

The logo of Galgotias University is a circular emblem with a stylized 'G' shape. It features three curved, overlapping bands in shades of yellow, blue, and red, set against a light brown background.

Basic Circuit of metabolism-I

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Introduction:

Metabolism is a highly coordinated cellular activity in which many multienzyme systems (metabolic pathways) cooperate to

- (1) obtain chemical energy by capturing solar energy or degrading energy-rich nutrients from the environment;
- (2) convert nutrient molecules into the cell's own characteristic molecules, including precursors of macromolecules
- (3) polymerize monomeric precursors into macromolecules: proteins, nucleic acids, and polysaccharides
- (4) synthesize and degrade biomolecules required for specialized cellular functions, such as membrane lipids, intracellular messengers, and pigments.

➤ Living organisms can be divided into two large groups according to the chemical form in which they obtain carbon from the environment.

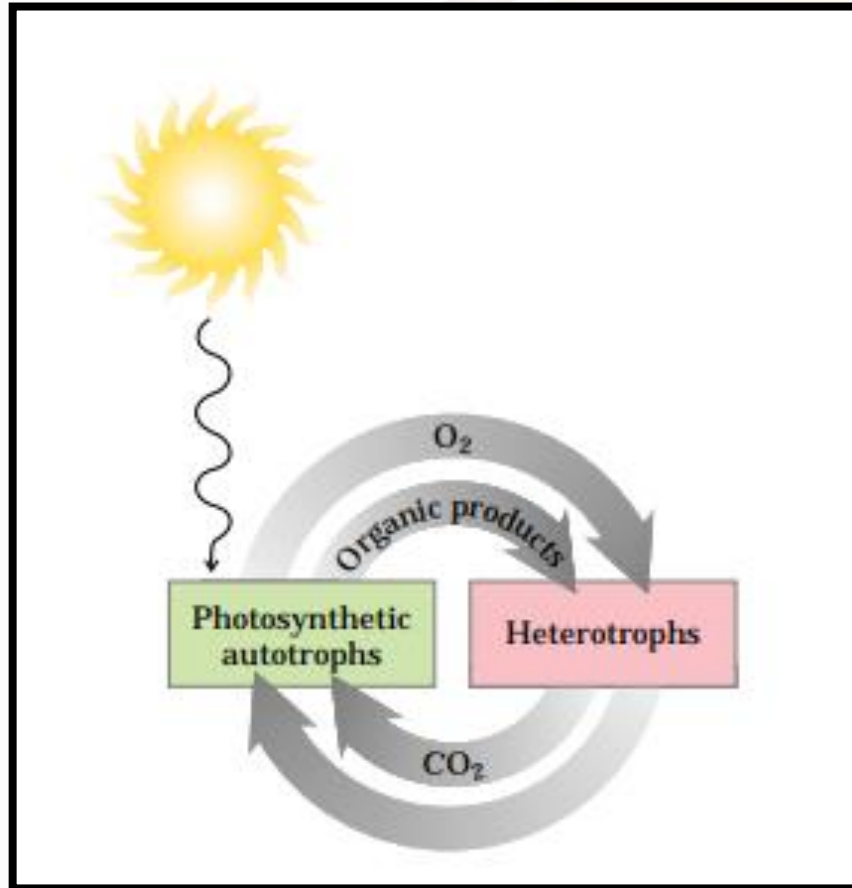
Autotrophs can use carbon dioxide from the atmosphere as their sole source of carbon, from which they construct all their carbon-containing biomolecules such as photosynthetic bacteria and vascular plants.

Heterotrophs cannot use atmospheric carbon dioxide and must obtain carbon from their environment in the form of relatively complex organic molecules such as glucose. Multicellular animals and most microorganisms are heterotrophic.

Characteristic features of Autotrophes and Hetrotrophes.

- Autotrophic cells and organisms are relatively self-sufficient, whereas heterotrophic cells and organisms must subsist on the products of other organisms.
- Autotrophic organisms are photosynthetic and obtain their energy from sunlight, whereas heterotrophic organisms obtain their energy from the degradation of organic nutrients produced by autotrophs.
- Autotrophic organisms use atmospheric carbon dioxide to build their organic biomolecules, some of them generating oxygen from water in the process.
- Heterotrophs in turn use the organic products of autotrophs as nutrients and return carbon dioxide to the atmosphere

Cycling of carbon dioxide and oxygen between the autotrophic (photosynthetic) and heterotrophic domains in the biosphere



➤ **The cycles represents flow of energy into and through the biosphere:**

- capture of solar energy by photosynthetic organisms
- use of this energy to generate energy rich carbohydrates and other organic nutrients
- these nutrients are then used as energy sources by heterotrophic organisms.

➤ **In all energy transformations, there is a loss of useful energy (free energy) and an increase in the amount of unusable energy (heat and entropy).**

Reference:

Lehninger, Albert L., Cox, Michael M.Nelson, David L.**Lehninger** Principles Of Biochemistry. New York : W.H. Freeman, 2008.

The logo of Galgotias University is a stylized, circular emblem. It features a central white swirl that transitions into a yellow arc at the top, a blue arc on the right, and a pinkish-red arc at the bottom. The overall shape is reminiscent of a stylized 'G' or a wave.

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