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:CARBOHYDRATES

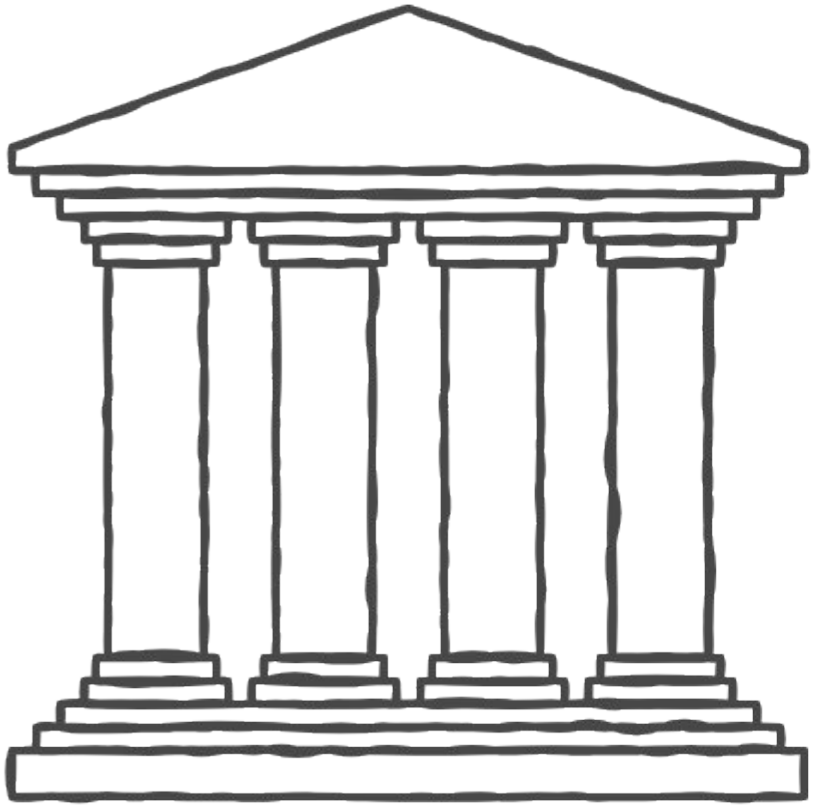
DESIGN THINKING STAGES IN CLASSIFICATION

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.

Foundations of Carbohydrate Knowledge



Definition

Explains the fundamental nature of carbohydrates.

Classification

Categorizes carbohydrates based on structure and complexity.

Examples

Provides real-world instances of different carbohydrate types.

Chemical Properties

Describes the key chemical behaviors of carbohydrates.

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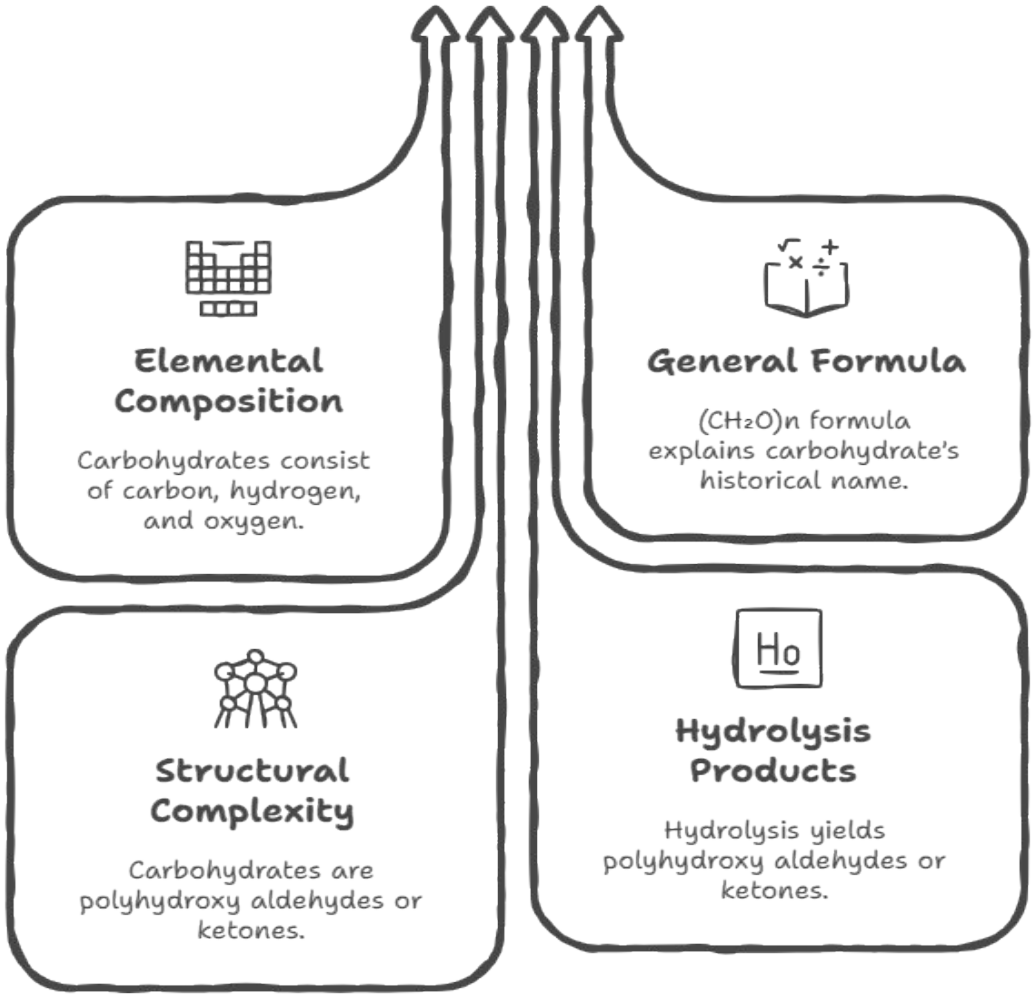
Unveiling Carbohydrate's True Nature



