

# **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 : BIO CHEMISTRY**

**D.PHARM/ II YEAR**

**TOPIC: DISACCHARIDES**

## 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.

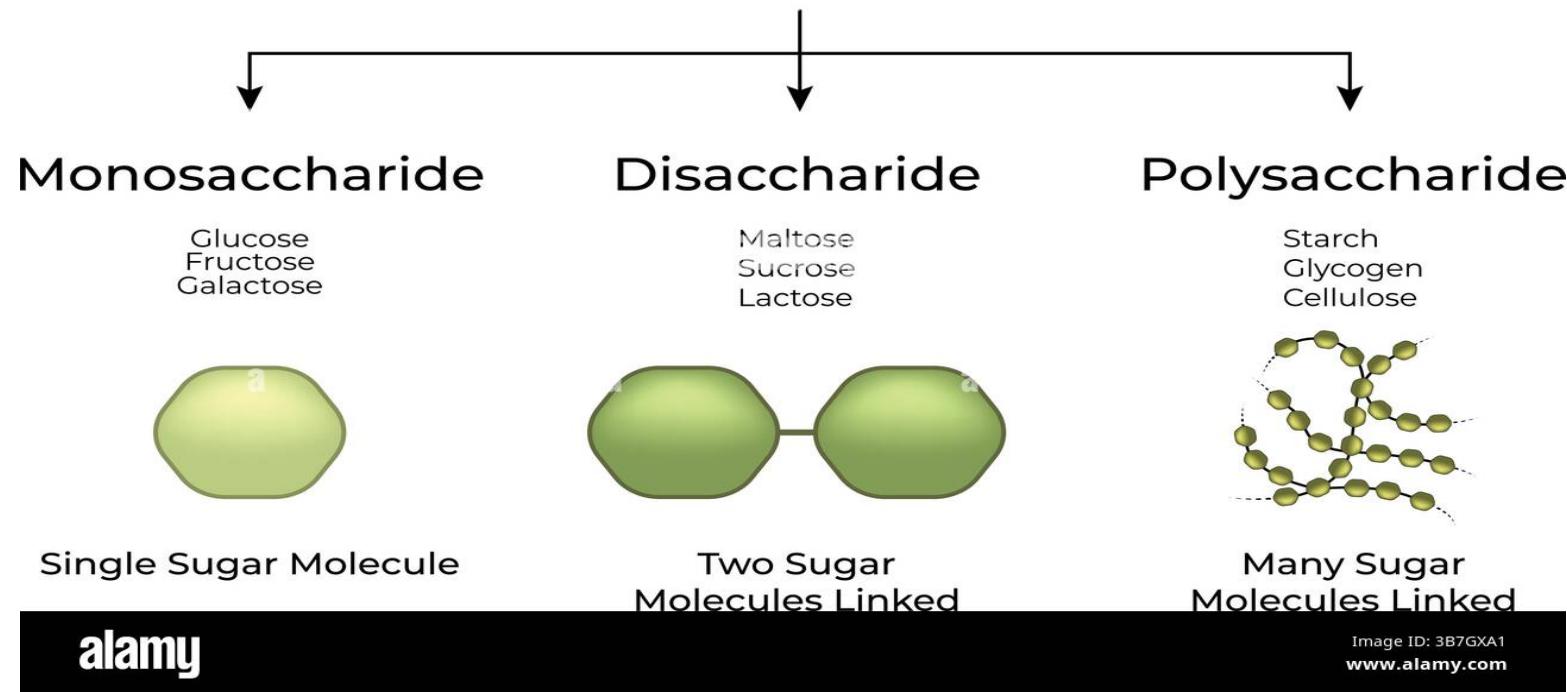
**Ideate:** Generate possible solutions or improvements.

**Prototype:** Create a tangible version of your solution **Test:**

Evaluate the prototype with real users.

