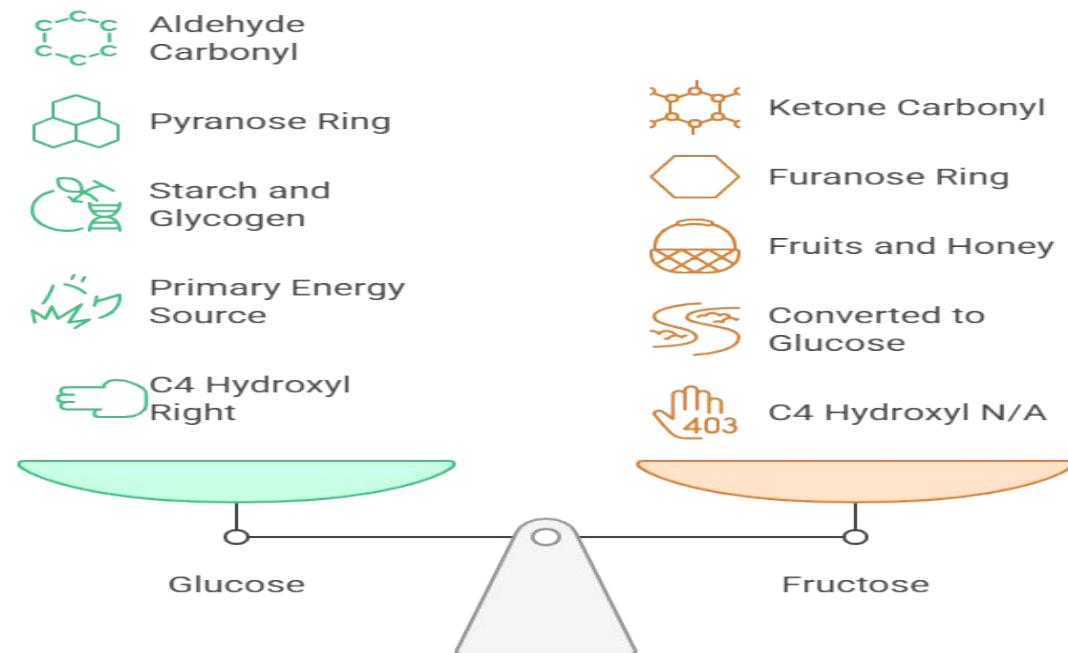
Fructose is the most water-soluble sugar of all the sugars.

Fructose has the lowest glycemic index value of all the natural sugars including glucose.

The sweetness of fructose is greater than that of glucose and it shows a synergy effect when combined with other sweeteners.