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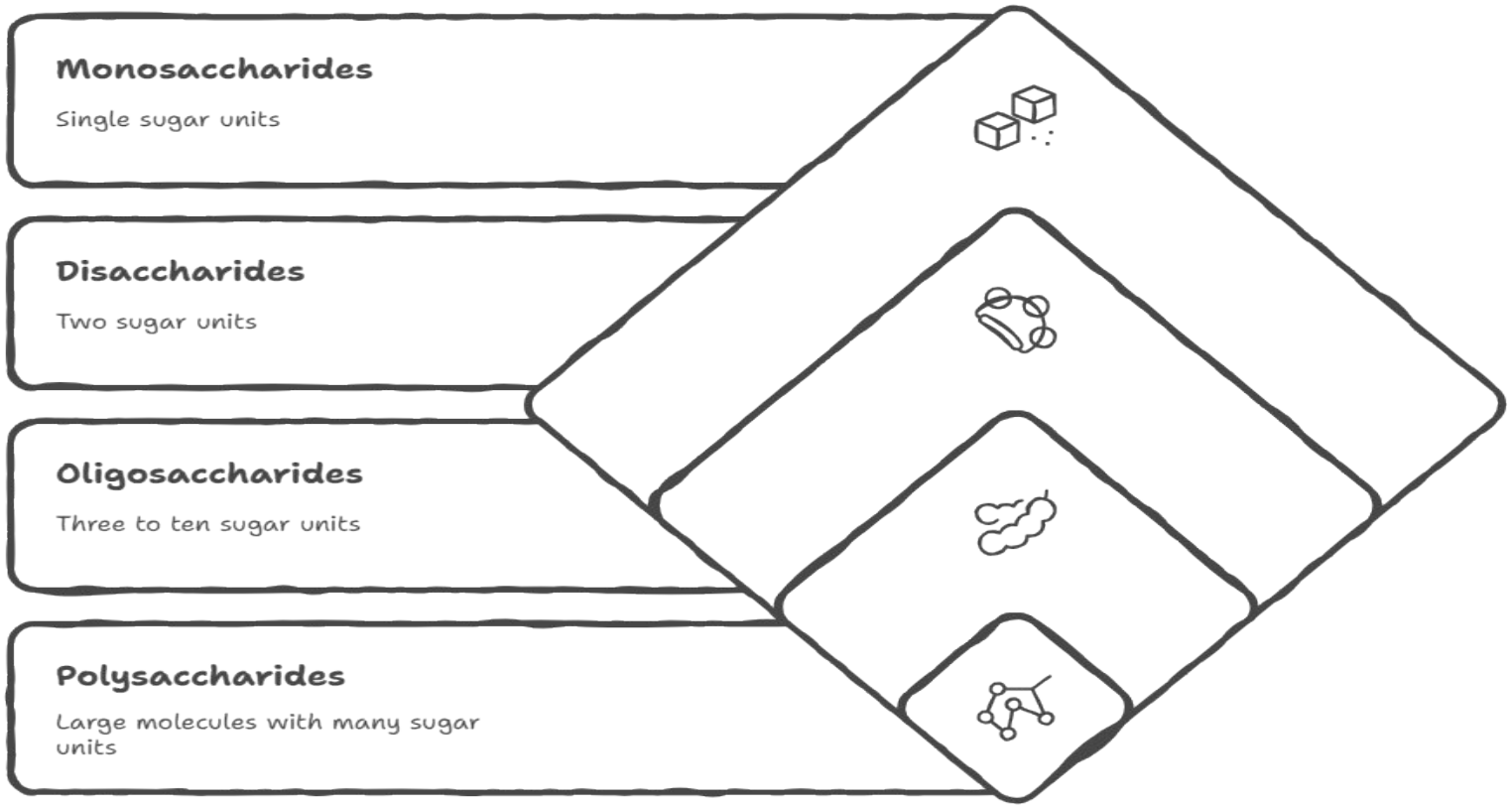
Carbohydrate Classification



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Examples of Sugars

Deoxyribose

A component of DNA (deoxyribonucleic acid).