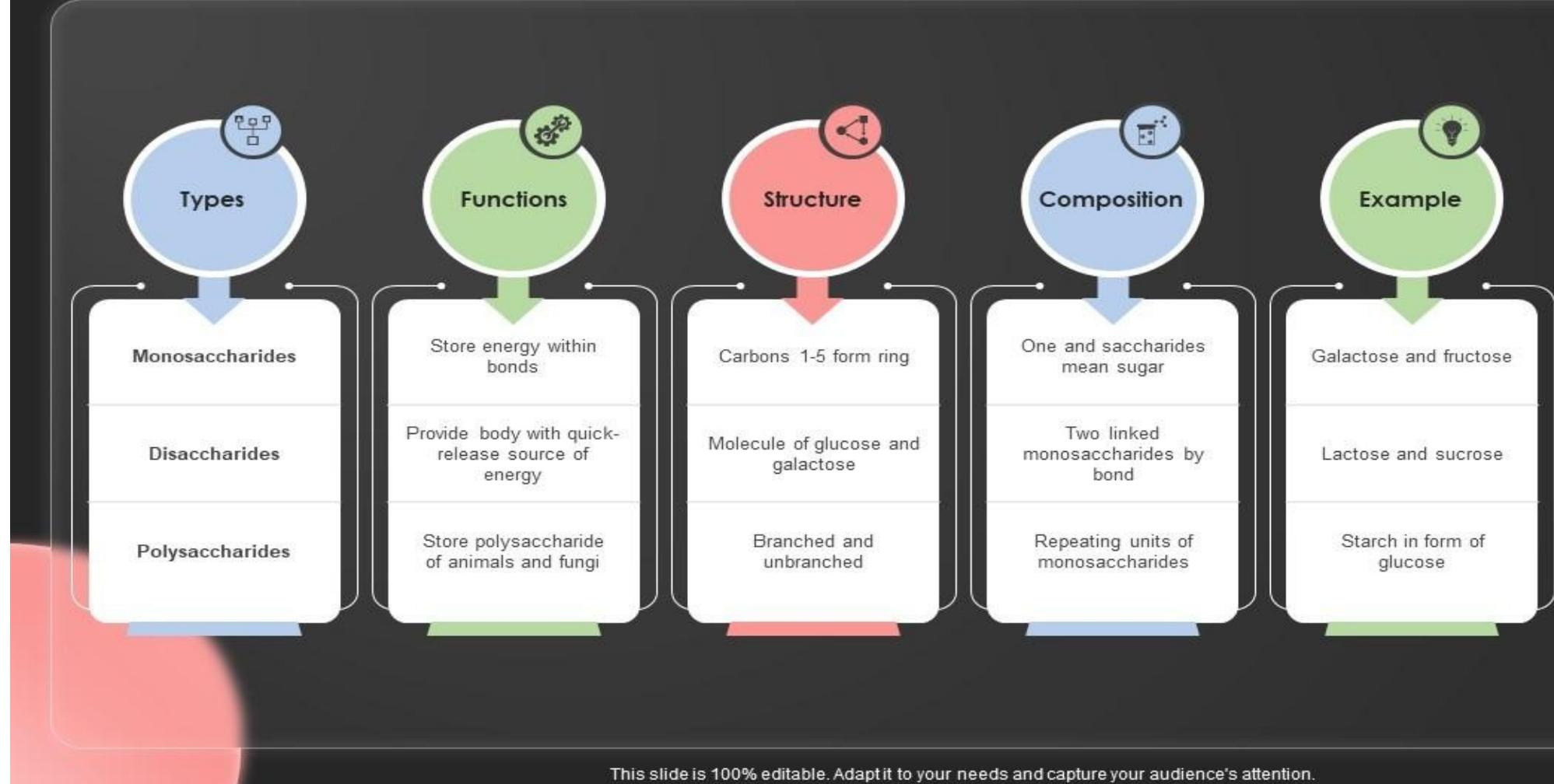
# CLASSIFICATION OF CARBOHYDRATES

## Carbohydrates



## Functional roles and structure of saccharides types

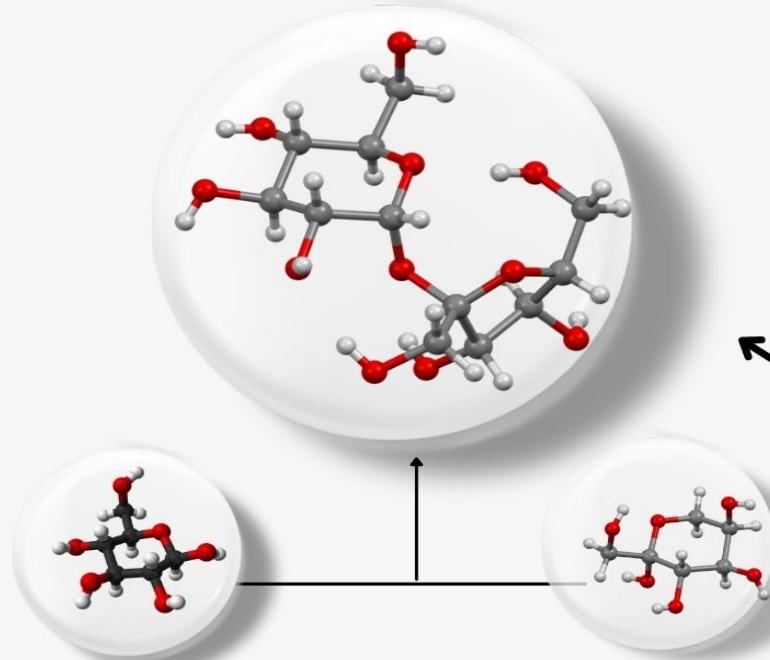
The purpose of this slide is to highlight various types of saccharides and their distinct structural features to understand the practical implications of saccharide structures in various biological processes such as monosaccharides, disaccharides, etc.



This slide is 100% editable. Adapt it to your needs and capture your audience's attention.

