



Pharmacognosy



Unit 4



Introduction to Metabolites of Plant Origin and Traditional Systems of Medicine



Nature's Chemistry
Bioactive Potential



Traditional Systems
Timeless Practices



Evidence & Validation
Science Meets Tradition



Integrated Learning
Knowledge for Wellness



Plant
Metabolites



Traditional
Wisdom



Holistic
Healing

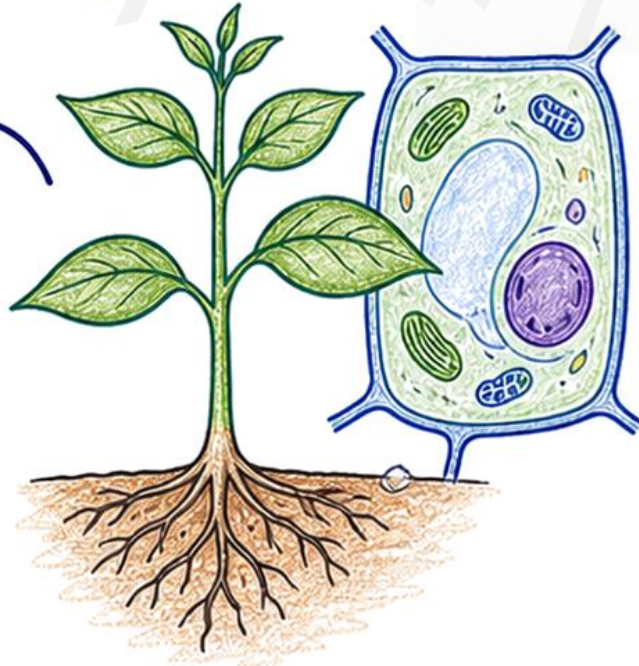


PLANT METABOLITES

- Plant metabolites are compounds synthesized or modified by plants through cellular metabolism.
- They range from small molecules to complex polymers and occur in different tissues, developmental stages, and species.
- Their amounts vary with genetics, plant part, age, season, environment, harvest, and storage.
- In pharmacognosy they support identity, quality assessment, standardization, and discovery of useful compounds.
- Primary metabolites support core growth and reproduction. Specialized (secondary) metabolites mainly mediate defence, signalling, attraction, and environmental interactions; the boundary is not absolute.

Primary metabolites

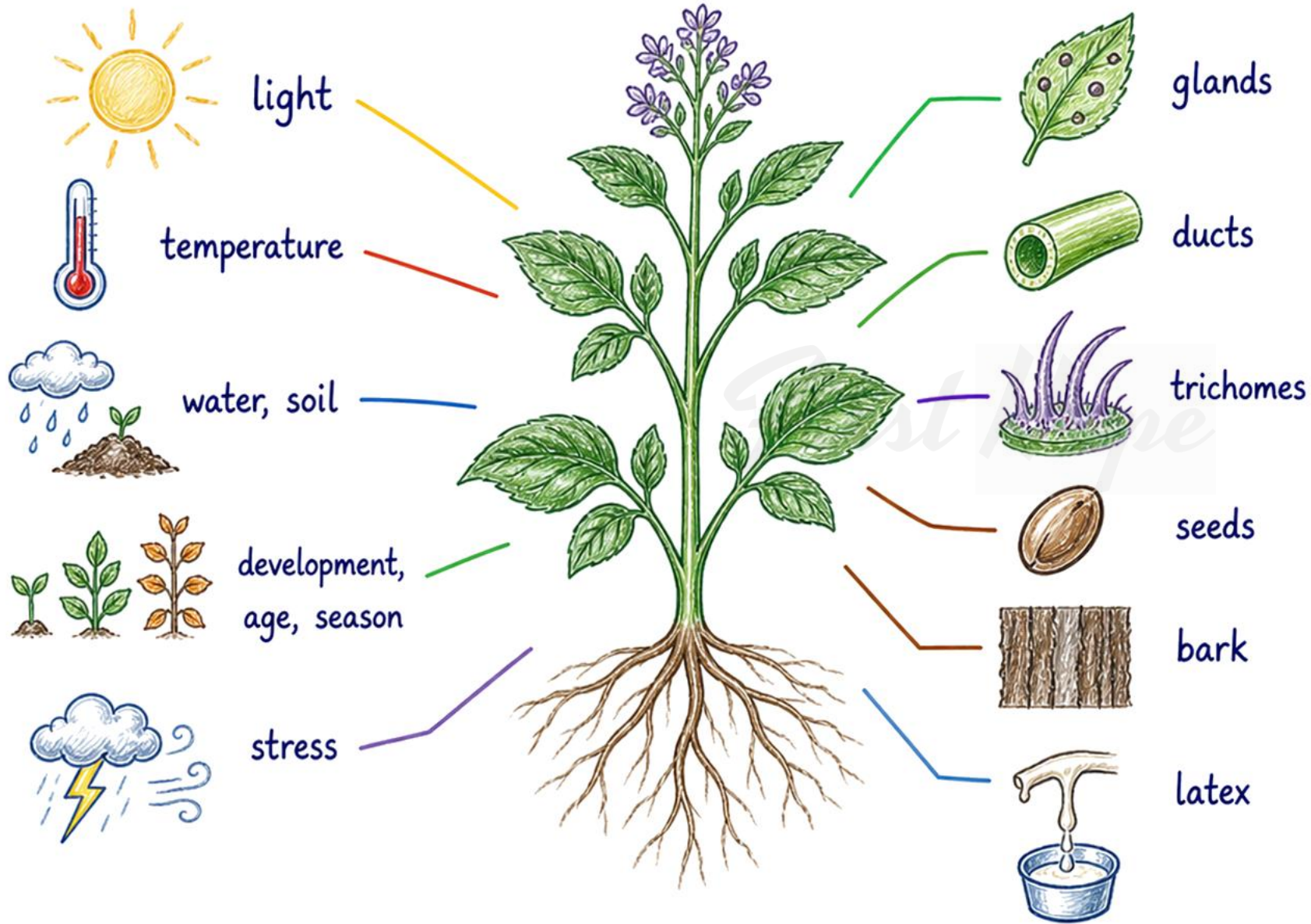
Primary metabolites support core growth and reproduction.



