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The Boundless Microbiology textbook is a college-level, introductory textbook that covers the subject of Microbiology, one of the building blocks of the life sciences. Boundless works with subject matter experts to select the best open educational resources available on the web, review the content for quality, and create introductory, college-level textbooks designed to meet the study needs of university students.

This textbook covers:

Microbiology -- Microbiology, Microbes and the World, The Science of Microbiology

Chemistry -- Atomic Structure, Chemical Bonds, Chemical Reactions, Inorganic Compounds, Organic Compounds, Energy, Enzymes

Microscopy -- Looking at Microbes, Light Microscopy, Other Types of Microscopy

Bacteria, Archaea, and Eukaryote Cell Structure -- An Overview of Prokaryotic and Eukaryotic Cells, Cytoplasmic Membrane of Prokaryote and Eukaryotic Cells, Transport across the Cell Membrane, Cell Walls of Prokaryotes, Specialized External Structures of Prokaryotes, Specialized Internal Structures of Prokaryotes, Internal Structures of Eukaryotic Cells, Other Eukaryotic Components, Protein Export and Secretion, Studying Cells

Microbial Metabolism -- Types of Metabolism, Energy Production, Catabolism, Glycolysis, Respiratory ETS and ATP Synthase, The Citric Acid (Krebs) Cycle, Alternatives to Glycolysis, Fermentation, Anaerobic Respiration, Chemolithotrophy, Phototrophy, Biosynthesis, Anabolism, Amino Acid and Nucleotide Biosynthesis, Nitrogen Fixation

Culturing Microorganisms -- Microbial Nutrition, Cell Differentiation and Starvation, Culturing Bacteria, Microbial Culture Methods, Bacterial Identification, Microbial Growth, Bacterial Population Growth, Counting Bacteria, Temperature and Microbial Growth, Other Environmental Growth Factors, Microbial Growth in Communities, Microbial Growth Control, Mechanisms of Microbial Control, Physical Antimicrobial Control, Chemical Antimicrobial Control

Microbial Genetics -- Genes, Prokaryotic Genomes, DNA Replication, Plasmids, RNA Synthesis: Transcription, Protein Synthesis: Translation, Protein Modification, Folding, Secretion, and Degradation, Archaeal Genetics, Eukaryotic Genetics, Mutation, Genetic Transfer in Prokaryotes, Tools of Genetic Engineering, Bioinformatics, Cloning Techniques, Genome Evolution, Environmental Genomics, Molecular Regulation, Global Regulatory Mechanisms, RNA-Based Regulation, Developmental Regulation, Sensing and Signal Transduction, Genomics and Proteomics, Genetic Engineering Products, Transgenic Organisms, Molecular Techniques, Cell Physiology Techniques

Microbial Evolution and Phylogeny -- Origins of Life, Astrobiology, Microbial Phylogeny, Classification of Microorganisms, Methods of Classifying and Identifying Microorganisms, Bacterial Diversity, Proteobacteria, Gram-Positive Bacteria and Actinobacteria, Nonproteobacteria Gram-Negative Bacteria, Irregular Bacterial Cells, Other Bacterial Groups, Thermophiles, Archaeal Diversity, Crenarchaeota,

Euryarchaeota, Eukaryotic Microbial Diversity, Fungi, Protists, Algae, Helminths

Viruses -- Virus Overview, Viral Structure, Viral Classification, Culturing Viruses, Viral Replication, Subviral Entities, Viral Diversity, Positive-Strand RNA Viruses of Animals, Negative-Strand RNA Viruses of Animals, Double-Stranded RNA Viruses: Retroviruses, DNA Viruses of Eukaryotes, Viruses and Cancer, Viral Ecology

Epidemiology -- Principles of Epidemiology, Pathogen Identification, Disease Patterns, Nosocomial Infections, Epidemiology and Public Health

Immunology -- Overview of Immunity, The Innate Immune Response, Phagocytes, Innate Defenders, The Adaptive Immune Response, Antigens and Antibodies, Antibodies, T Cells and Cellular Immunity, Antigen Presenting Cells, Immunity Molecular Signals, The Major Histocompatibility Complex (MHC), Classifying Immunities

Immunology Applications -- Immunization, Diagnostic Immunology, Preparation for Diagnosing Infections, Immunity Disorders: Hypersensitivity, Immunity Disorders: Autoimmune Diseases, Immunity Disorders: Immunodeficiencies

Antimicrobial Drugs -- Overview of Antimicrobial Therapy, Actions of Antimicrobial Drugs, Commonly Used Antimicrobial Drugs, Interaction Between Drug and Host, Measuring Drug Susceptibility, Drug Resistance, Antiviral Drugs, Other Antimicrobial Drugs

Pathogenicity -- Entry into the Host, Overview of Microbe-Host Interactions, Penetrating Host Defenses, Damaging Host Cells, Surviving Within the Host and Exiting the Host, Pathogenicity and Other Microbes

The following chapters are also included:

Diseases

Microbial Ecology

Industrial Microbiology

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