

# 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 micrometers	0.2–5 micrometers	1–90 micrometers	0.02–0.3 micrometers
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	Most 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
  - 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 (septate) or not (non-septate)

### Viral Shapes

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

# Study Guide For Clinical Microbiology

**Lansing M. Prescott, John P.  
Harley, Donald A. Klein**



## **Study Guide For Clinical Microbiology:**

**Study Guide for Bailey and Scott's Diagnostic Microbiology - E-Book** Betty A. Forbes, Daniel F. Sahm, Alice S. Weissfeld, 2016-06-30 Corresponding to chapters in Bailey Scott's Diagnostic Microbiology 12th Edition this new guide reviews important topics and helps students master key material It includes chapter objectives a summary of key points review questions and case studies Material is presented in an engaging format that challenges students to apply their knowledge to real life scenarios Type Source Promotion Chapter Objectives open each chapter providing a measurable outcome to achieve by completing the material A summary of Key Points from the main text helps students clearly identify key concepts covered in each chapter Review Questions in each chapter test students on important knowledge in addition to key terms and abbreviations Case studies in each chapter offer challenging questions for further analysis and challenge students to apply their knowledge to the real world [Study Guide for Clinical Procedures for Medical Assistants - E-Book](#) Kathy Bonewit-West, 2022-10-12 Learn how to think critically and perform competently in the clinical setting Correlating to chapters in Clinical Procedures for Medical Assistants 11th Edition this study guide provides additional activities review questions and exercises designed to prepare you to work in a modern medical office Content aligns to the new 2022 medical assisting educational competencies and provides procedure checklists and video evaluations to help you track your mastery of clinical skills This essential companion provides the practice you need to prepare for a successful career in the fast paced world of medical assisting Critical thinking activities with realistic situations help students analyze and apply what they've learned with games role playing situations crossword puzzles and independent study questions Focus on competency mastery includes worksheets to practice key skills and evaluation forms to assess proficiency Assignment sheets at the beginning of chapters help students stay organized and document their progress NEW 2022 CAAHEP medical assisting competencies throughout represent the latest educational standards NEW Updated content addresses changes in the medical record nutritional guidelines OSHA standards for infection control and prevention emergency preparedness and more REVISED Self assessment opportunities allow students to perform quick comprehension checks including pre tests post tests and key term assessments *Diagnostic Bacteriology* Margaret A. Bartelt, 1999-01-01 Organized in a concise simplified manner using an outline format to organize the material this text emphasizes the role of the clinical microbiology laboratory in diagnosing and treating diseases Bacteria e g gram positive anaerobic etc and laboratory procedures e g antimicrobial agents and susceptibility tests are clustered in seven unique sections Chapter study questions and a 100 question comprehensive exam are included **Medical Microbiology** Samuel Baron, 1996-01-01 **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

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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

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Review and Study Guide Anna P. Ciulla, Georganne K. Buescher, 1992 This self examination review is designed to prepare students for exams such as the US National Certificate Examinations Over 200 multiple choice and objective questions are accompanied by detailed explanations The new edition features a practice exam and additional case study questions

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