## DEFINITION OF DISACCHARIDE

# Disaccharide

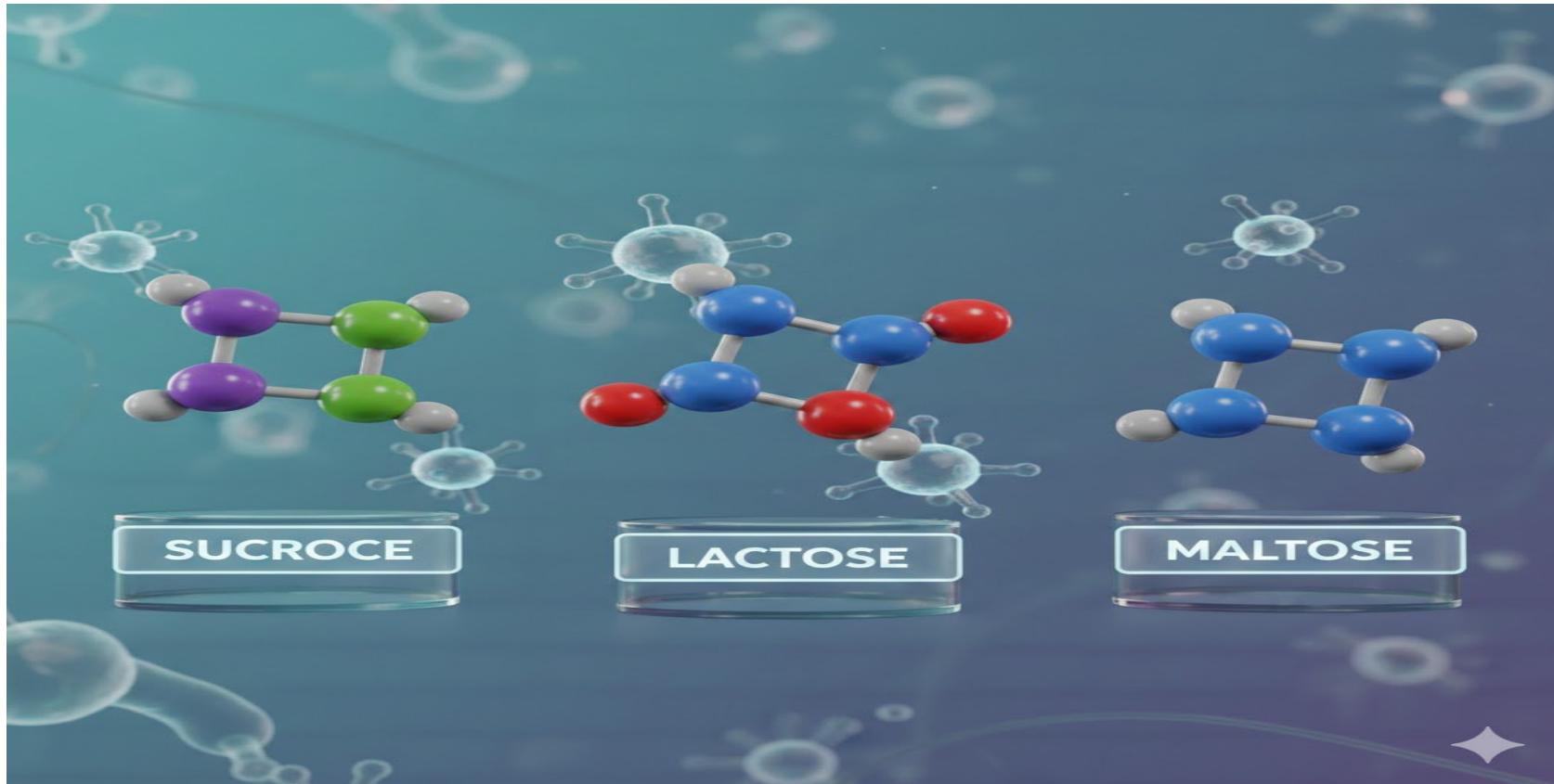


Disaccharides are carbohydrates (sugars) that are formed by the combination of two monosaccharides.