Specialized (secondary) metabolites

Specialized (secondary) metabolites mainly mediate defence, signalling, attraction, and environmental interactions; the boundary is not absolute.

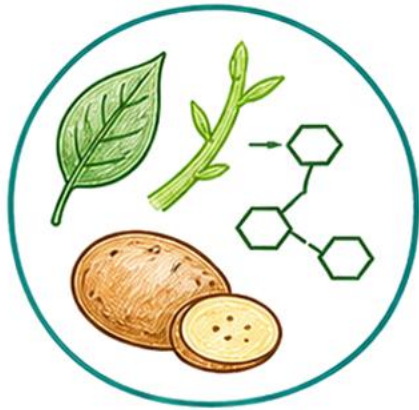
GENERAL PROPERTIES OF PLANT METABOLITES



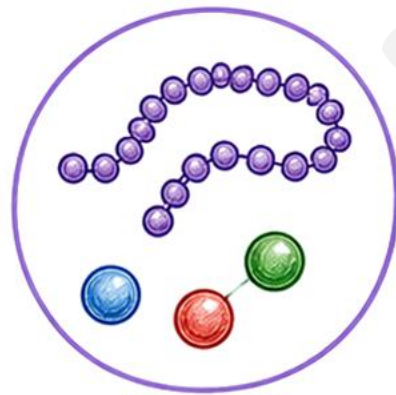
- Plants produce chemically diverse metabolites through regulated enzyme pathways.
- Some, such as sugars and amino acids, are widespread; others are restricted to particular taxa or tissues.
- Metabolites may function in energy, structure, growth, signalling, pigmentation, defence, or ecological interactions.
- They may accumulate in vacuoles, glands, ducts, trichomes, seeds, bark, latex, or other tissues.
- Concentration depends on genotype, development, light, temperature, water, soil, stress, processing, and storage.
- Medicinal relevance requires correct identity, composition, dose, quality, safety, and evidence - not plant origin alone.

PRIMARY METABOLITES

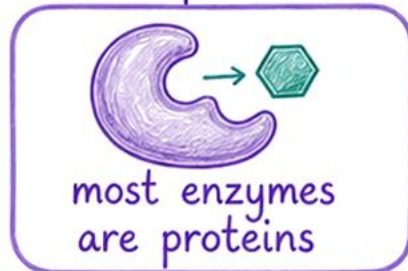
- Primary metabolites participate directly in core cellular growth, maintenance, and reproduction.
- They provide energy, structural material, genetic information, catalysts, storage reserves, and metabolic precursors.
- Major groups include carbohydrates, amino acids and proteins, lipids, nucleic acids, and related intermediates.
- Most enzymes are proteins, so enzymes should not be treated as a completely separate chemical class.
- These metabolites occur widely, but their amounts change with tissue and developmental state; "large quantity" is not universal.
- In pharmacognosy they contribute nutrients, excipients, diagnostic features, processing behaviour, and quality attributes.



