BIOMOLECULES AND STRUCTURAL BIOLOGY

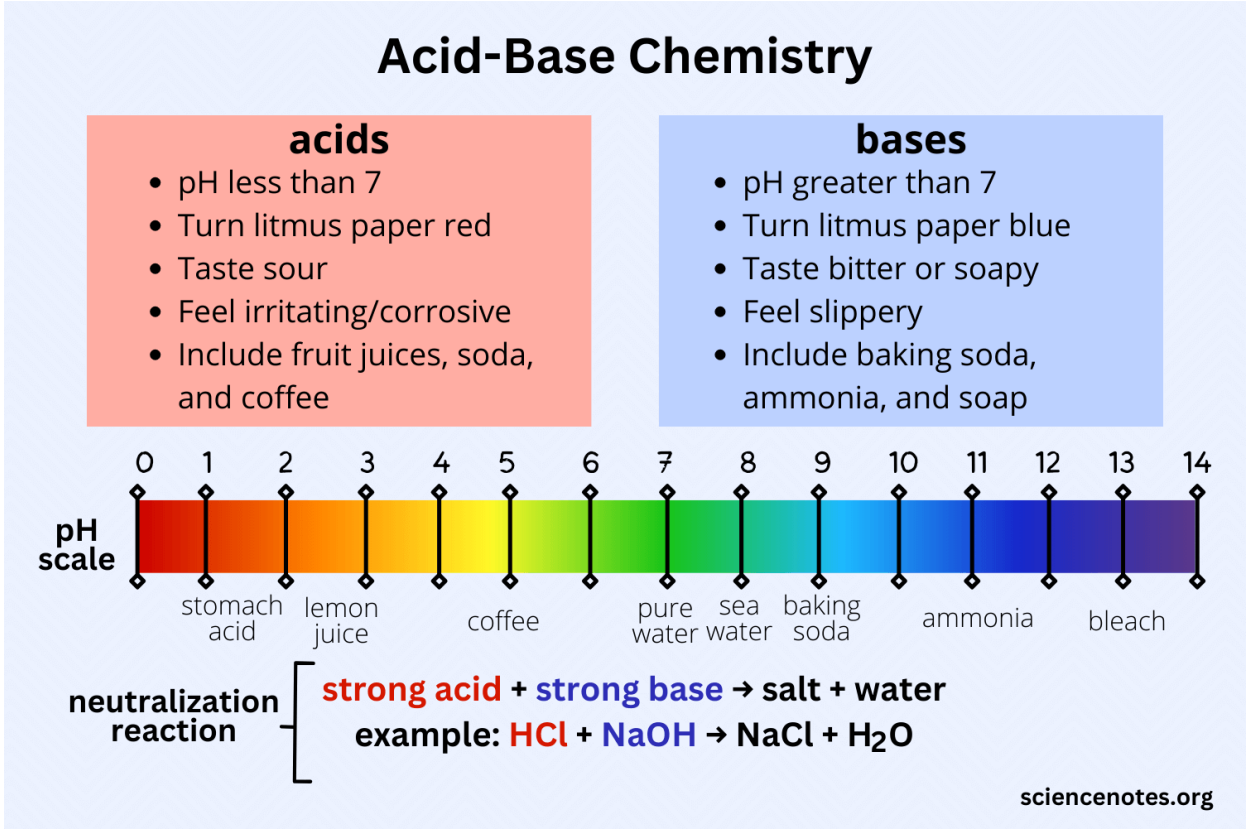
[22ZOOC13]

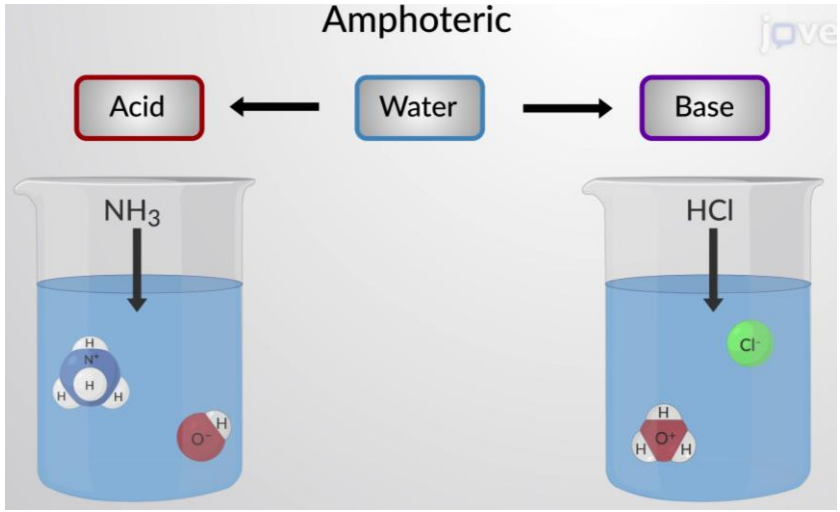
Fundamentals of Biomolecules and Structural Biology