**SUCROSE IS A DISACCHARIDE  
FORMED BY THE JOINING OF  
2 MONOSACCHARIDES**

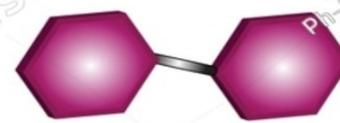


# 3D DIMENSIONAL STRUCTURE FOR DISACCHARIDE COMPOUNDS

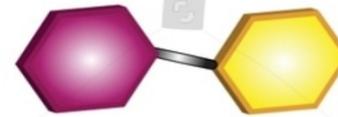


## STRUCTURE OF DISACCHARIDE CLASSIFICATION

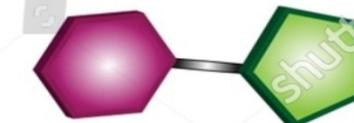
### Disaccharide



Maltose



Lactose

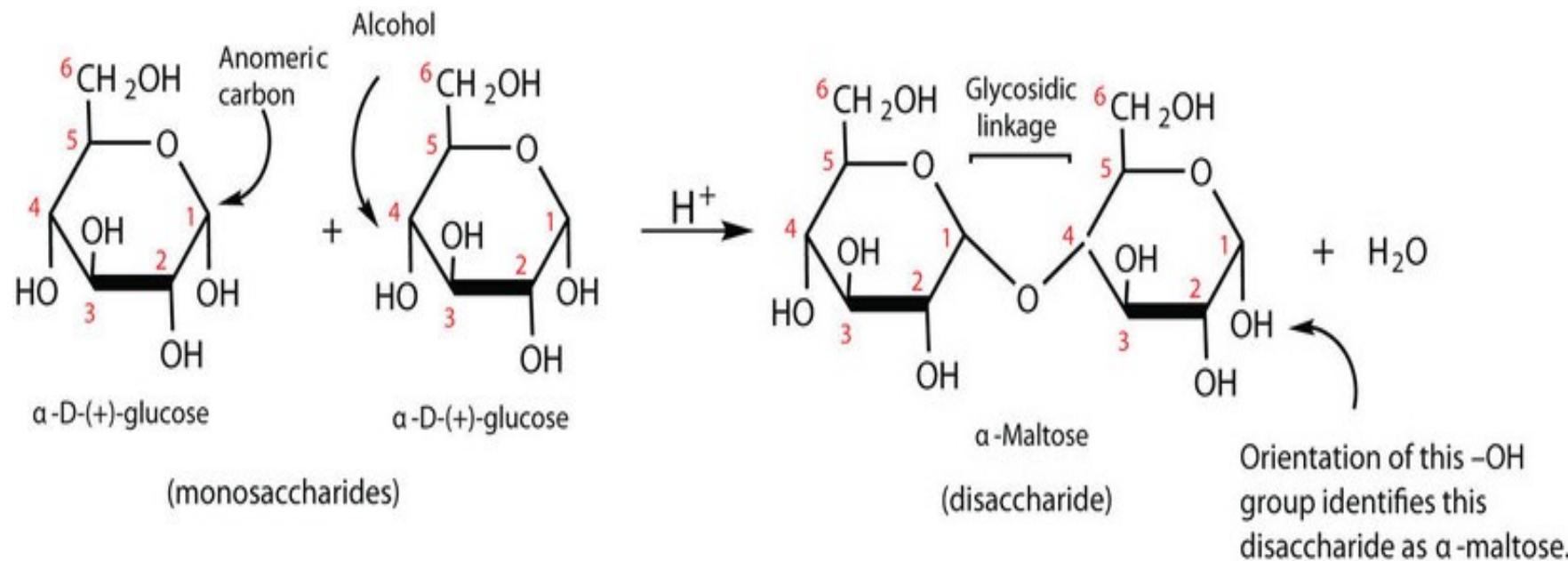


Sucrose

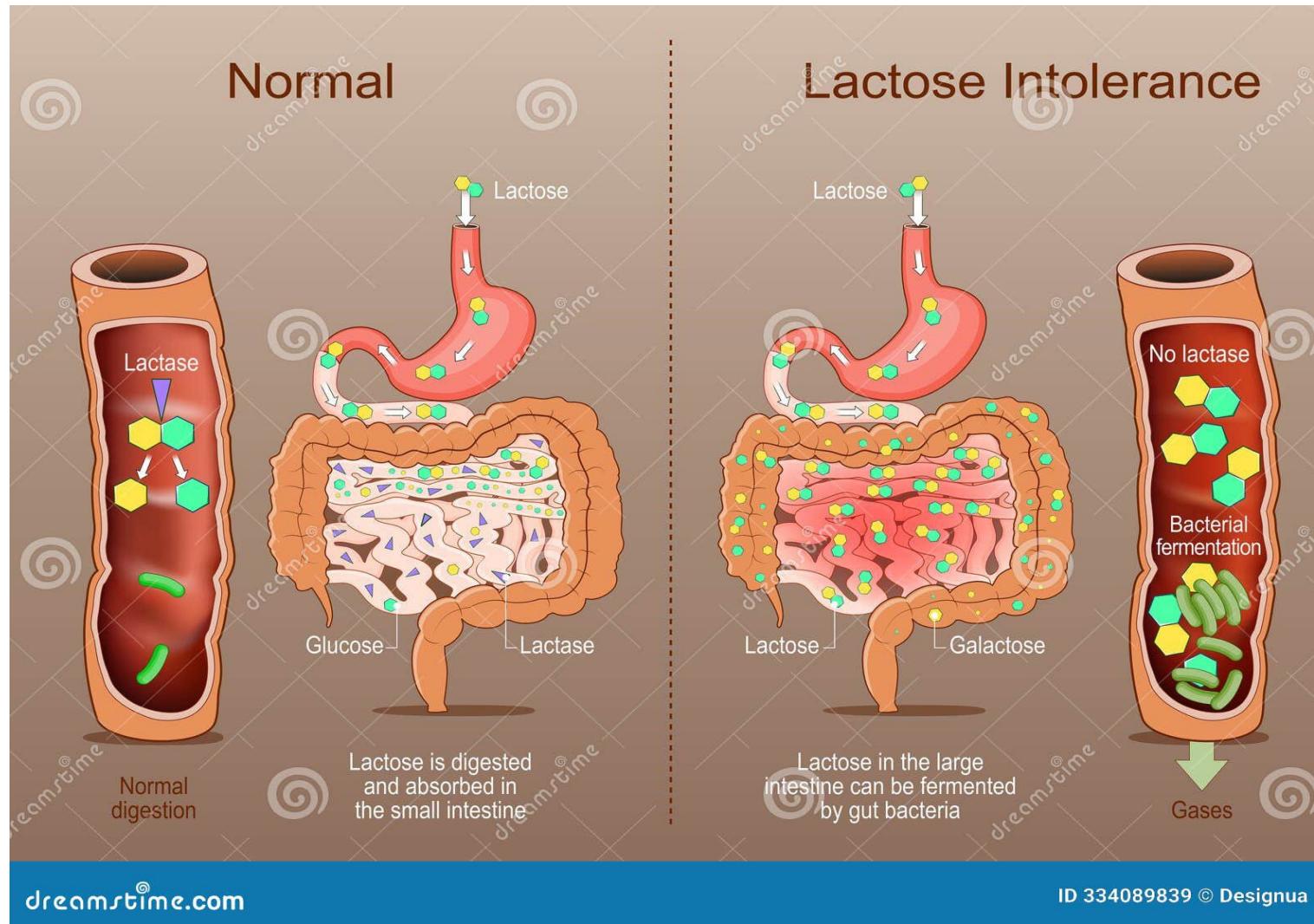
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## STRUCTURE OF DISACCHARIDE VS MONOSACCHARIDE



