

Microbiology 214

A1.2

CHAPTER 10: Introduction to Metabolism (page 208-221)

The biological significance of microbes on Earth and the relationship between metabolism, cellular work and energy.

3.8 billion years ago

Our understanding of Earth's biogeological history shows that prokaryotic cells were the first life forms.

- Microbes have evolved with regards to species and metabolic diversity
- Wide range of substrates that can be used as carbon and energy sources for growth.
- Bacteria is not so dependent on oxygen as a final electron acceptor and can use an unlimited spectrum of organic and inorganic electron acceptors.
- They can adapt to any environment and thus have become the most abundant life form.
- They are ubiquitous in their ability to colonise the entire biosphere in and around the planet.

2.7 billion years ago

The emergence of oxygenic cyanobacteria gradually turned the Earth's atmosphere from anaerobic to aerobic thus allowing aerobic life forms.

Autotrophs: use Carbon such as CO ₂		
	Photolithotrophs	Chemolithotrophs
Energy	Light	Oxidation / reduction reactions
Electron donor	Inorganic – H ₂ S, H ₂ O	Inorganic – H ₂ , S, NH ₃ , H ₂ S
Examples	Plant cell / photosynthetic bacteria	Sulphur oxidising nitrifying bacteria

Heterotrophs: Use organic forms of Carbon		
	Photo-organotrophs	Chemo-organotrophs
Energy	Light	Oxidation / reduction reactions
Electron donor	Organic	Organic
Examples	Purple- non sulphur bacteria	Most microbes, animal cells

The sole purpose for microbes is to maintain its cell structure and reproduce/ replicate. Every cell is wired to extract nutrients of carbon, oxygen, nitrogen, sulphur, hydrogen and phosphorous and energy from the environment to do cellular work. Inorganic and organic forms of these elements are continually recycled by microbes.

Energy is converted via enzyme-catalysed chemical into its useful form nucleoside triphosphate ATP.



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Laboratory Methods in Microbiology W. F. Harrigan, Margaret E. McCance, 2014-06-28 Laboratory Methods in Microbiology is a laboratory manual based on the experience of the authors over several years in devising and organizing practical classes in microbiology to meet the requirements of students following courses in microbiology at the West of Scotland Agricultural College The primary object of the manual is to provide a laboratory handbook for use by students following food science dairying agriculture and allied courses to degree and diploma level in addition to being of value to students reading microbiology or general bacteriology It is hoped that laboratory workers in the food manufacturing and dairying industries will find the book useful in the microbiological aspects of quality control and production development The book is organized into two parts Part I is concerned with basic methods in microbiology and would normally form the basis of a first year course Abbreviated recipes and formulations for a number of typical media and reagents are included where appropriate so that the principles involved are more readily apparent Part II consists of an extension of these basic methods into microbiology as applied in the food manufacturing dairying and allied industries In this part the methods in current use are given in addition to or in place of the classical or conventional techniques *Probiotics* Adriano Brandelli, 2021-12-02 Probiotics Advanced Food and Health Applications presents the functional properties and advanced technological aspects of probiotics for food formulation nutrition and health implications Specifically the book addresses the fundamentals of probiotics from their discovery to actual developments the microbiological aspects of the main genus showing probiotic properties the natural occurrence of probiotic strains in foods the development of nutraceuticals based on probiotics and the relationship of probiotics to health The book also includes a discussion on regulatory aspects This book is an excellent resource for food scientists nutritionists dieticians pharmaceutical scientists and others working with probiotics or studying related fields Introduces basic concepts on probiotics and describes the properties of main microorganisms with applications in probiotics Provides a description on the natural presence of probiotics in different food matrixes and how probiotics can be developed for incorporation in food formulations Offers advice on how probiotics can be used as nutritional input along with their value on the preservation of healthy intestinal status and their potential benefits in specific illnesses Contains definitions applications literature reviews and recent developments Includes a general introduction to the subject taxonomy biology primary sources of probiotics and development of probiotics as food ingredients human nutrition and health properties and the use of high throughput technologies in probiotics characterization **Dictionary Catalogue of the London School of Hygiene and Tropical Medicine, University of London** London School of Hygiene and Tropical Medicine. Library, 1965 **Bowker's Medical Books in Print**, 1972 Bacteriology Illustrated Robert Reid Gillies, T. C. Dodds, 1973 *National Library of Medicine Current Catalog* National Library of Medicine (U.S.), 1969 First multi year cumulation covers six years 1965 70 General Catalog Iowa State University, 1995 Library of Congress Catalogs

Library of Congress,1978 **Sustainable Microbial Technology for Synthetic and Cellulosic Microfiber Bioremediation** Alok Prasad Das,Ipsita Dipamitra Behera,Dipalee Bhanja,2024-07-25 This book offers a variety of cases that detail microbial technologies for remediation of microfiber pollution Synthetic microfibers are made up of polypropylene nylon and polyethylene terephthalate They are porous and dry which makes them ideal for cleaning but wide use of synthetic microfibers across industries and the human population in general has led to the accumulation of microfiber wastes in both terrestrial and marine ecosystems Microfibers are a major environmental pollutant due to their endurance omnipresence and synthetic composition Due to their undetectable size and wide distribution microfibers slowly get incorporated within the food chain leading them into the higher trophic level Microbial remediation of Synthetic microfibers through biodegradation is a sustainable and economic solution With advanced bioremediation technology novel methods have been developed for remediation recovery and recycling Some of these methods are detailed in this volume *Scientific and Technical Books in Print* ,1972 **Current Catalog** National Library of Medicine (U.S.),1969 Includes subject section name section and 1968 1970 technical reports **Subject Catalog, 1976** Library of Congress,1976 **Catalogs of the Scripps Institution of Oceanography Library: Subject Catalog, Shelf List, Shelf List of Documents and Reports Collection** Scripps Institution of Oceanography. Library,1973 *American Scientific Books* ,1963 *Municipal Reference Library Notes* New York Public Library. Municipal Reference Library,1958 *Agricultural Index* ,1923 Catalogs of the Scripps Institution of Oceanography Library Scripps Institution of Oceanography. Library,1980 **The Scientific Roll and Magazine of Systematised Notes. ...** ,1905 Forthcoming Books Rose Arny,1998-04 **The Cumulative Book Index** ,1975 A world list of books in the English language

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In an electronic digital era where connections and knowledge reign supreme, the enchanting power of language has are more apparent than ever. Its ability to stir emotions, provoke thought, and instigate transformation is actually remarkable. This extraordinary book, aptly titled "**Micro Lecture Notes Microbiology 11th Edition**," published by a very acclaimed author, immerses readers in a captivating exploration of the significance of language and its profound affect our existence. Throughout this critique, we shall delve to the book is central themes, evaluate its unique writing style, and assess its overall influence on its readership.

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