

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.

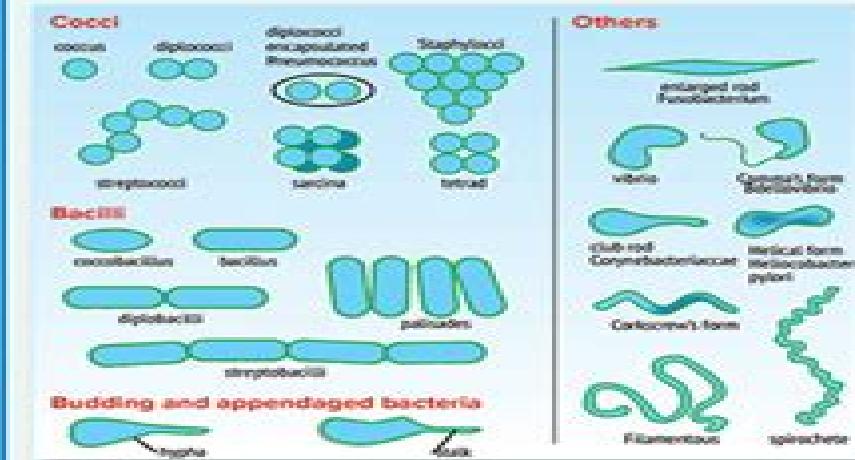
Viruses

- 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



- Diploci: Prefix meaning two; a diplococcus is two cocci that have grown together.
- Tetrad: Four cocci that grow together in a cube.
- Sarcinae: Eight cocci that grow together in a cube.
- Streptocci: 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.
- Flagellate: Nonplant, non-fungi eukaryote (e.g., ciliates and flagellates).
- Algae: Photosynthetic eukaryote with a nucleus and chloroplasts. Many are single cells, others are multicellular, but many forms are still microscopic (e.g., yeasts).
- Ciliates: Photosynthetic eukaryote with a ciliate cell wall often with a complex, symmetrical pattern.
- Yeasts: Eukaryotic, single-celled, round fungi.
- Mold: Multicellular fungus which forms hair-like projections (hyphae) that may contain asexually (conidia) or sex (conidia).

Viral Shapes

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

Microbiology Study Guide Exam

Alvin F. Gardner

Microbiology Study Guide Exam:

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Microbiology Study Guide Patrick Leonardi, 2010

Hardcore Microbiology and Immunology Benjamin W.

Sears,Lisa M. Spear,Rodrigo E. Saenz,2007 Hardcore Microbiology and Immunology focuses on the essentials of microbiology and immunology as an ultra high yield USMLE Step 1 review and an ideal course supplement Figures and images help students visualize key concepts and the concise outline format allows rapid access to vital information Critical hardcore facts are highlighted in the text emphasizing the most heavily tested information for review Microbiology & Immunology Richard M. Hyde,2012-12-06 Oklahoma Notes Microbiology and Immunology second edition is a comprehensive update of the first edition and designed to serve as a study guide for a review of microbiology and immunology preparatory to Part I of the National Board of Medical Examiners NBME examination The book offers proficiency examinations in each of the five major areas covered microbial physiology microbial genetics immunology pathology pathogenic microbiology and virology A comprehensive examination at the end as questions numerous illustrations summary sentences or phrases and other study aids such enhance the text s usefulness Catalog of Copyright Entries. Third Series Library of Congress.

Copyright Office,1962 Includes Part 1 Number 2 Books and Pamphlets Including Serials and Contributions to Periodicals July December **Active Learning in College Science** Joel J. Mintzes,Emily M. Walter,2020-02-23 This book explores evidence based practice in college science teaching It is grounded in disciplinary education research by practicing scientists who have chosen to take Wieman s 2014 challenge seriously and to investigate claims about the efficacy of alternative strategies in college science teaching In editing this book we have chosen to showcase outstanding cases of exemplary practice supported by solid evidence and to include practitioners who offer models of teaching and learning that meet the high standards of the scientific disciplines Our intention is to let these distinguished scientists speak for themselves and to offer authentic guidance to those who seek models of excellence Our primary audience consists of the thousands of dedicated faculty and graduate students who teach undergraduate science at community and technical colleges 4 year liberal arts institutions comprehensive regional campuses and flagship research universities In keeping with Wieman s challenge our primary focus has been on identifying classroom practices that encourage and support meaningful learning and conceptual understanding in the natural sciences The content is structured as follows after an Introduction based on Constructivist Learning Theory Section I the practices we explore are Eliciting Ideas and Encouraging Reflection Section II Using Clickers to Engage Students Section III Supporting Peer Interaction through Small Group Activities Section IV Restructuring Curriculum and Instruction Section V Rethinking the Physical Environment Section VI Enhancing Understanding with Technology Section VII and Assessing Understanding Section VIII The book s final section IX is devoted to Professional Issues facing college and university faculty who choose to adopt active learning in their courses The common feature underlying all of the strategies described in this book is their emphasis on actively engaging students who seek to make sense of natural objects and events Many of the strategies we highlight emerge from a constructivist view of learning that has gained widespread acceptance in recent years In this view learners make sense of the world by forging connections between new ideas and those that are part

of their existing knowledge base For most students that knowledge base is riddled with a host of naive notions misconceptions and alternative conceptions they have acquired throughout their lives To a considerable extent the job of the teacher is to coax out these ideas to help students understand how their ideas differ from the scientifically accepted view to assist as students restructure and reconcile their newly acquired knowledge and to provide opportunities for students to evaluate what they have learned and apply it in novel circumstances Clearly this prescription demands far more than most college and university scientists have been prepared for

Clinical Medicine; Examination Review

George Horemis,1972

Medical-surgical Nursing Examination Review

George Horemis,Clemencia Matamors,1973

The

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Microbiology Gerard J. Tortora,Berdell R. Funke,Christine L. Case,1989

The National Guide to Educational Credit

for Training Programs American Council on Education,2005 Highlights over 6 000 educational programs offered by business labor unions schools training suppliers professional and voluntary associations and government agencies

First Aid for the USMLE Step 1 Vikas Bhushan,Chirag Amin,1998

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Robert R Harr,2012-10-11 Use this comprehensive resource to gain the theoretical and practical knowledge you need to be prepared for classroom tests and certification and licensure examinations

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