# DIFFERENCE BETWEEN NORMAL DIGESTION VS LACTOSE INTOLERANCE DIGESTION



# STRUCTURAL FORMULA AND MOLECULAR FORMULA FOR MALTOSE

## Maltose (Maltobiose)

Malt sugar  
Disaccharide  
Reducing sugar

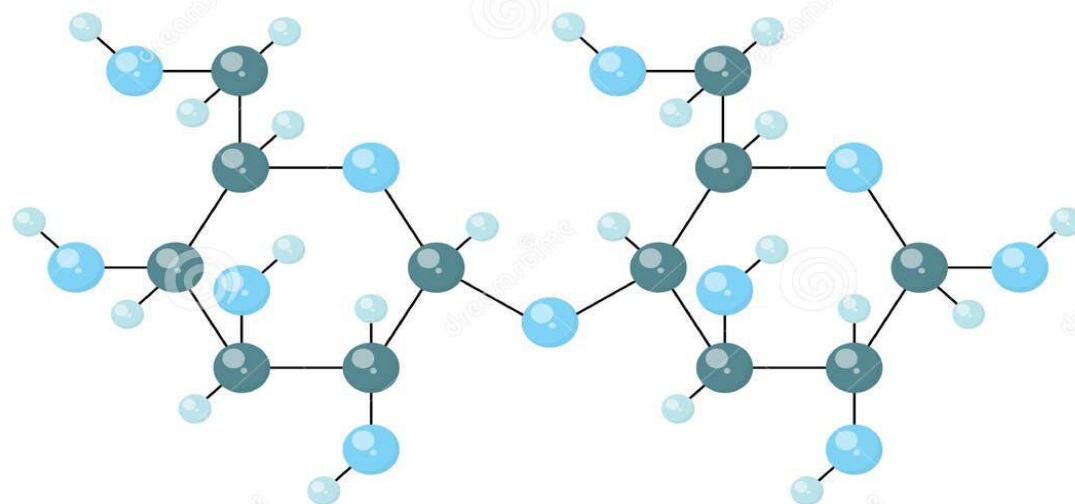
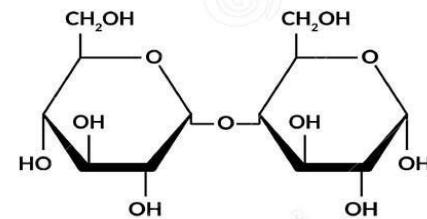
VECTOR OBJECTS  
EPS 10

Molecular Formula of  
Maltose:

$C_{12}H_{22}O_{11}$

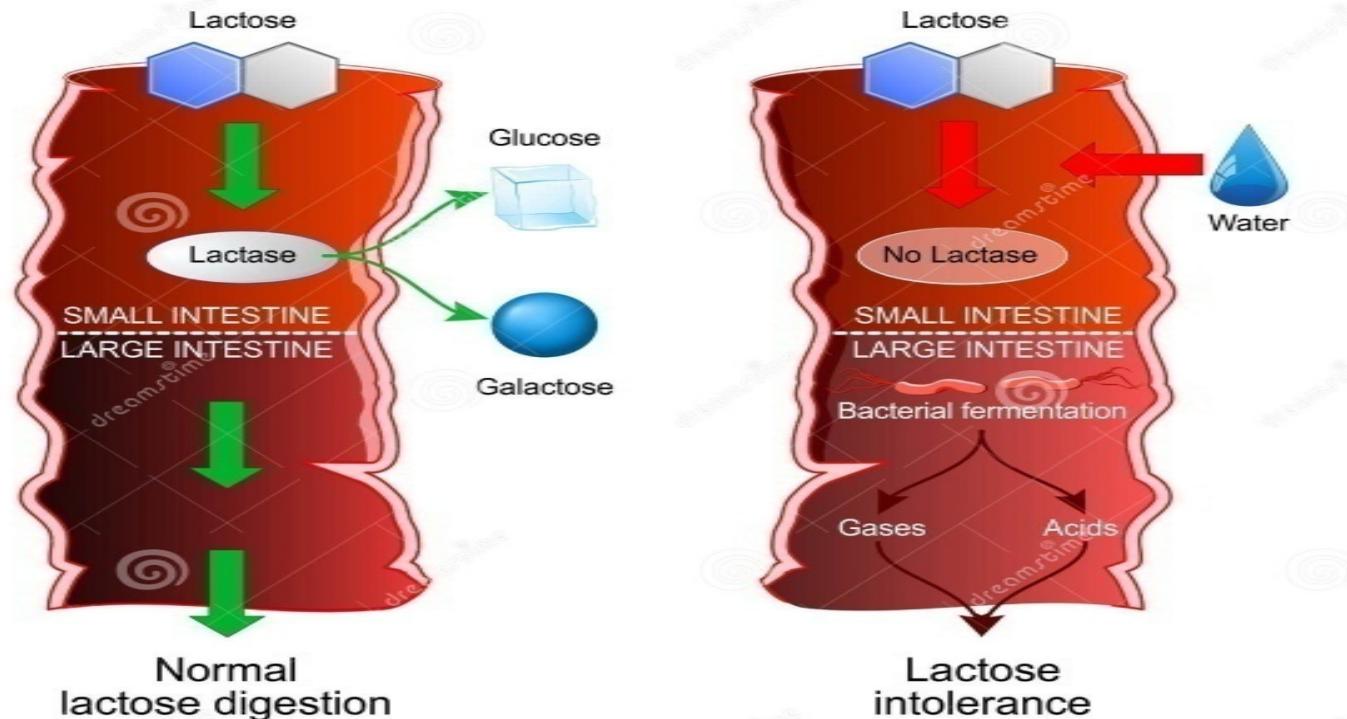
 C Carbon  
 O Oxygen  
 H Hydrogen

Structural Formula of  
Maltose:



# LACTOSE INTOLERANCE IN SMALL INTESTINE AND LARGE INTESTINE

## Lactose Intolerance



dreamstime.com

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Lactose plays a central role in milk and is considered an exotic sugar in nature.