Glucose

A primary source of energy for cells. Found in fruits, honey, and corn syrup.

Ribose

A component of RNA (ribonucleic acid).

Fructose

The sweetest of the naturally occurring sugars. Found in fruits and honey.

Galactose

A component of lactose (milk sugar).

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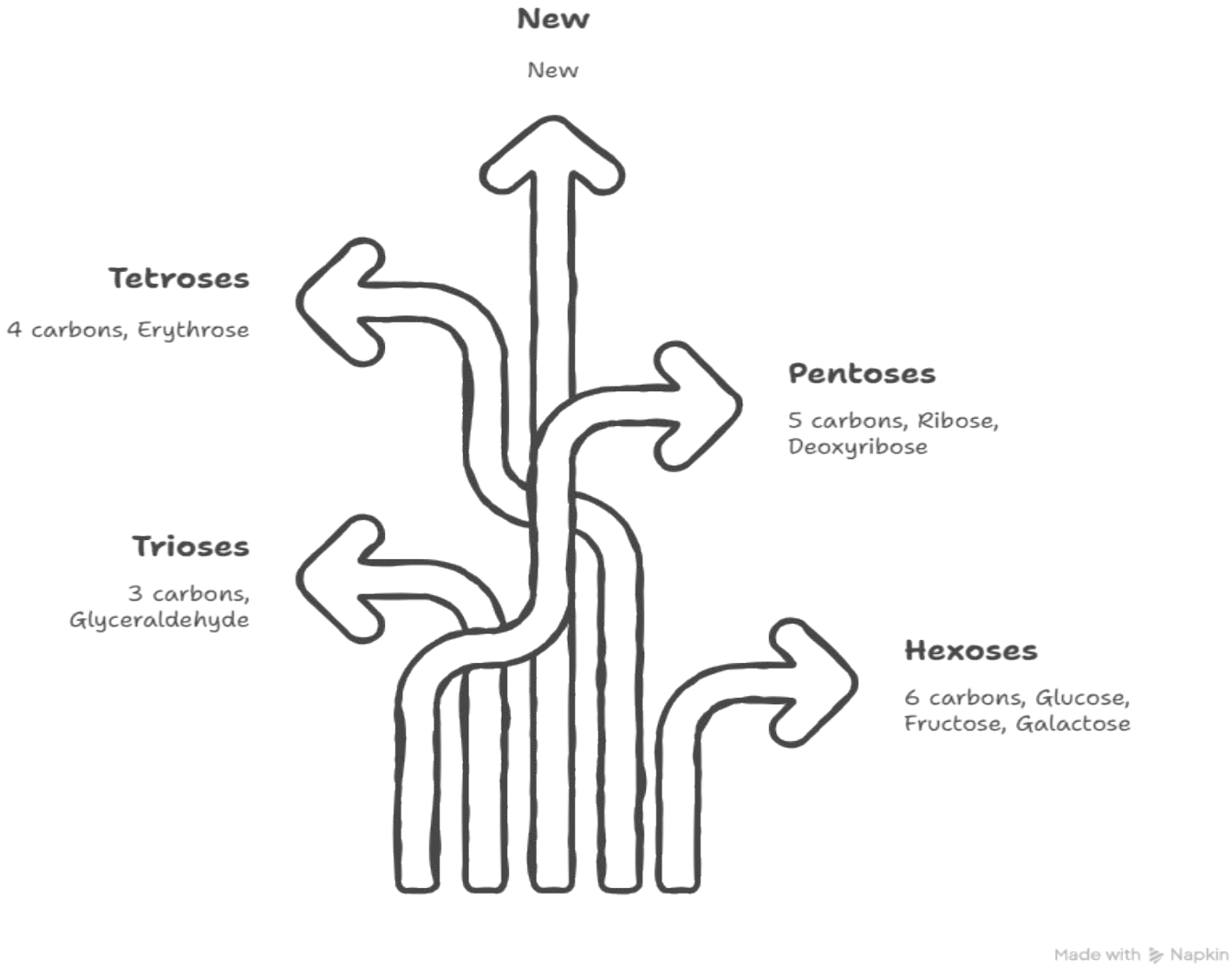
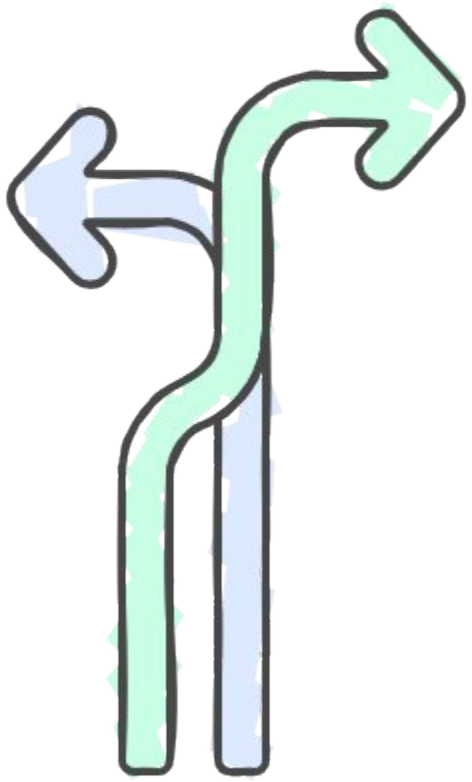
How many carbon atoms are in the monosaccharide?