UNIT 1

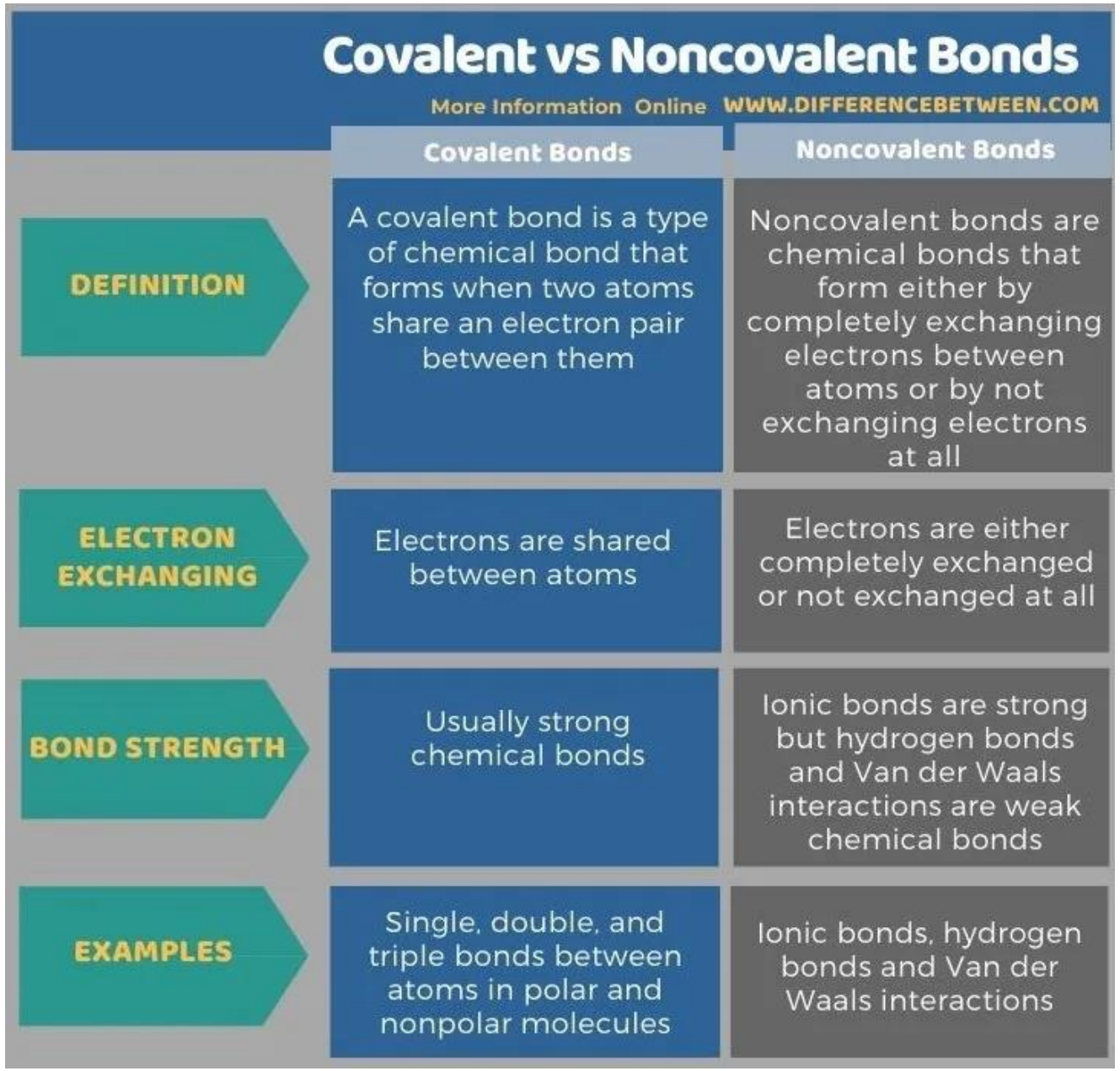
Importance of Biochemistry:

- **Biochemistry** is one of the branches of **chemistry** which deals with the chemical basis of life in plants and animals.
- It is used in clinical diagnosis, manufacture of various biological products, treatment of diseases, in nutrition, agriculture, etc.
- It tries to explain life in terms of biochemical reactions, including other sciences as Anatomy, Medicine, Agriculture, pharmacy, etc.





pH scale has values ranging from zero (the most acidic) to 14 (the most basic). As you can see from the pH scale above, pure water has a pH value of 7. This value is considered neutral—neither acidic or basic.