Milk has two types of protein, whey and casein. Both contain lactose.



Milk



Forsythia flowers



Some tropical shrubs

## Evolution of Lactose as the Main Carbohydrate in Milk



**Why lactose not glucose is used as energy carrier for breast feeding?**



**Lactose is the only source of galactose which is a major component of human and higher primate brains.**



**Galactose plays an important role in the biosynthesis of glycoproteins, and glycolipids.**



**Galacto-oligosaccharides have Prebiotic properties.**

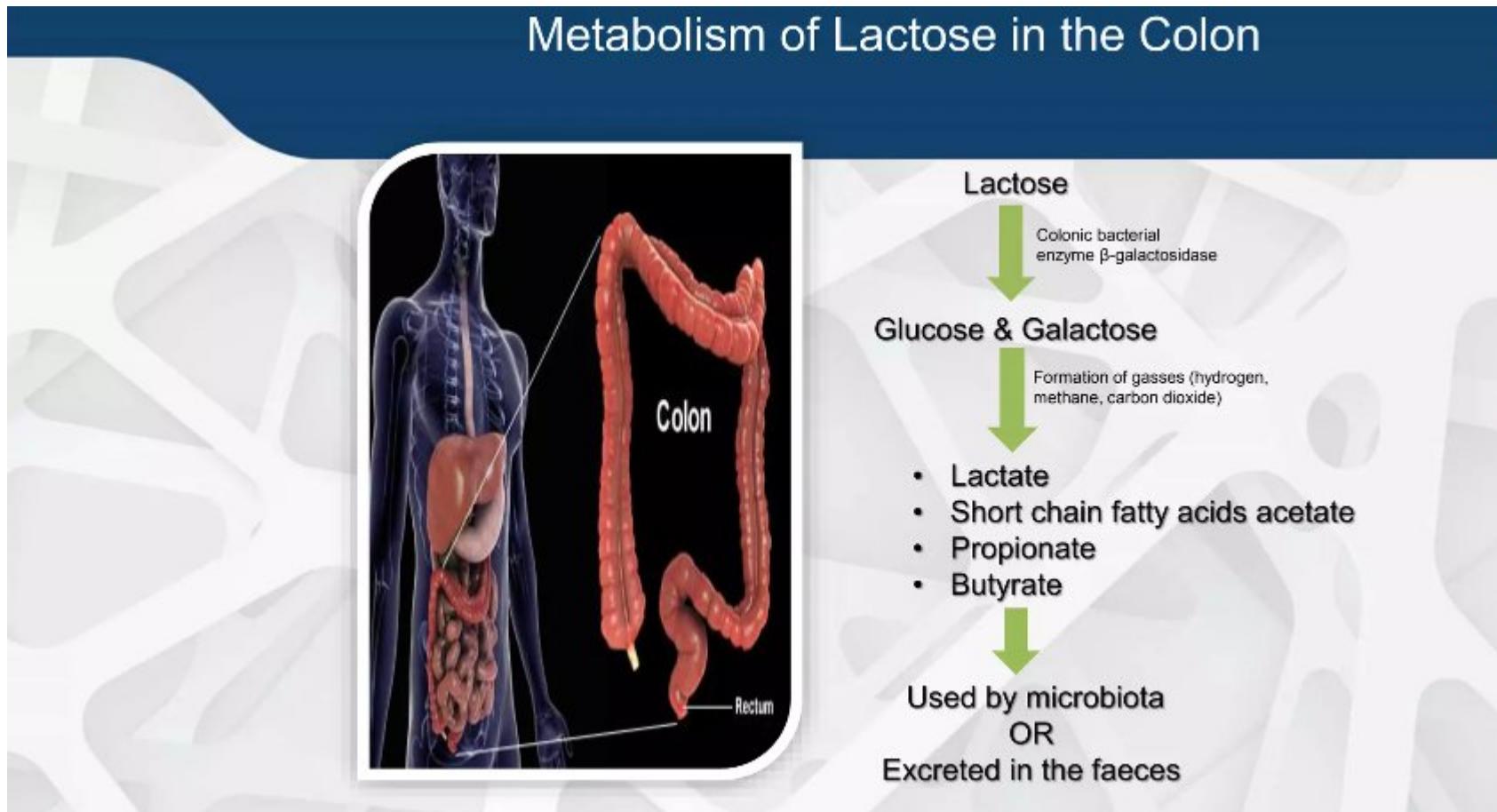


**Galactose helps in the construction of gangliosides which plays an important role in signal transduction and immunity.**