How are disaccharides formed?

Glycosidic Bond

Formed by joining two monosaccharides with the removal of water.



Dehydration Reaction

The process of removing water to form the bond.

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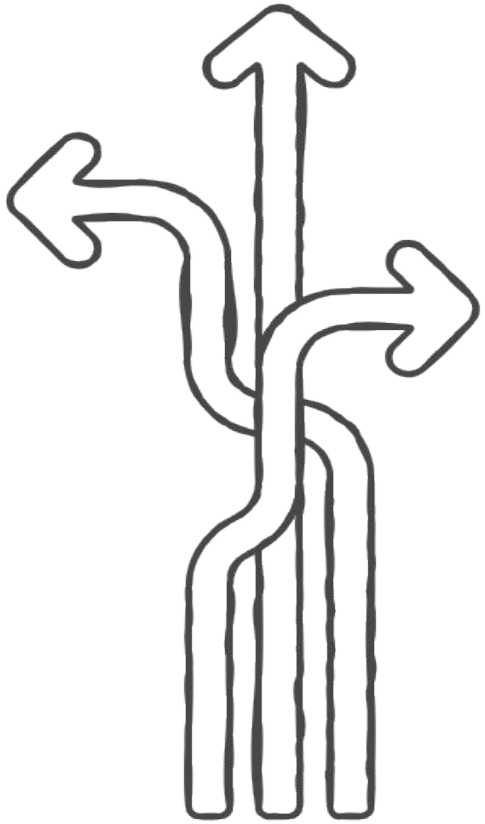
Which disaccharide should be recommended based on dietary needs?

Lactose

Ideal for individuals who consume dairy products

Sucrose

Suitable for general sweetness and energy



Maltose

Beneficial for those who prefer malt-based products

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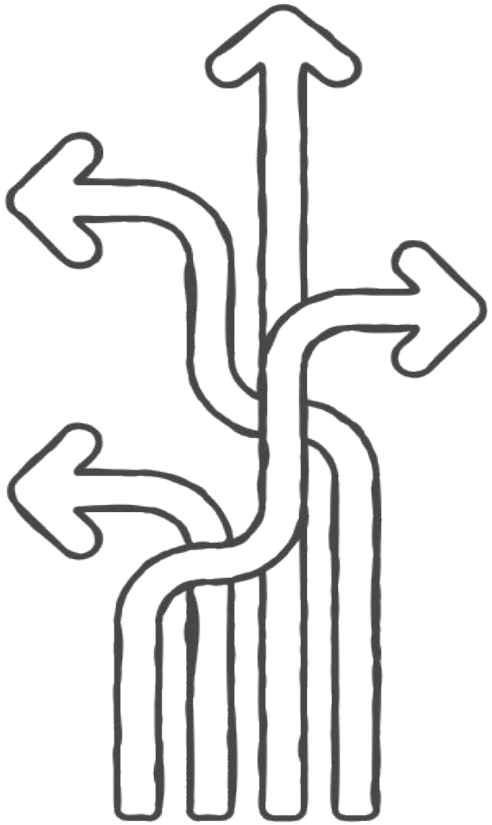
What type of carbohydrate is being described?

Oligosaccharides

3-10 monosaccharides linked, often attached to proteins or lipids.

Disaccharides

Two monosaccharides linked together.



Polysaccharides

Many monosaccharides linked, forming complex structures.

Monosaccharides

Single sugar units, the simplest form of carbohydrates.