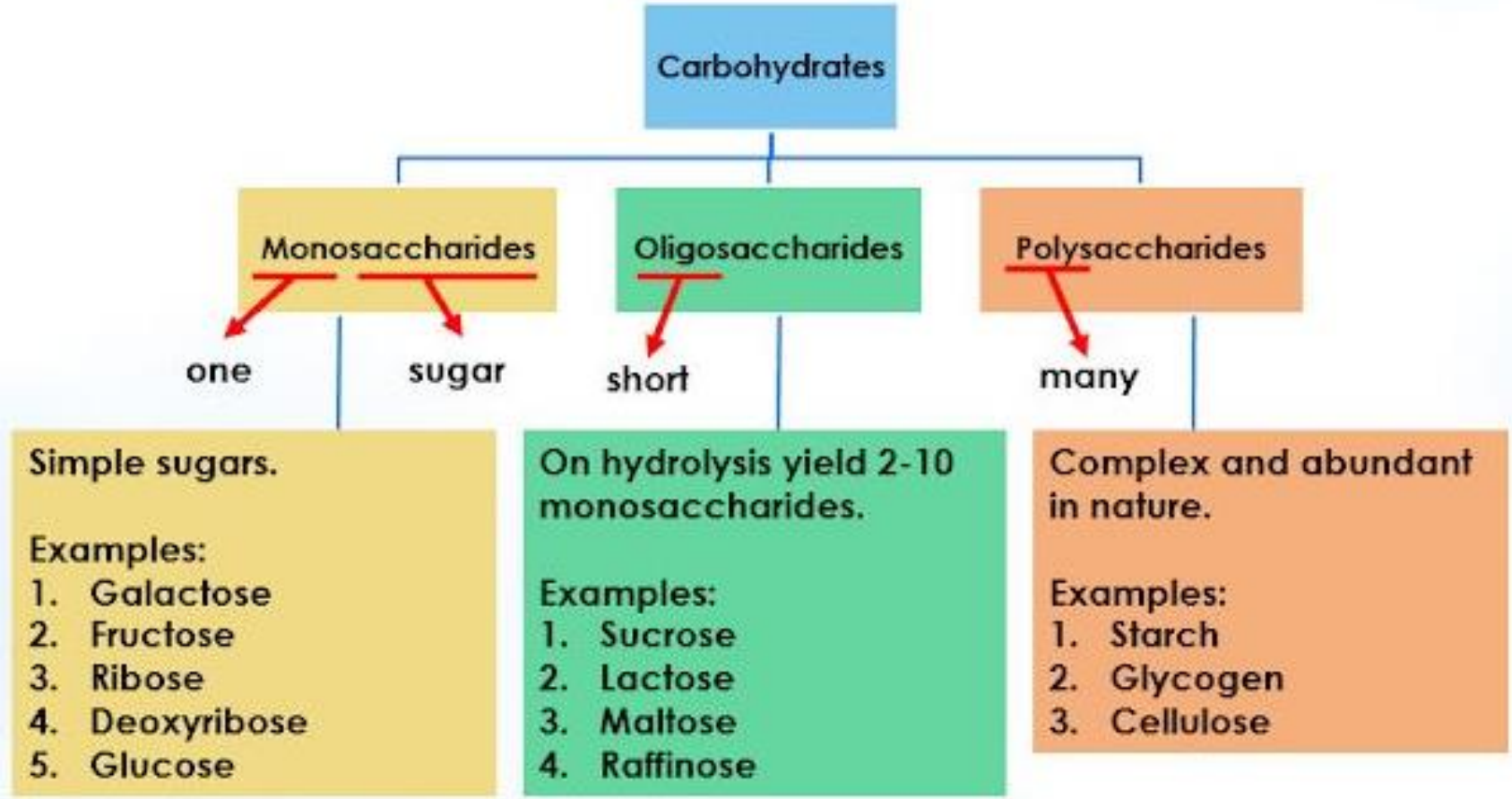
Types of Biochemical Reactions

- Hydrolysis
- Dehydration Synthesis
- Redox
- Neutralization

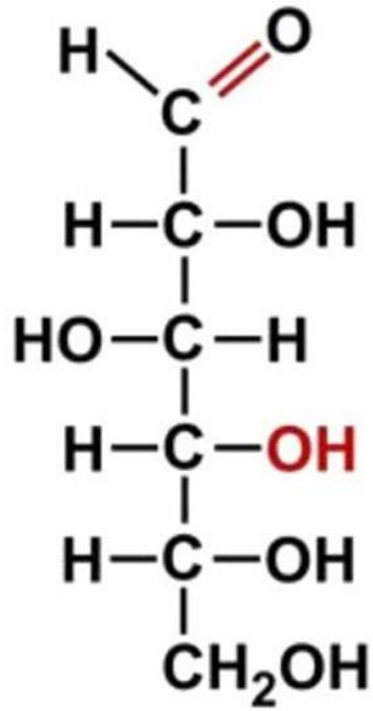
A biochemical reaction is the transformation of one molecule to a different molecule inside a cell. Biochemical reactions are mediated by enzymes, which are biological catalysts that can alter the rate and specificity of chemical reactions inside cells.