**Galactose also plays a vital role in myelination that occurs all through 1st year of life.**

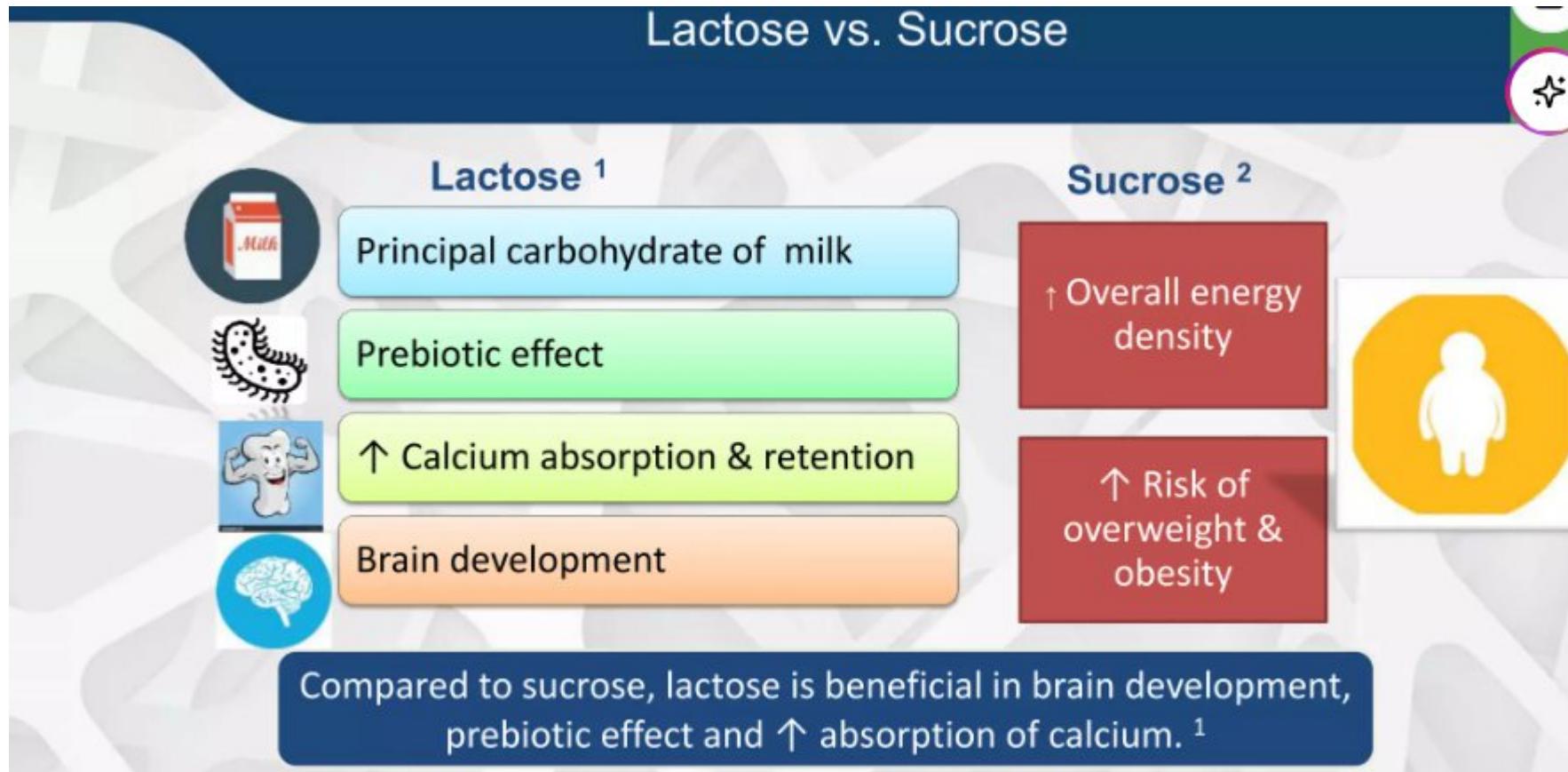
# METABOLISM OF LACTOSE IN THE COLON AREAS

## Metabolism of Lactose in the Colon



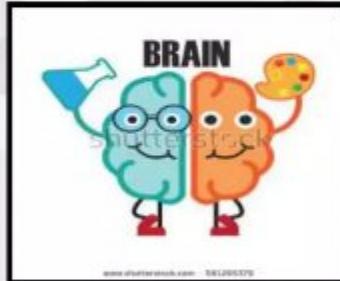
## DIFFERENCE BETWEEN LACTOSE VS SUCROSE

### Lactose vs. Sucrose



## Lactose and Brain Development

Majority of galactose incorporated into brain myelin lipids is obtained from lactose<sup>1</sup>



