

# MICROBIOLOGY

Discover the science of microorganisms

## Organisms & Evolution //

**Microbiology:** The study of living things too small to see with the naked eye

- The four main divisions of life are bacteria, archaea, eukaryotes, and viruses
- Each division's DNA is more similar to its own than to any of the other three



Characteristic	Bacteria	Archaea	Eukaryotes	Viruses
Size	0.2–5 microns	0.2–5 microns	1–90 microns	0.02–0.3 microns
Nucleus	No	No	Yes	No
Genetic information	DNA	DNA	DNA	DNA or RNA
Lipid bilayer	Yes	Modified	Yes	Sometimes
Ribosomes	Small, unique	Small, more like eukaryotes	Large	No
Membrane-bound organelles	No	No	Yes	No
RNA polymerase	Single, 3 subunits	More complex, 8 subunits	More complex, 12 subunits	Depends on genetic material
Grow without outside help	Yes	Yes	Yes	No
Maximum number of cells	1	1	Many	Non-cellular
Cell wall	Peptidoglycan	Several different forms	Cellulose, sometimes none	None

### Bacteria

- Were the first cells on Earth
- Contain over 50 different phyla (major groupings)
- Are the most abundant form of life
  - People have more bacteria growing on/in them than human cells
- Incredibly diverse
  - There are thousands of different species in one gram of soil
- Live in most environments, including the deep sea, underground, and terrestrial

### Archaea

- Relatively uncommon with fewer known species
  - Most common in extreme environments (e.g., deep sea vents and high salinity lakes)
- Combine some features of prokaryotes and eukaryotes
- Often known as extremophiles and will grow when other organisms cannot
  - ECG: Halophiles, salt loving; sulfophiles, sulfur loving; thermotrophs, heat loving; lithotrophs, rock loving; methanophiles, methane loving (ruminant guts)

### Eukaryotes

- May be single cells (e.g., yeast, algae, and amoebas) or multicellular (e.g., fungi, plants, and animals)
  - Contain membrane-bound subcompartments that separate specific functions, particularly the nucleus
  - Division includes microscopic organisms previously belonging to the Monera kingdom

### Viruses

- Many feel viruses are not alive as they are obligate parasites and cannot replicate without other cells
- Different viruses target all three domains
- Viruses may use DNA or RNA as genetic material and use molecules from the host cell to make more virus particles, ultimately killing the host

## Shapes & Types //

### Bacterial & Archeal Cell Shapes & Growth Characteristics

- Cocci: Spherical
- Bacilli: Rod-shaped
- Spirilla: Spiral-shaped
- Pleomorphic: Multiple shapes are possible



- Diplo- Prefix meaning two; a diplococcus is two cocci that have grown together
- Tetrad: Four cocci that grow together in a plane
- Sarcinae: Eight cocci that grow together in a cube
- Strepto- Prefix meaning chain; a streptococcus is cocci that have grown together in a chain
- Staphylo- Prefix meaning cluster; a staphylococcus is cocci that have grown together in a cluster

### Eukaryotic Types

- Ciliates: Short cilia used for locomotion and/or feeding
- Flagellates: Long flagella used for locomotion; usually there are only one or two per cell
- Slime molds: Single cells living in a damp environment (e.g., under leaves in a forest) that come together during replication



- Amoeba: Free-form cell that can change its shape and engulf its prey
- Protist: Non-plant, non-fungi organism (e.g., ciliates and flagellates)
- Algae: Photosynthetic organism with a nuclei and chloroplasts. Many are single cells, others are multicellular, but many forms are still microscopic (i.e., volvox)
- Diatoms: Photosynthetic eukaryote with a silicate cell wall often with a complex symmetrical pattern
- Yeast: Eukaryotic, single-celled, round fungi
- Mush: Multicellular fungus which forms hair-like projections (hyphae) that may contain crosswalls (septa) or not (coenocytic)

### Viral Shapes

- Icosahed: Spiral arrangement of protein capsid molecules that can appear rod-shaped