UNIT 2

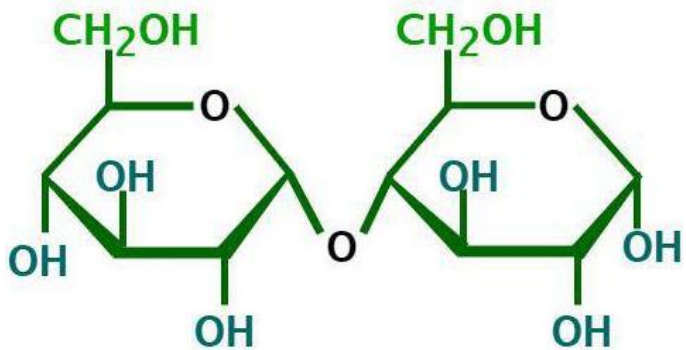
Carbohydrates and its classification



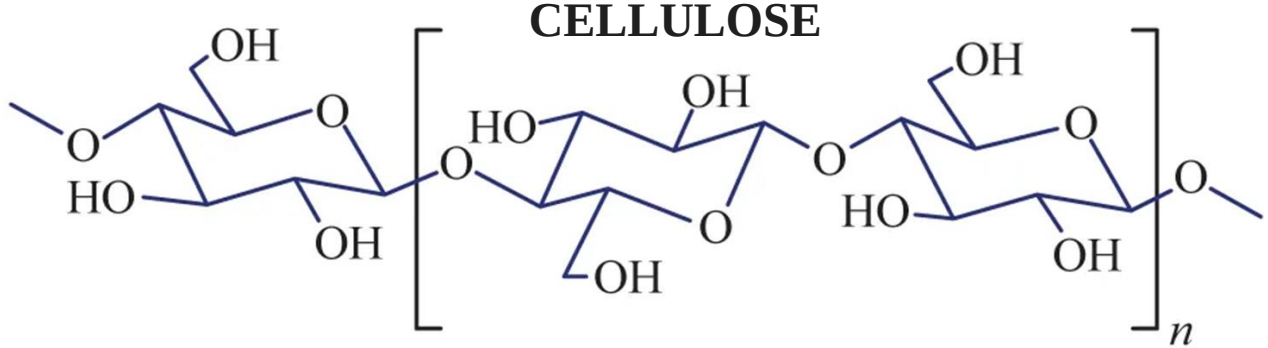
GLUCOSE

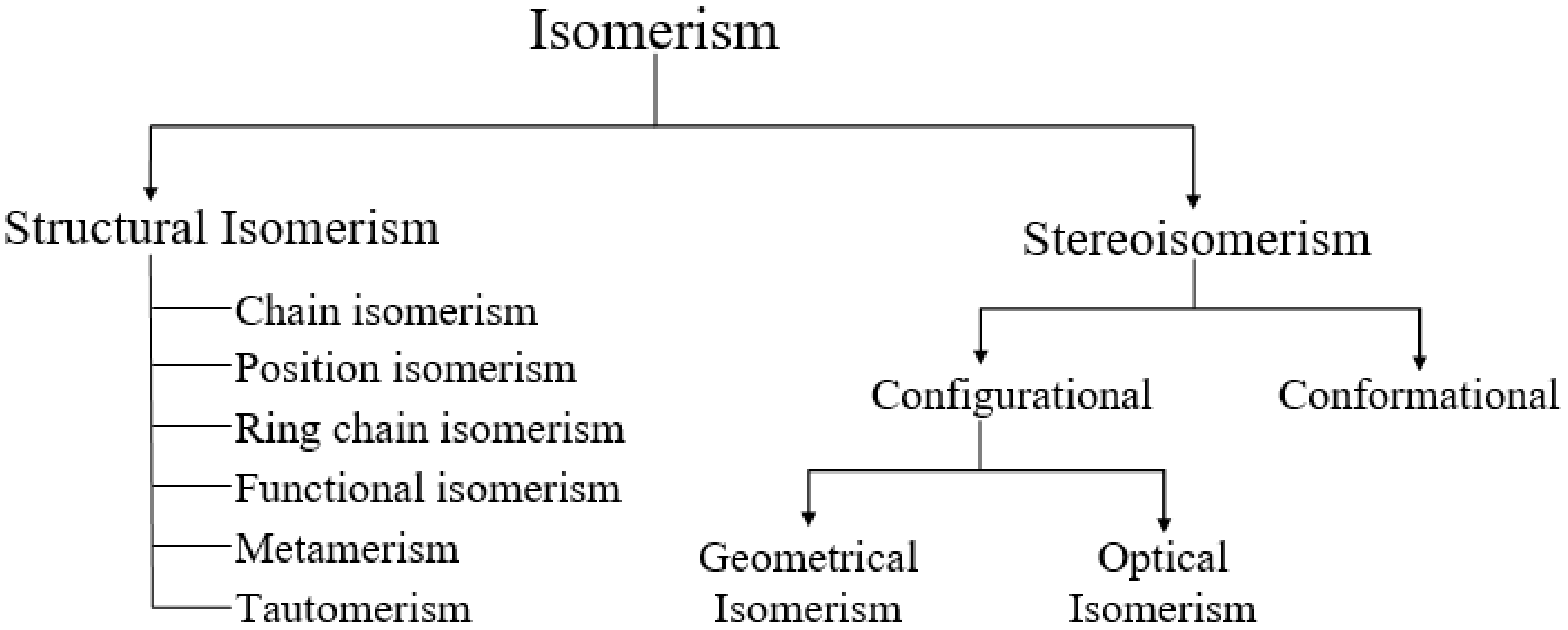


MALTOSE



CELLULOSE

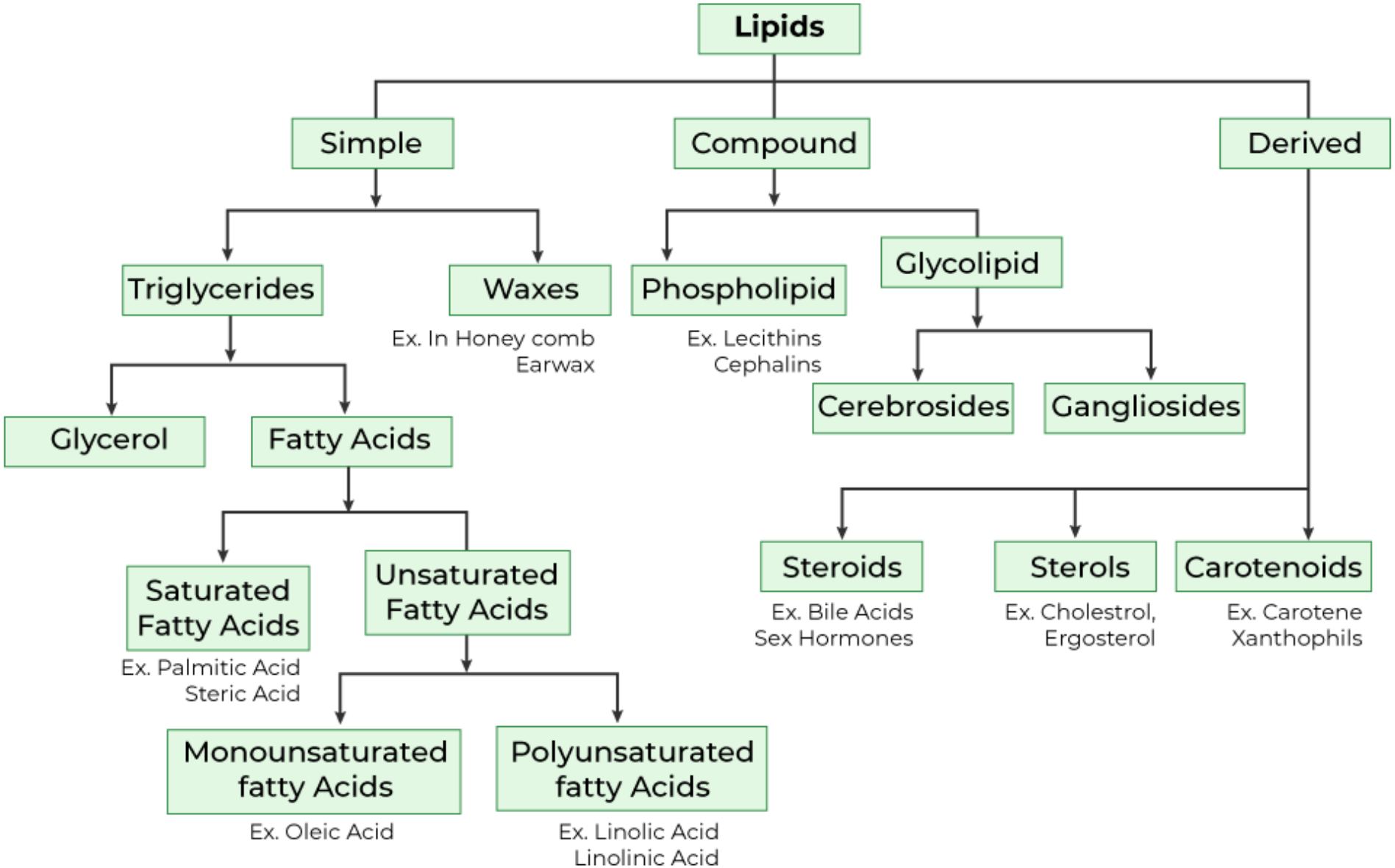




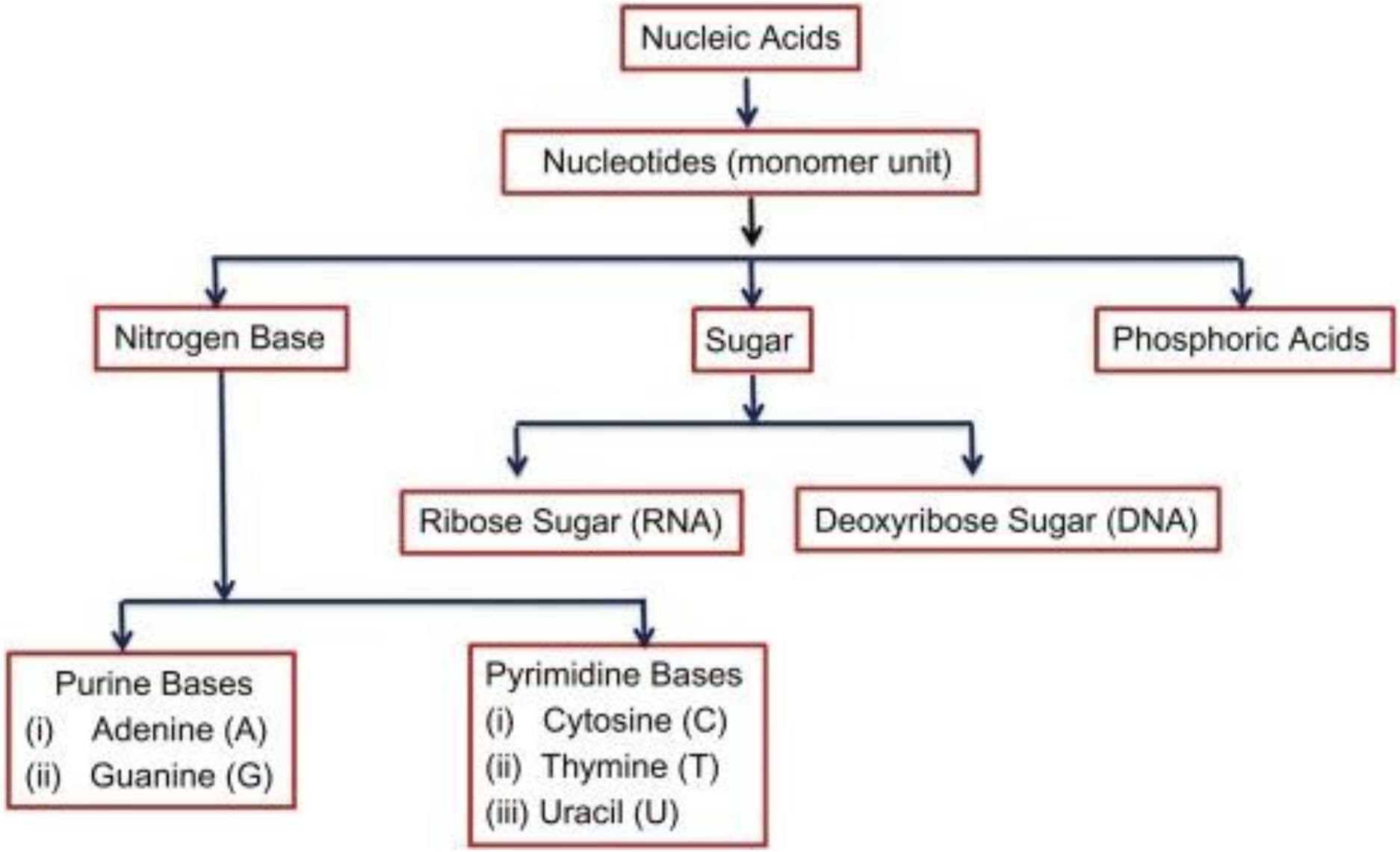
- Isomers are important because they have different properties, even though they have the same molecular formula.
- Isomers can have different physical properties, such as melting and boiling points, and optical rotation. They can also have different chemical reactions.
- Isomerism finds its importance in the field of clinical pharmacology and pharmacotherapeutics, as isomers differ in their pharmacokinetic and pharmacodyanmic properties. Drug isomerism has opened a new era of drug development.