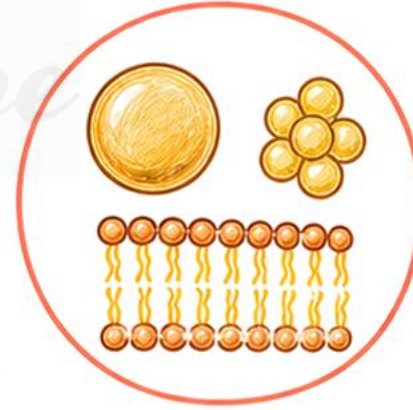
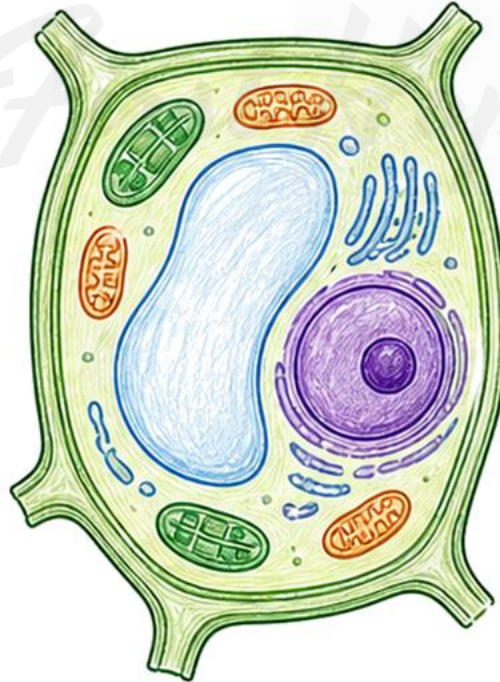
carbohydrates



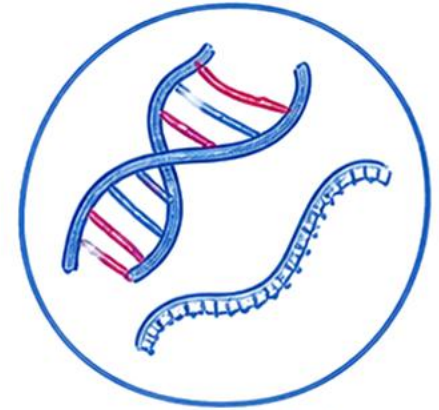
amino acids
and proteins



most enzymes
are proteins

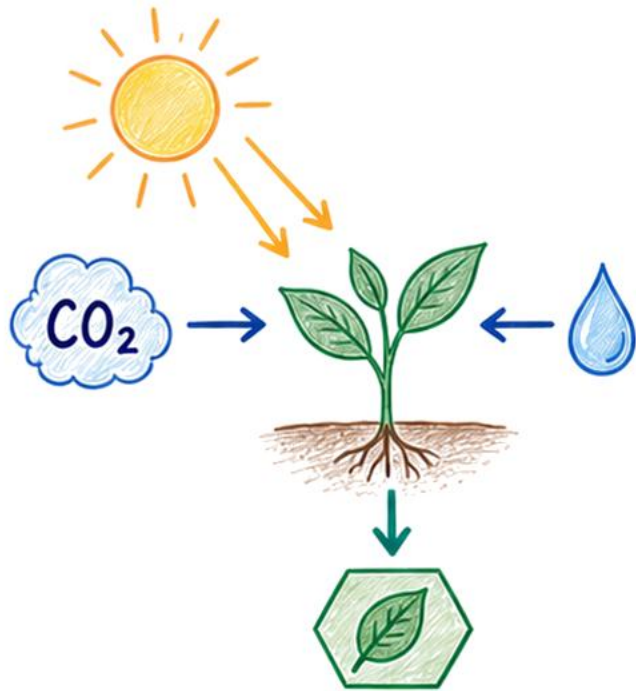


lipids



nucleic acids
and related
intermediates

CARBOHYDRATES: FORMATION AND CLASSIFICATION



Carbohydrates
that supply sugars and
other plant constituents.

MONOSACCHARIDES

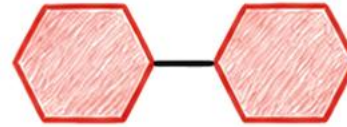
Single sugar unit



Examples:
glucose, fructose,
and galactose

DISACCHARIDES

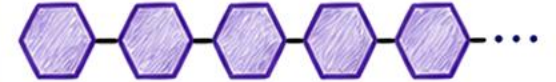
Two sugar units
linked together



Examples:
sucrose and
maltose

POLYSACCHARIDES

Many sugar units
linked together



Examples:
starch, cellulose,
pectin, and inulin

- Photosynthesis fixes carbon dioxide into triose phosphates that supply sugars and other plant constituents.
- Carbohydrates contain monosaccharide units, but sweetness, crystallinity, and water solubility vary widely.
- Monosaccharides include glucose, fructose, and galactose; disaccharides include sucrose and maltose.
- Lactose is a standard disaccharide example but is characteristic of milk, not a normal plant carbohydrate.
- Plant polysaccharides include starch, cellulose, pectin, and inulin. Glycogen is common in animals and fungi, not the usual plant storage polysaccharide.
- Classification depends on sugar-unit number and linkage.

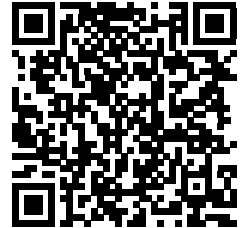


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