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Primary & Secondary Metabolite

Plants and animals produce thouands type of chemicals. Some of the organic compound like carbohydrates, fats, proteins, nucleic acids, chorophylls are required for their basic metabolic processes. These compounds are called **Primary Metabolites.**

When one analysed plants, fungal and microbial cells, one would see thouands of compounds other than these primary metabolites, eg. alkaloids, rubber, essential oil, antibiotics, pigments, scents, gums, spices. These are called **"secondary Metabolites"**.

* Primary metabolites have identifiable functions and play known roles in normal physiological processes.

* Some 2° metabolites have Ecological importance.
* we do not know the function of all the secondary metabolites, but many of them are useful to human welfare.

Examples of some secondary metabolites.

* Pigments – Carotenoids, Anthocyanins etc
* Alkaloids - Morphine, Codeine etc.
* Terpenoids - Monoterpens, Diterpenes etc.
* Essential oils - Lemon grass oil
* Toxins - Abrin, Ricin
* Lectins - Concanavalin A
* Drugs – Vinblastin, curcumin etc.
* Polymeric substance - Rubber, gums, cellulose.

** Dynamic state of Body Constituents – concept of Metabolism

* All organism possess thousands of organic compounds. These are present in certain concentrations (expressed as mols/cells or mols/litre etc).

* All these biomolecules have a turn over. This means they are constantly being changed into some other biomolecules and also made from other biomolecules. This breaking and making is through chemical reactions constantly occuring in living organisms. Together all these chemical reactions are called "**Metabolism**".

* Majority of metabolic reactions are linked to other reactions.

* Metabolites are converted into each other in a series of linked reactions are called Metabolic pathways. These Pathway are of two types (a) Linear (b) circular. These pathway criss cross each other.

* Flow of metabolites through metabolic pathway has definite rate and direction, this metabolite flow is called the dynamic state of body constituents.

* All these metabolic reactions are catalysed reactions. → "These Tce rate of Reaction & they are proteins. These proteins are called enzymes"
There is no uncatalysed conversion in living system.

Metabolic Basis For Living :-

Metabolic pathways are of ② types

Anabolic	Catabolic
* Simpler structure converted to complex one	* Complex structure converted to simpler one
eg. Acetic acid → cholesterol	eg. glucose → Lactic acid in our skeletal muscles. → Require 10 metabolic steps k/a glycolysis
* It generally consume energy	* It releases energy & it stores in form of "ATP" → Also k/a Energy currency of cell.

This energy is utilized for biosynthetic process, osmotic and mechanical work that we perform.

Bioenergetics :→ The study of the transformation of energy in living organism.
"Source of energy, store form of energy, how energy is converted into work" ??

The living State :→

All compounds present in living system have particular concentration which is charcterstic of each of them.

For example :- Blood glucose conc. in a normal healthy individual is 4.2 mmol/L – 6.1 mmol/L
Hormones in ng/mL

The most important fact of biological systems is that all living organisms exist in a steady-state characterised by concentrations of each of these biomolecules. These biomolecules are in metabolic flux. The steady state is a non-equilibrium state.

"As Living organisms work continuously, they can not afford to reach equilibrium. Hence the living state is a non-equilibrium steady state to be able to perform work. Living Process is constant effort to prevent falling into equilibrium. This is achieved by energy input. Metabolism provides a mechanism for the production of energy. ∴ Living State and Metabolism are synonymous.

*** * Without metabolism there can not be a living state.