

MICROBIOLOGY

Discover the science of microorganisms

Organisms & Evolution //

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

- The five 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 micrometers	0.2—5 micrometers	1—100 micrometers	100—1000 micrometers
Nucleus	No	No	Yes	No
Genetic Information	DNA	DNA	DNA or RNA	
Lipid Bilayer	No	Substituted	No	Substituted
Polysaccharides	None, unique	None, more like eukaryotes	Large	No
Mitochondria	No	No	No	No
RNA Polymerase	Simple, 3 subunits	More complex, 8 subunits	More complex, 12 subunits	Depend on protein: bacterial
Gene without membrane	No	No	No	No
Membrane	None	None	Cellulose, non-cellulose, none	None
Cell wall	Peptidoglycan	Surfactant, stiffness, toxins	Cellulose, non-cellulose, none	No

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 them than human cells.
- Extremely 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).
 - Contain some features of prokaryotes and eukaryotes.
 - Often known as extremophiles and will grow when other organisms cannot.
- Ex: 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 amoebae) or multicellular (e.g., fungi, plants, and animals).
 - Contain membrane-bound subcompartments that separate specific functions, particularly the nucleus.
 - Divisions includes microeukaryotic organisms previously belonging to the Monera kingdom.

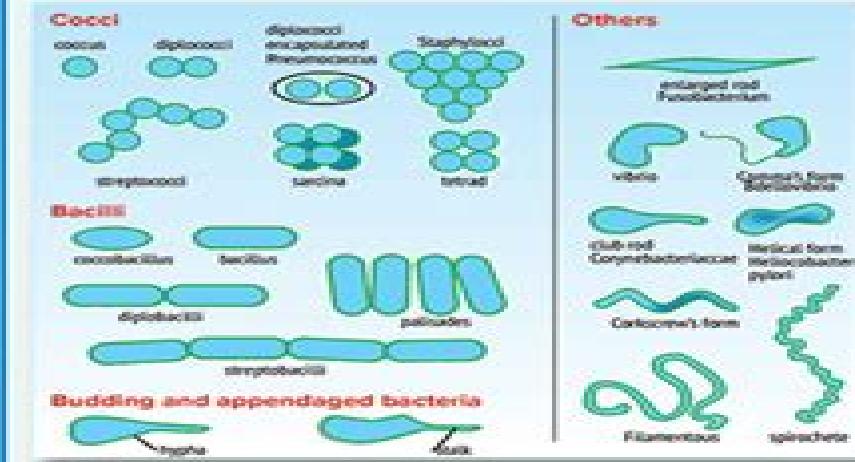
Viruses

- 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 & Archival Cell Shapes & Growth Characteristics

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



- Diplococci: Prefix meaning two; a diplococcus is two cocci that have grown together.
- Tetrad: Four cocci that grow together in a cube.
- Sarcina: Eight cocci that grow together in a cube.
- Streptococci: Prefix meaning chain; a streptococcus is cocci that have grown together in a chain.
- Staphylococci: 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 three per cell.
- Slime molds: Single cells living in a damp environment (e.g., under leaves in a forest) that come together during replication.



- Amoebae: Free-living cell that can change its shape and engulf its prey.
- Flagellates: Nonplant, non-fungi organisms (e.g., ciliates and flagellates).
- Algae: Photosynthetic organisms with a nucleus and chlorophyll. Many are single cells, others are multicellular, but many forms are still microscopic (e.g., yeasts).
- Slime molds: Photosynthetic eukaryotes with a eukaryotic cell wall often with a complex, symmetrical pattern.
- Yeasts: Eukaryotic, single-celled, round fungi.
- Molds: Multicellular fungi which form hair-like projections (hyphae) that may contain asexually (conidia) or not (conidia).

Viral Shapes

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

Microbiology Study Guide 1 With Answers

George A. Wistreich,David W. Smith

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[Microbiology: An Introduction, Global Edition](#) Gerard Tortora, Gerard J. Tortora, Berdell R. Funke, Christine L. Case, Derek Weber, Warner B. Bair, 2024-10-11 For pre nursing allied health students and mixed majors courses Connect microbiology to future healthcare careers Tortora Case Bair Weber Funke's Microbiology An Introduction delivers an exceptionally clear presentation of complex topics a careful balance of concepts and applications and pedagogically superior art The trusted clinical focus and student friendly narrative help students understand why microbiology is relevant to their future healthcare careers The 14th Edition deepens the clinical focus and integrates SARS CoV 2 and COVID 19 coverage Updates include innovative microbiology research revised immunology chapters and an extensive diversity equity and inclusion review

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Clinical Infectious Diseases Study Guide Joseph Domachowske, Manika Suryadevara, 2020-08-05 This book is meticulously designed for the busy student trainee or seasoned physician looking to enhance or refresh skills in infectious diseases It is intended to provide a solid resource for students and physicians in need of a concise yet comprehensive background of the material Each chapter begins with a summary of the topic a brief case description definitions critical teaching points and tables figures photos and other visual materials to reinforce learning The chapters take a systems based approach to infections before concluding with the essentials of diagnostic microbiology to leave users with a practical toolkit for real world clinics Authored by two expert educators and dual infectious diseases and pediatrics specialists Clinical Infectious Diseases Study Guide is the only updated study guide designed for medical students fellows residents and trainees who need a strong foundation in infectious diseases This includes infectious disease specialists in both adult and pediatric care various internal medicine subspecialists and hospitalists [Study Guide \[to\] Microbiology, Principles & Applications, Third Edition \[by\] Jacquelyn G. Black](#) Jacquelyn G. Black, George Allan Wistreich, Black, 1996 [Instructor's Manual and Study Guide Answers for the Human Body in Health and Disease](#) Barbara Janson Cohen, Memmler, 1996 **Current Catalog** National Library of Medicine (U.S.), 1979 First multi year cumulation covers six years 1965-70 **Study Guide to Accompany the Microbial Perspective** Frank Whitehouse, 1982 **Introductory Microbiology** Frederick C. Ross, 1986 [Key Facts for Anatomy and Physiology](#) Patrick Leonardi, 2007 This wonderful study guide covers the following topics medical terminology the cell digestive system respiratory system circulatory system immune and lymphatic system excretory

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