

Chapter 5 – Microbial Metabolism

Metabolism - Sum of all chemical reactions that happen within the cell.

- Synthesis, store and utilize that energy

Pathways of Metabolism

Catabolism

- The breakdown of molecules (Hydrolytic reactions in which produces ATP)
- Degradative
- Hydrolysis
- Exergonic Reactions → Produces energy → ATP production

Anabolism

- The Synthesis of larger molecules from smaller ones. (Dehydration reactions that use ATP)
- Biosynthetic
- Dehydration → Lose H₂O
- Endergonic Reactions → use energy → By releasing the last phosphate in ATP → 3 PO₄⁻ turns into 2 PO₄⁻ → ADP

*LEGEND: ~ = Unstable bond

Two Key Players in Metabolism

1) ATP

- Considered the cells currency because you can save it, use it, or even exchange it.
- Principle form of energy in all organisms
- Immediately available

2) Enzyme

- Acts as a biological catalyst for speeding up chemical reactions → By lowering the activation energy → Increase the likelihood of the reaction
- Remain unchanged after a reaction
- Influenced by various factors in our genetic makeup

Enzyme Components

1) Apoenzyme

- Protein portion
- Inactive

2) Cofactor

- Nonprotein component
 - Inorganic Molecules → Ca⁺, Fe⁺, Mg, Mn⁺

Microbiology Chapter 5 Test Microbial Metabolism

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Microbiology George A. Wistreich, David W. Smith, 1988 *Food Microbiology* Karl R. Matthews, Kalmia E. Kniel, Faith J. Critzer, 2024-12-24 Leading textbook presenting all aspects of food microbiology Food Microbiology An Introduction presents the basics of microorganisms that impact food safety and quality the roles of beneficial microbes food safety regulations and proper practices for safe and healthy foods throughout all aspects of the supply chain This Fifth Edition has been updated to reflect advances in research and technology and threats to the global food supply while retaining the pedagogy and structure that students and professors appreciate Written in a clear and easy to understand style the book is divided into four sections Part I introduces the fundamentals of food microbiology including a brief history of the field the growth processes of food microorganisms the biology of spores and sporeformers techniques for enumeration and detection of organisms in food description of rapid and automated microbial methods and a new chapter focused on antimicrobial resistance Part II addresses important regulatory issues and focuses on foodborne pathogenic microorganisms with chapters describing the most common bacterial species that cause foodborne diseases as well as discussion of parasites viruses and prions Part III explores nonpathogenic microbes important in food including those responsible for fermentations and food spoilage Part IV focuses on the control of microorganisms in food including chemical antimicrobials biological and physical methods of food preservation nonthermal processing and food safety systems Food Microbiology An Introduction also

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Microbiology for the Health Sciences Marcus M. Jensen,Donald N. Wright,Richard A. Robison,1997 Appropriate for courses in Microbiology for the Health Sciences A complete clinically oriented overview of basic medical microbiology this book provides a taxonomic approach to organism presentation using a pathogen oriented sequence that provides an understanding of the microbe in its setting regardless of the site of infection Its comprehensive coverage is specifically designed to be accessible to students with limited backgrounds in science *General Microbiology* Robert F. Boyd,1987-12

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