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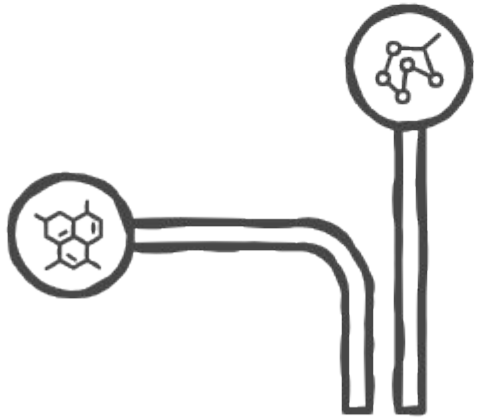
Which oligosaccharide should be studied?

Stachyose

Composed of two galactose, one glucose, and one fructose, making it a more complex tetrasaccharide.



Raffinose

Composed of galactose, glucose, and fructose, making it a simple trisaccharide.

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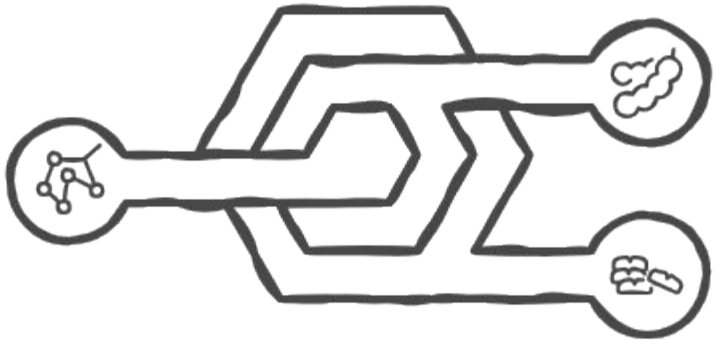
Polysaccharide Structure

Polysaccharides

Complex carbohydrates with many monosaccharide units



Monosaccharides

Simple sugar units forming polysaccharides

Glycosidic Bonds

Links connecting monosaccharides

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Polysaccharide Structure and Function

Amylose

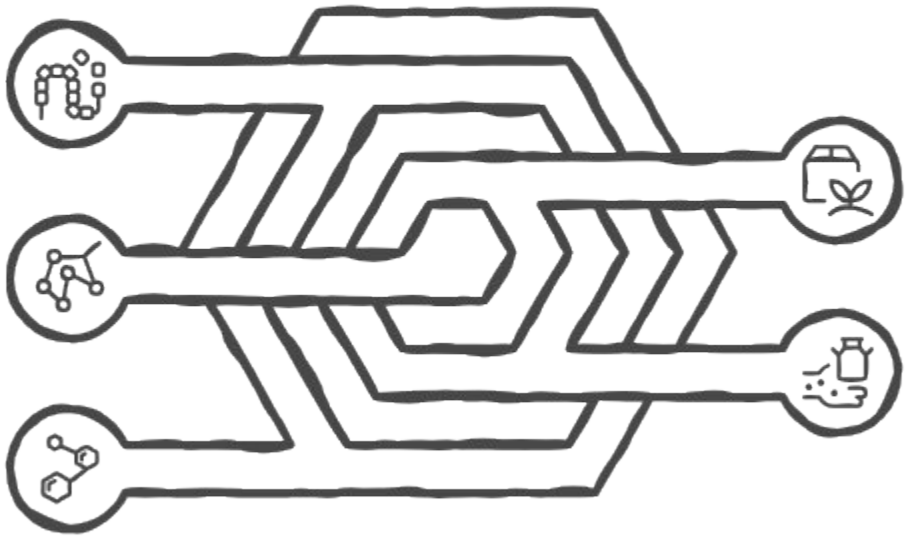
Linear form of starch

Polysaccharides

Complex carbohydrates with diverse functions

Amylopectin

Branched form of starch



Starch

Storage polysaccharide in plants

Glycogen

Storage polysaccharide in animals

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Choose the appropriate structural polysaccharide for specific applications.

