

**Microbial Metabolism**

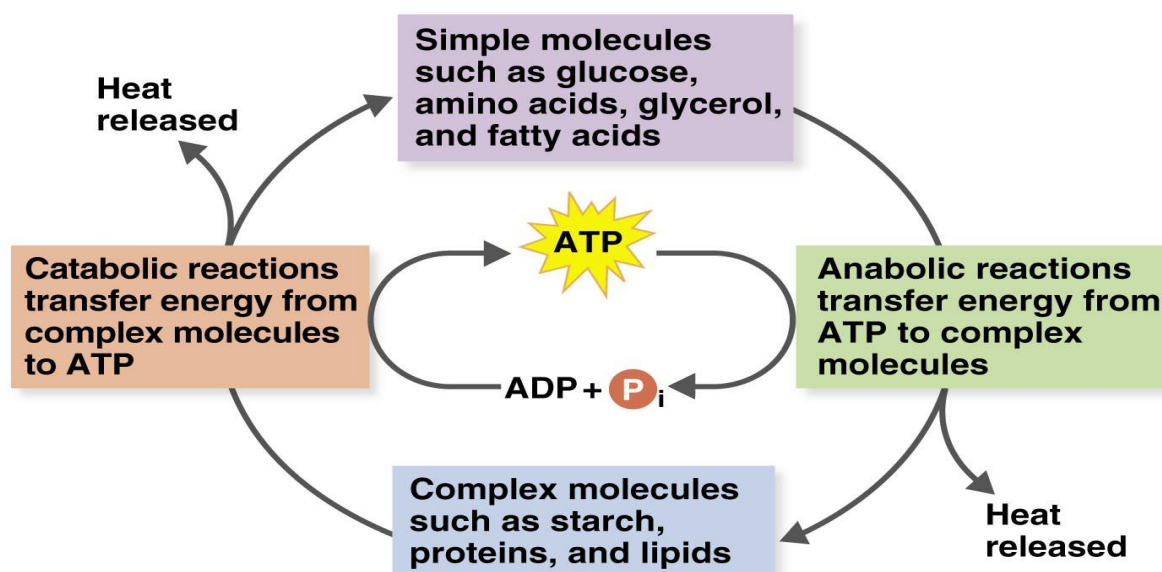
- Microbial metabolism is a series of biochemical reactions by which a microbe obtains energy and nutrients (e.g., carbon). These reactions occur within an organism.
- Metabolism are categorized according to whether the reactions lead to the breakdown or synthesis of substances:
  1. Catabolism
  2. Anabolism
- Metabolism can be categorized based on the functional roles and significance of the produced compounds into:
  1. Primary metabolism
  2. Secondary metabolism

**Catabolism**

- Catabolism: is the set of metabolic pathways that results in breakdown of large molecules (polysaccharides, lipids, nucleic acids, and proteins) into smaller molecules (monosaccharides, fatty acids, nucleotides, and amino acids, respectively). Catabolism is the energy-releasing processes.

**Anabolism**

- Anabolism: is the set of metabolic pathways that results in the synthesis of larger molecules from smaller molecules. Anabolism is the energy-using processes.
- Anabolism includes the biosynthesis:
  1. Cellular macromolecules such as polysaccharides, lipids, nucleic acids, and proteins as well as synthesis of cellular structural components.
  2. Vitamins and coenzymes which are essential for driving various reactions.



### **Primary Metabolism**

- Primary metabolism: refers to the essential biochemical reactions in living organisms that are necessary for their growth, development, and reproduction.
- The products of primary metabolism are called primary metabolites, such as amino acids, vitamins, nucleotides etc.

### **Secondary Metabolism**

- Secondary metabolism: involves the production of compounds in organism that are not directly essential for their growth, development, or reproduction, but often contribute to survival and adaptation.
- The products of secondary metabolism are called as secondary metabolites.
- These metabolites can serve various functions such as defense against predators, and competition with other organisms such as antibiotic and pigments in bacteria.