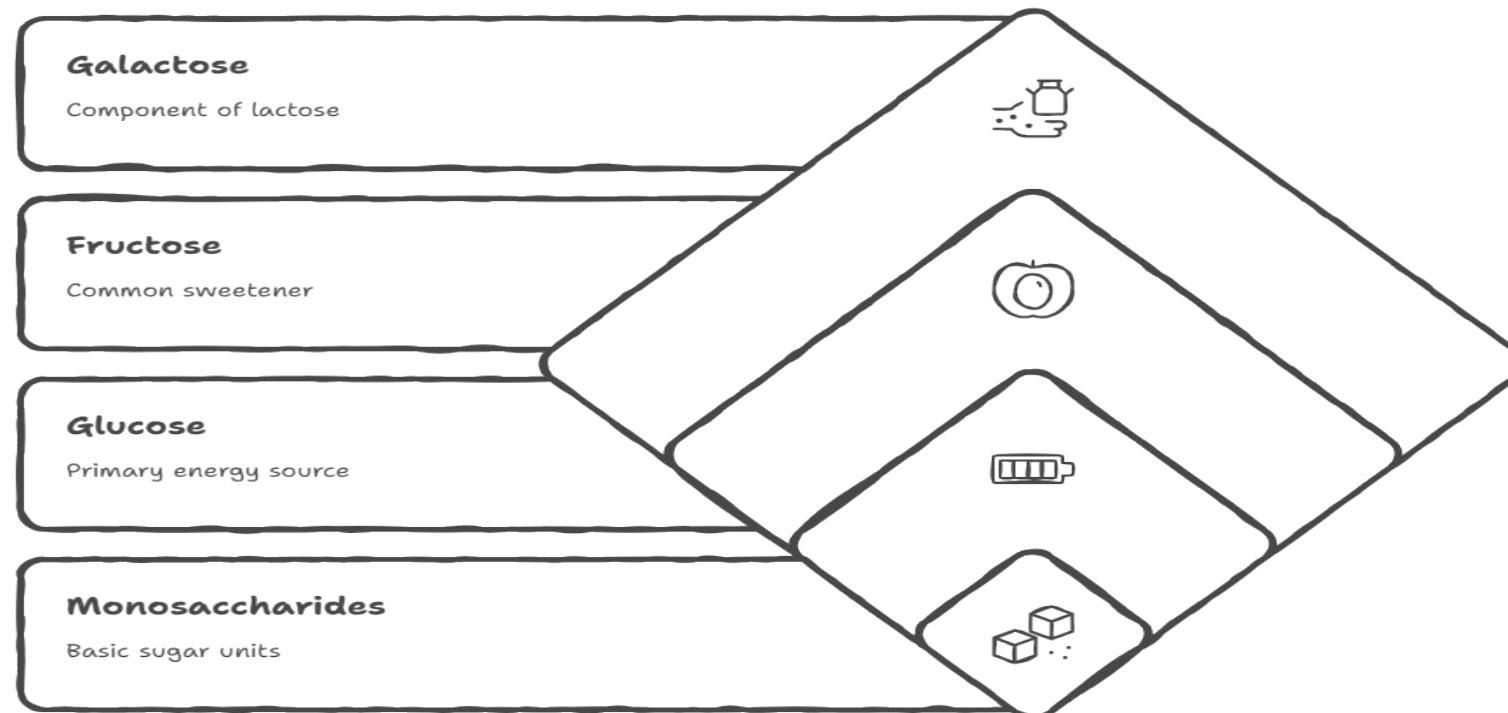
# ASSESSMENT

## Comparing Glucose and Fructose Structures and Roles



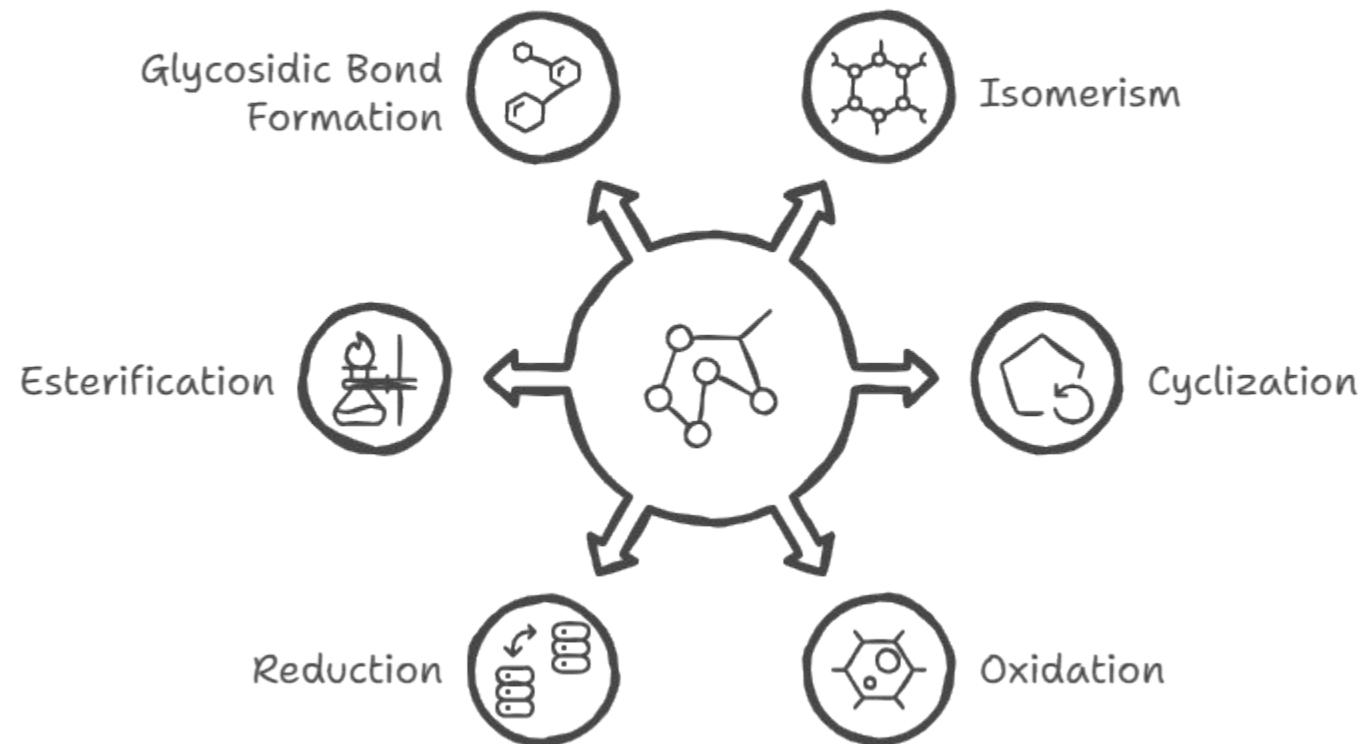
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## Monosaccharide Structures and Functions



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## Monosaccharide Reactions



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## REFERENCES

**"Biochemistry" by Berg, Tymoczko, and Stryer (W. H. Freeman)**

**Lehninger Principles of Biochemistry" by Nelson and Cox (W. H. Freeman)**

**Essentials of Glycobiology" by Varki et al. (Cold Spring Harbor Laboratory Press)**

**"Carbohydrates: Structure, Synthesis, and Function" by Collins and Ferrier (Wiley)**

**"Monosaccharides: Chemical Synthesis and Reactions" by D. Horton (Academic Press)**

**"The Journal of Biological Chemistry" (American Society for Biochemistry and Molecular Biology)**

# Thank You