Cellulose

Provides plant cell wall structure

VS

Chitin

Forms arthropod exoskeletons and fungal cell walls

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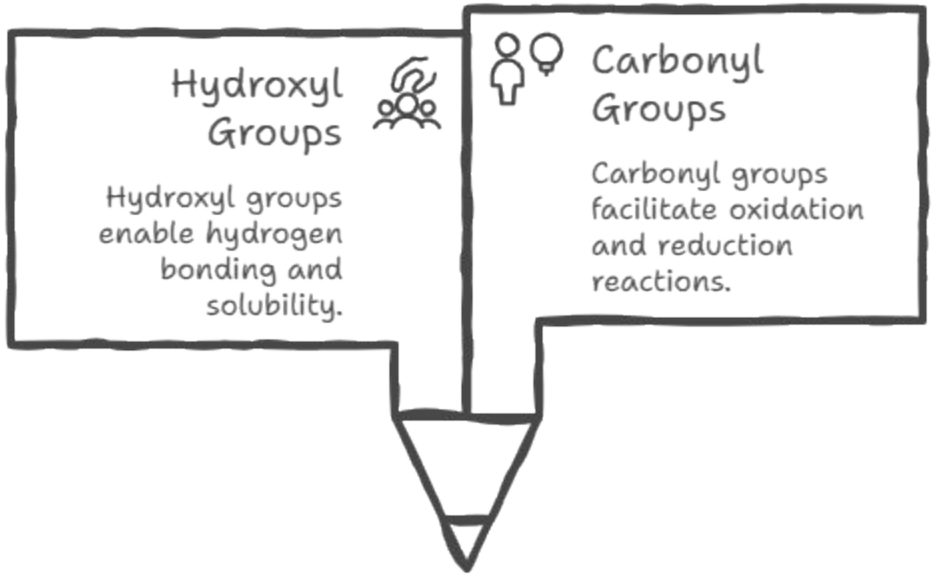
Functional Group Influence on Carbohydrate Chemistry



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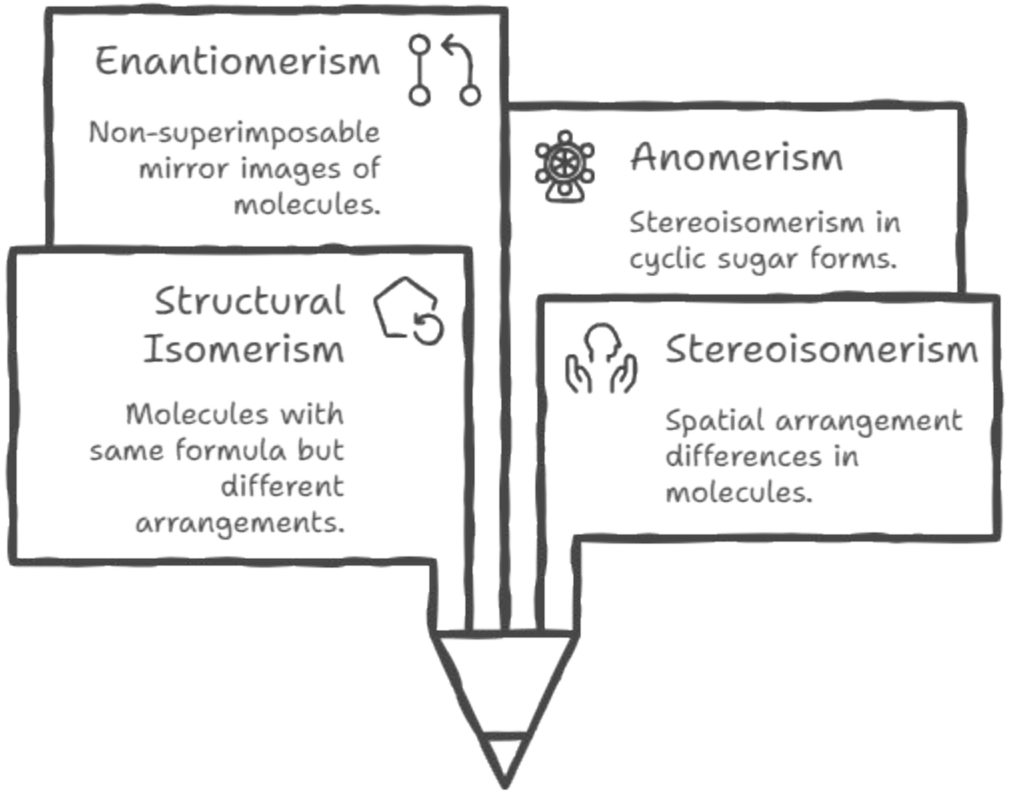
Isomeric Diversity in Carbohydrates