UNIT 3

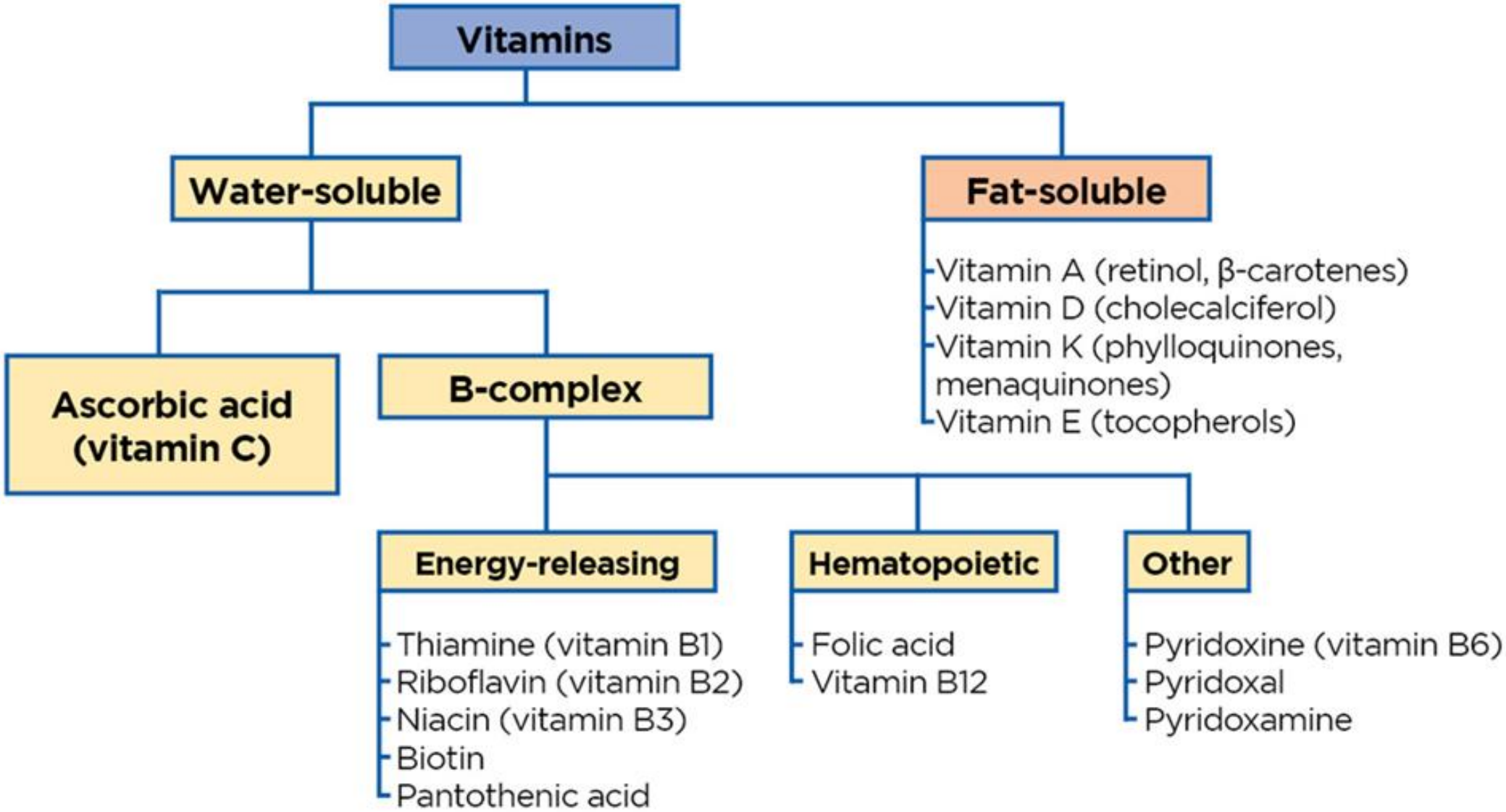
CLASSIFICATION



CLASSIFICATION



CLASSIFICATION

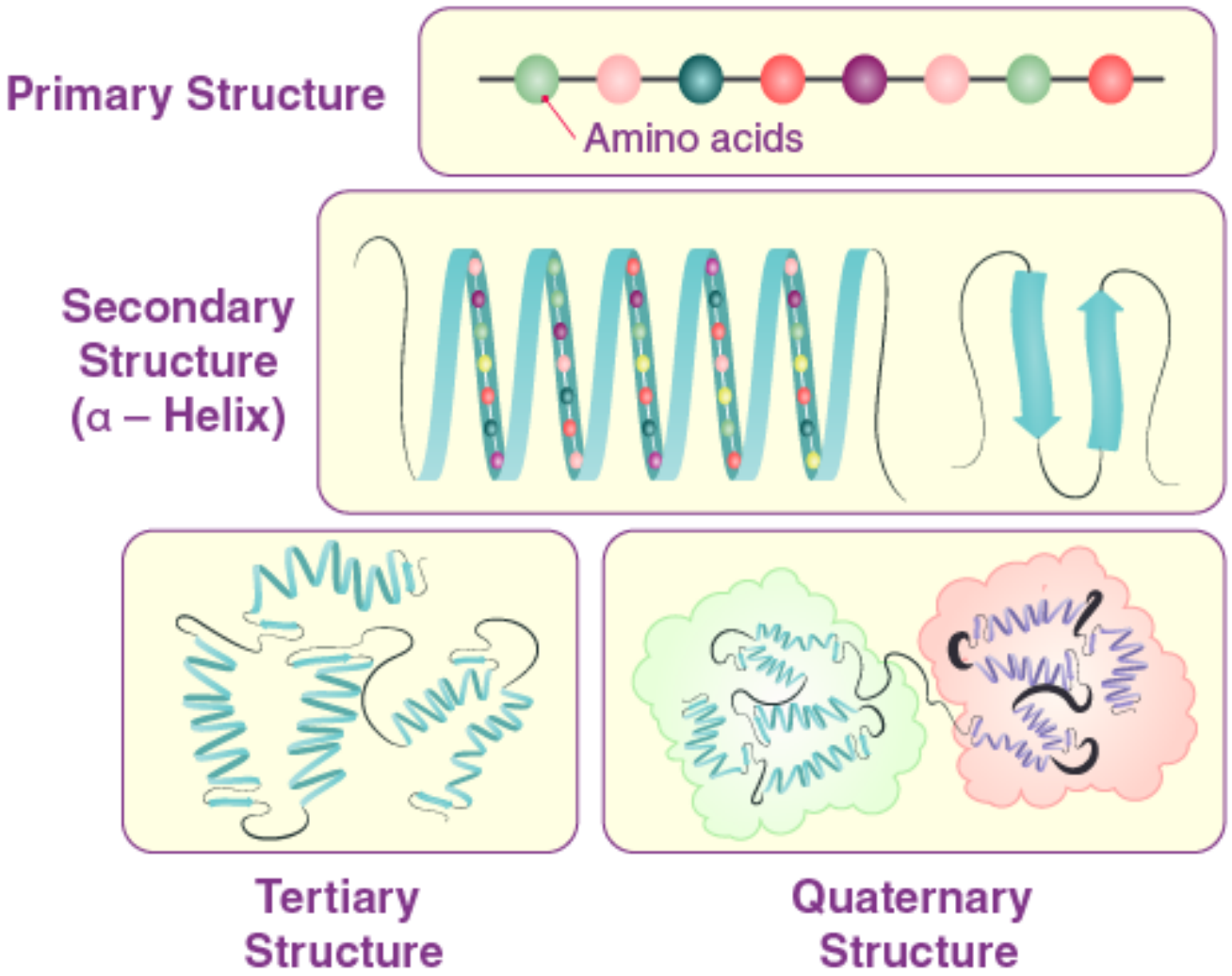


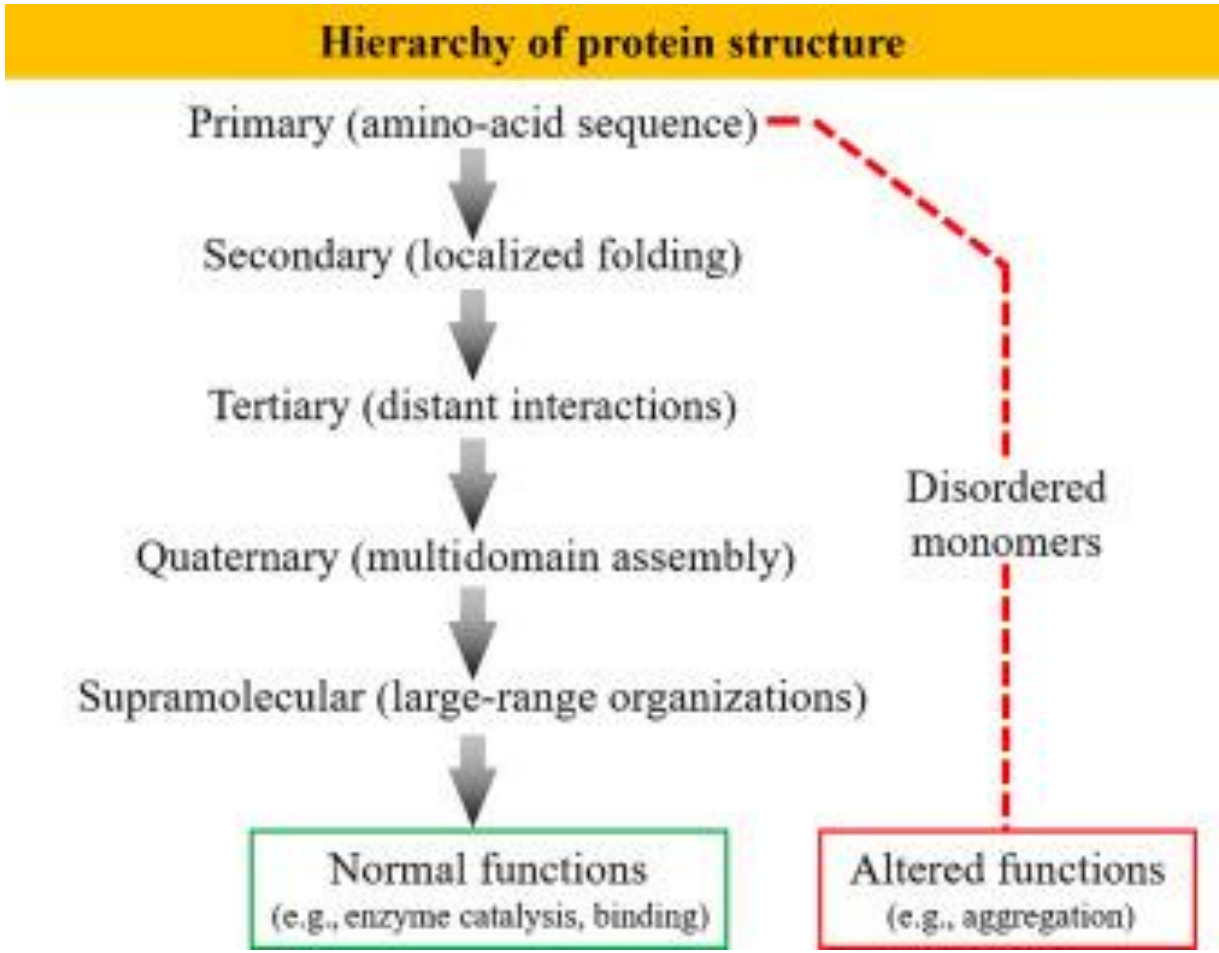
UNIT 4

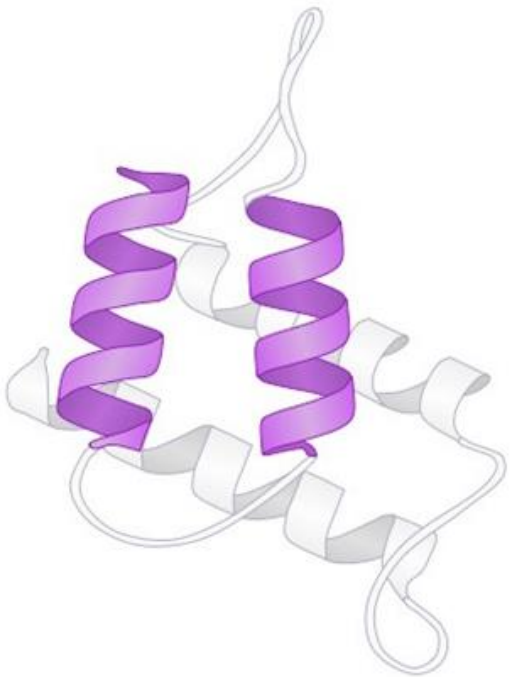
CLASSIFICATION

Essential	Conditionally Non-Essential	Non-Essential
Histidine	Arginine	Alanine
Isoleucine	Cystine	Asparagine
Leucine	Glutamine	Aspartate
Lysine	Glycine	Glutamate
Methionine	Proline	Serine
Phenylalanine	Tyrosine	
Threonine		
Tryptophan		
Valine		