# Microbiology Study Guide Leboffe

**Berdell R. Funke**



## **Microbiology Study Guide Leboffe:**

**Subject Guide to Books in Print**, 1996      *Microbiology Study Guide* Patrick Leonardi, 2010      Experiments in Applied Microbiology Samuel Singer, 2001-02-20 Experiments in Applied Microbiology is a book of open ended experiments to teach applied bacteriology approaches and techniques Divided into three sections it emphasizes its multi disciplinary nature applications in both bacteriology courses and macrobiology courses and offers the opportunity of teaching basic fermentation and biocontrol approaches This is one of the few lab books stressing the use of invertebrate animals vis vis bacteriological material This book is unique in its potential for a wide application breaking new ground in hands on bacteriology experience and emphasizing the role of bacteria in both microbiological and macrobiological disciplines Key Features Open ended experimental design Experiments are multi disciplinary featuring applied bacteriology procedures Applicable to bacteriology and macrobiology courses Experiments can be used singly or in multiple array For individual or class Offers alternate or parallel experiments Laboratory lore integrating experiment background with insightful explanations Stresses use of insects mollusks and other invertebrates as lab animals vis vis bacteriological materials Extensive sources resources and references given of material as well as the livestock used in the experiments

*Microbiology Study Guide Set* Jacquelyn G Black, 1999-08-01      **Microbiology (Speedy Study Guide)** Speedy Publishing LLC, 2014-09-04 A Microbiology study guide is a learning resource that is recommended to be used in a microbiology course The study guide is used in correspondence with the course textbook the material matching what is found in the textbook and in the course Microbiology study guide includes important definitions flash cards study games and diagrams to help learn the material in your course The study guide can contribute to your success in microbiology by focusing on the important material you need to know to learn the material and to pass the exams The study guide can help to boost your grade to the next level      **Microbial Systematics** Bhagwan Rekadwad, 2020-11-01 This book presents recent

scientific investigations in microbial ecology and systematics Advanced microbial science investigations employ the latest technologies for research in microbiology and microbial applications The book has complete information on classical microbiology techniques for assessment of the composition of microbial diversity assessment advancement in next generation technology advantages of microbial products in sustainable developments and their application for societal benefits Current research on microorganisms is presented as a perfect book for studies on Microbial Systematics This book will serve as an important resource for practising research and review for the scientific community      *Microbiology Study Guide Set*

Jacquelyn G. Black, 1999-07-01      Microbiology Study Guide Lansing M. Prescott, John P. Harley, Donald A. Klein, 2004-02

This is an introduction to the major areas of microbiology and is designed for students of medicine dentistry nursing and allied health Knowledge of biology and chemistry are prerequisites There is updated coverage in this edition of clinical

microbiology with corresponding photographs      **Microbiology** Speedy Publishing, 2014-09-04 A Microbiology study guide

is a learning resource that is recommended to be used in a microbiology course The study guide is used in correspondence with the course textbook the material matching what is found in the textbook and in the course Microbiology study guide includes important definitions flash cards study games and diagrams to help learn the material in your course The study guide can contribute to your success in microbiology by focusing on the important material you need to know to learn the material and to pass the exams The study guide can help to boost your grade to the next level      **Microbiology Study Guide** Elizabeth Machunis-Masuoka,2004      *Microbiology Essentials* Lauren Gross,Tammy McCormick,2013-01-01 REA s Essentials provide quick and easy access to critical information in a variety of different fields ranging from the most basic to the most advanced As its name implies these concise comprehensive study guides summarize the essentials of the field covered Essentials are helpful when preparing for exams doing homework and will remain a lasting reference source for students teachers and professionals Microbiology includes the history of microbiology equipment and techniques diversity of microorganisms genetics metabolism transport of molecules role of microbes in disease microbes in the environment and microbes in industry      *Basic Microbiology* R. Wilson Gorham,Wesley A. Volk,1992-01-01      Alcamo's Fund of Microbiology Jeffrey C. Pommerville,2007-01-01      **Basic Microbiology Study Guide** Harry E. Peery,Margaret A. Singer,1986-01-01      **Foundations in Microbiology Student Study Guide** Kathleen Park Talaro,2006-12      Alcamo's Fundamentals of Microbiology Jeffrey C. Pommerville,2004 Pommerville biology and microbiology Glendale Community College provides new infectious disease coverage with material on mad cow disease SARS and West Nile fever plus a new chapter on genetic engineering and bacterial genomics for this seventh edition of a text for introductory microbiology courses that emphasize the biology of human disea      **Study Guide for Microbiology** Berdell R. Funke,1982      **Journal of Apicultural Research** ,2006      *Medical Microbiology, Study Guide and Laboratory Manual* Charles Wesley Buggs,1959      **Study Guide for Microbiology with Diseases by Taxonomy** Robert W. Bauman,Mindy Miller-Kittrell,Elizabeth Machunis-Masuoka,2013-06-27 Students can master key concepts and earn a better grade with the help of the clear concise writing and creative thought provoking exercises in this study guide It includes concise explanations of key concepts definitions of important terms art labeling exercises critical thinking problems and a variety of self test questions with answers

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