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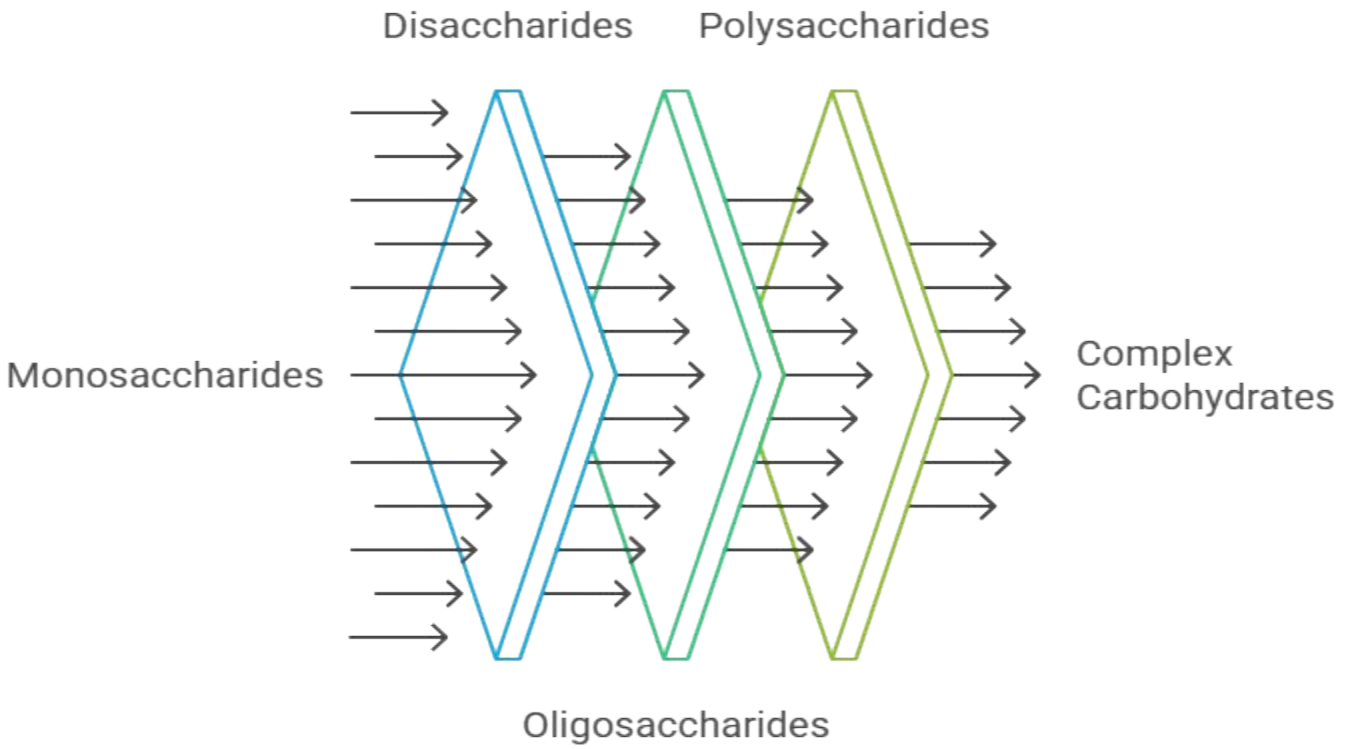
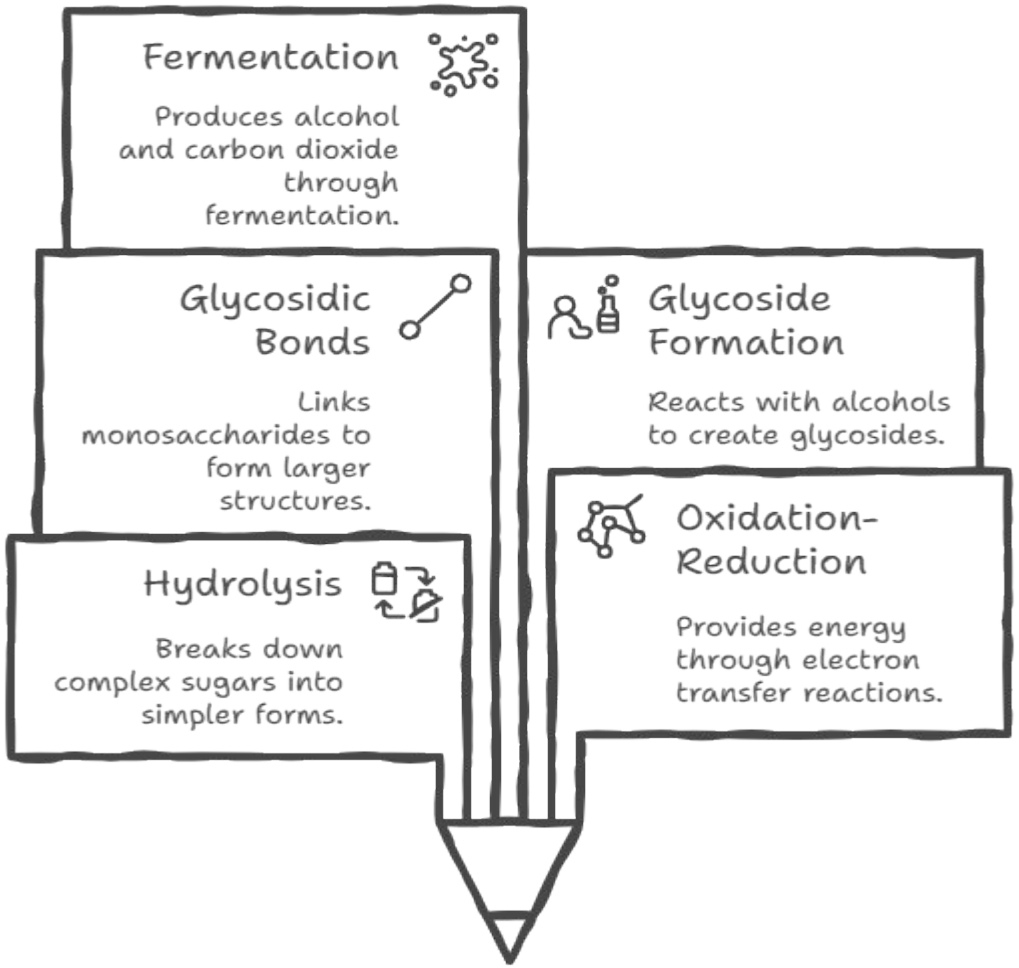
ASSESMENT