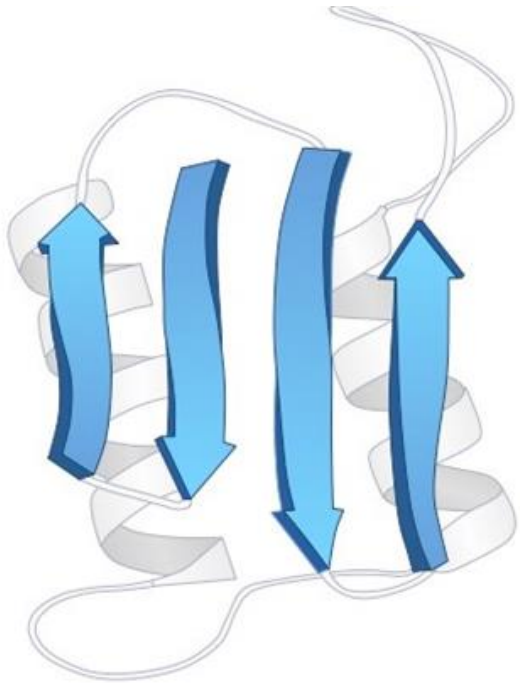
ORDER OF PROTEIN STRUCTURE AND ITS SIGNIFICANCE



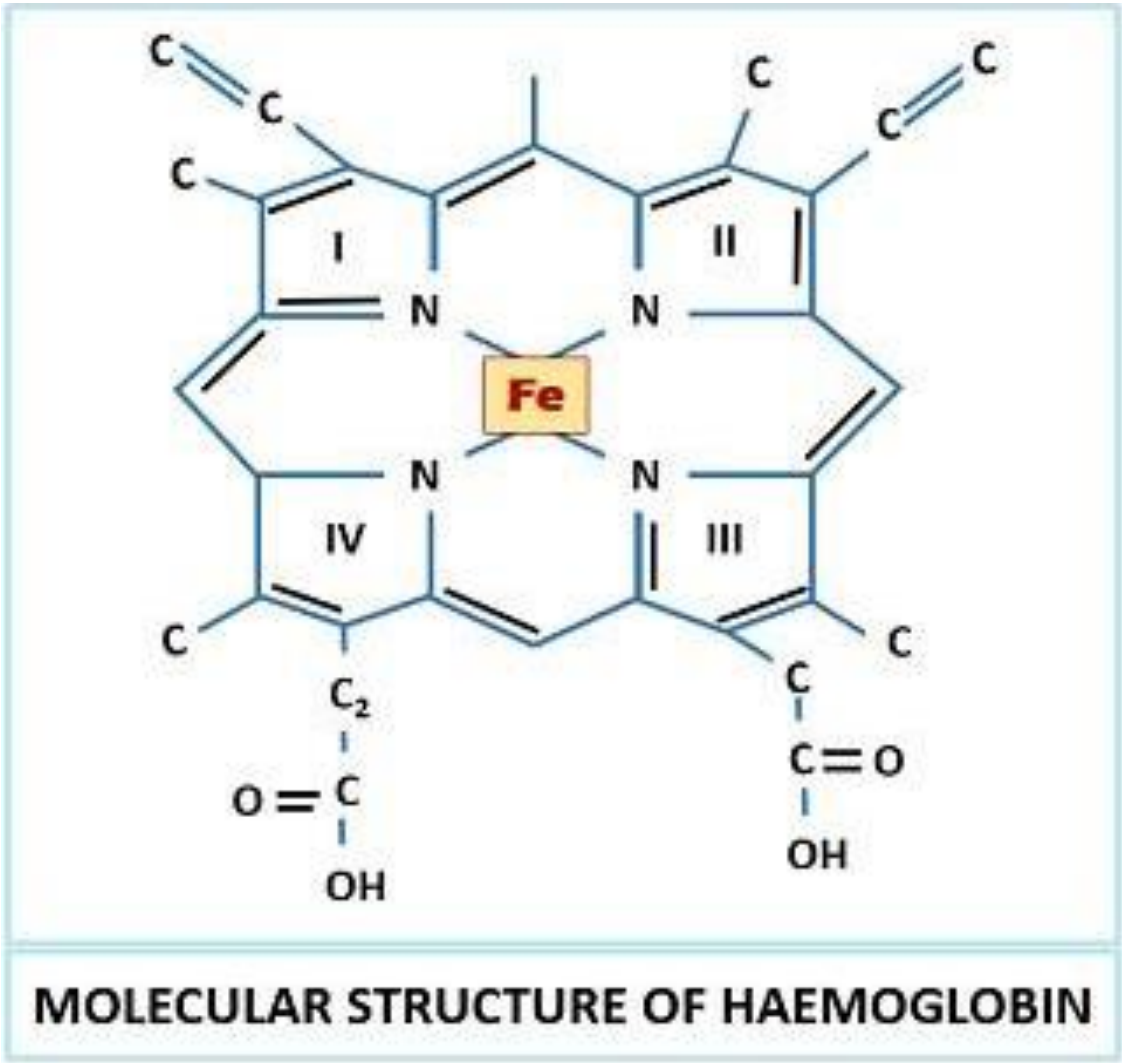




α - helices



β - pleated sheets



MOLECULAR STRUCTURE OF HAEMOGLOBIN

UNIT 5

CLASSIFICATION

Class	Nature of reaction catalyzed
Oxidoreductases	Oxidation - reduction
Transferases	Group transfer
Hydrolases	Cleavage of chemical bond by hydrolysis
Lyases	Non hydrolytic cleavage of chemical bond
Isomerases	Isomerization of substrates into structural or optical isomers
Ligases	Joining of two substrate molecules by forming new covalent bond

MEASUREMENT OF ENZYME ACTIVITY

1. It is a convenient method of enzyme quantitation.

2. The activity is related to concentration .

3. Common methods might photometrically measure :

- an increase In product concentration.
- a decrease in substrate concentration.
- a decrease in coenzyme concentration.
- an increase in the concentration of an altered coenzyme.