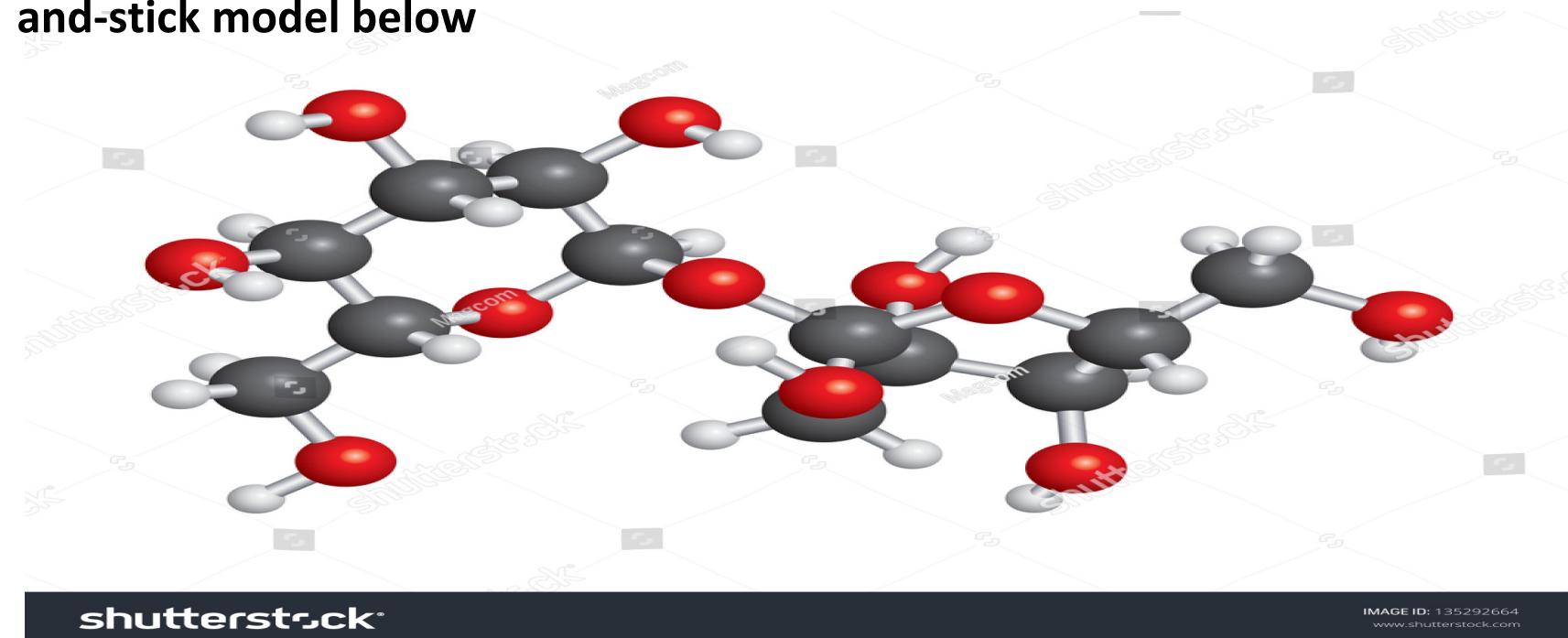
Rapid myelination that occurs all through first 1 year of life needs continuous supply of adequate galactose.

Lactose facilitates synthesis of cerebrosides and thus helps in myelination of CNS.<sup>2</sup>

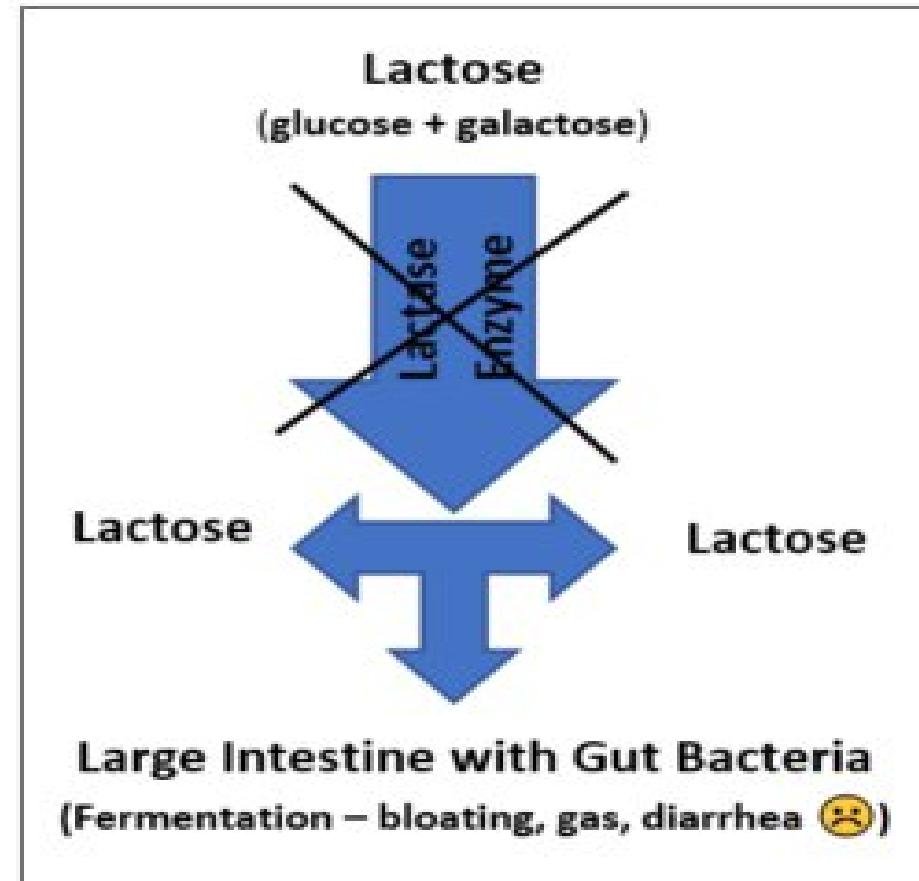
Breast fed babies have at least 8 points higher IQ in later life <sup>2</sup>

## ASSESSMENT

Which disaccharide is represented in the 3D ball-and-stick model below



## LACTOSE INTOLERANCE



## REFERENCES

1. Nelson, D. L., & Cox, M. M. *Lehninger Principles of Biochemistry* (Latest ed.). - Chapters on carbohydrates (covers sucrose, lactose, maltose).
2. Berg, J. M., Tymoczko, J. L., Gatto, G. J., & Stryer, L. *Biochemistry* (Stryer). – Clear explanations of glycosidic bonds and disaccharides.
3. Voet, D., Voet, J. G., & Pratt, C. W. *Fundamentals of Biochemistry: Life at the Molecular Level*.
4. Murray, R. K. et al. *Harper's Illustrated Biochemistry*. – Very popular for medical and health sciences.
- Online / Open Educational Resources 5. *LibreTexts Chemistry – Carbohydrates* – Detailed sections on mono-, di-, and polysaccharides. (Good for diagrams and simple explanations)



# Thank You