Carbohydrate Complexity Funnel



Chemical Properties of Carbohydrates



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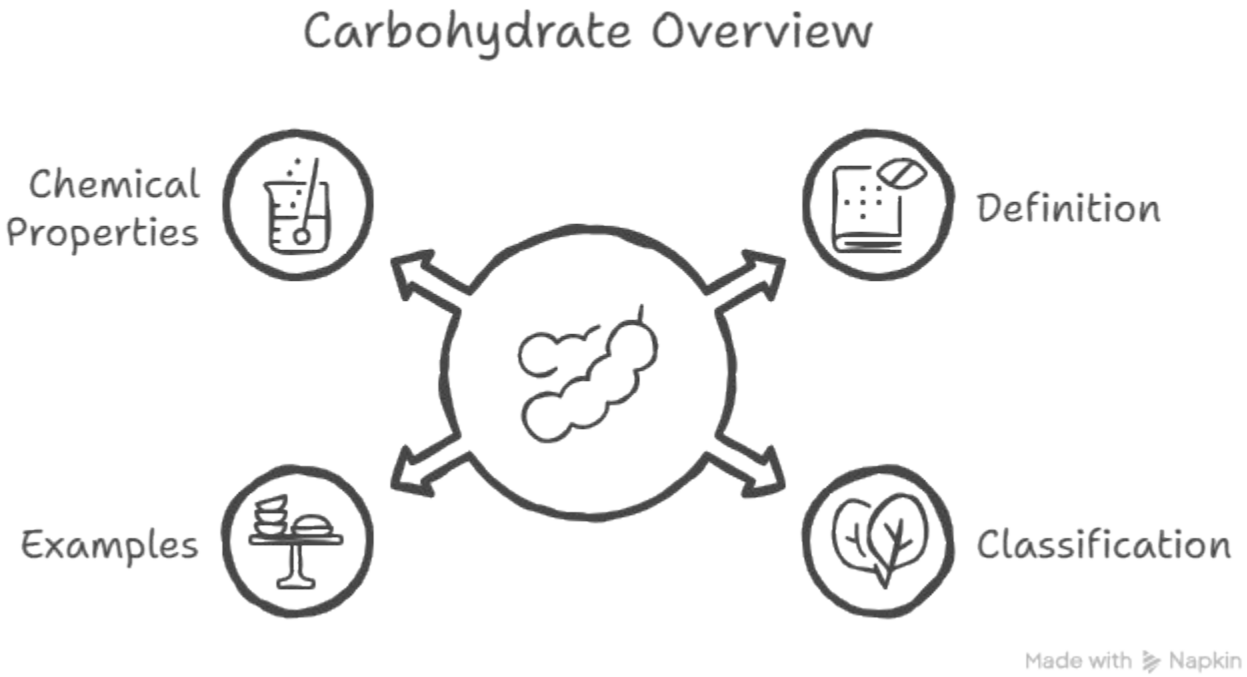
Carbohydrate Overview
Chemical Properties
Definition
Examples
Classification
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REFERENCES

➢ Best for concepts, pathways, and molecular understanding2.Biochemistry – Jeremy M. Berg, John L. Tymoczko, Gregory Gatto

➢ Clear explanations with clinical relevance3.Harper's Illustrated Biochemistry – Rodwell et al.

➢ Very popular for medical students, exams, and clinical correlation4.Textbook of Biochemistry – U. Satyanarayana & U. Chakrapani

➢ Excellent for Indian curricula, easy language, exam-oriented5.Biochemistry – Donald Voet & Judith Voet

➢ Detailed and advanced; good for in-depth study


Thank You