

E X E R C I S E 5

Observing Bacteria

OBJECTIVES

At the conclusion of the exercise, you should...

1. recognize the differences between bacteria and other organisms studied so far.
2. know the different types of microscopic morphology of bacteria.
3. be able to recognize the shapes of bacteria.
4. be able to recognize the sizes of bacteria.
5. become familiar with observing bacteria that have been stained.

INTRODUCTION

The shapes of bacteria can be grouped into three types: **bacillus** (rectangular or rod-shaped), **coccus** (spherical or round), and **spirillum** (curved or helical). There are variations within each of these shapes. In this exercise, you will continue practicing using the microscope to examine the variety of shapes and sizes of bacteria.

MATERIALS

Supplies:

Prepared microscope slides of a gallery of bacterial shapes and sizes

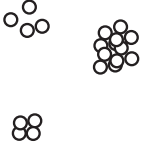
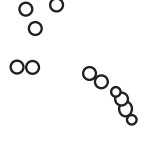

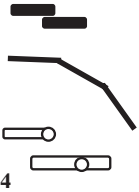
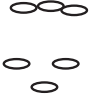



PROCEDURES

Technical Background

Most bacteria range in size between 0.5–2.0 micrometers (μm). One aspect of bacterial identification is to describe their shape. The three basic types are rod, spherical, and curved. Rods can vary in length and width, may have square, round, or pointed ends, may or may not have flagella (for motility), and may occur singly or in chains. Rods that have variable sizes among individual cells (i.e., coccoid to long rods) are referred to as pleomorphic in shape. The spherical coccid cells may occur singly, in pairs, tetrads (groups of four), chains, or irregular clusters. The helical or curved bacteria can vary in length and width, and may occur as curved, bent, or wavy forms, with or without flagella. There are bacteria that form endospores, and this morphological characteristic is also used in classifying bacteria.

The following are examples of the bacterial shapes that will be observed in this laboratory exercise.

Gallery of Bacteria Key

	cocci: single, clusters, tetrads  1	Cocci: single, pairs, chains  2	cocci: diplococci  3	rods: large; single, chains, with endospores  4
	rods: short (coccobacilli), single, chains  8	rods: long, single, chains  7	rods: pleomorphic  6	rods: curved or spiral  5

Observe the different shapes of bacteria in each section of the slide. Draw your observations on the next page. (**Note:** If gallery slides are not available, observe individual slides of the various shapes that are available.)

Examples of species of bacteria exhibiting the various shapes:

(**Note:** In most cases, the bacteria have been stained with a simple stain, unless otherwise noted.)

- cocci–single and clusters: *Staphylococcus aureus*
 cocci–tetrads: *Micrococcus luteus*
- cocci–single and chains: *Streptococcus* species
- cocci–diplococci: *Neisseria* species (*Moraxella catarrhalis*)
- bacilli (rods)–single and chains: *Bacillus megaterium* (some might show endospores, which do not stain, and will thus appear clear)
- rods–coccobacilli: *Escherichia coli*
- bacilli (rods): *Pseudomonas aeruginosa*
- bacilli (rods)–pleomorphic: *Corynebacterium* species
- bacilli (rods)–curved or spiral: *Rhodospirillum* species or *Spirillum volutans*

Observe separate slides of the following:

1. spirochetes: *Treponema pallidum*
2. spiral: *Spirillum volutans*
3. mixture of cocci, rods, and spirals
4. rods with endospores
5. bacteria, yeast, and blood cells for size comparison

Examining Different Shapes of Bacteria

1. Use the Gallery of Bacteria Key and other slides to examine the different shapes of bacteria.
2. Make sure you feel confident in recognizing the different shapes, sizes, and arrangements of bacteria.
3. Draw your observations in the Evaluation of Results section.

EVALUATION OF RESULTS (EXERCISE 5: OBSERVING BACTERIA)

Purpose

Data

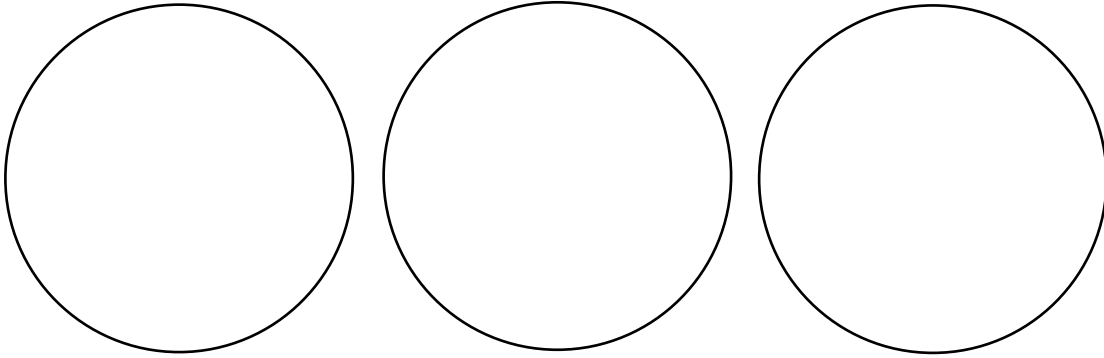
Draw the organisms seen under oil immersion (100x) from the “Gallery” slide in the spaces below.

Gallery of Bacteria Key

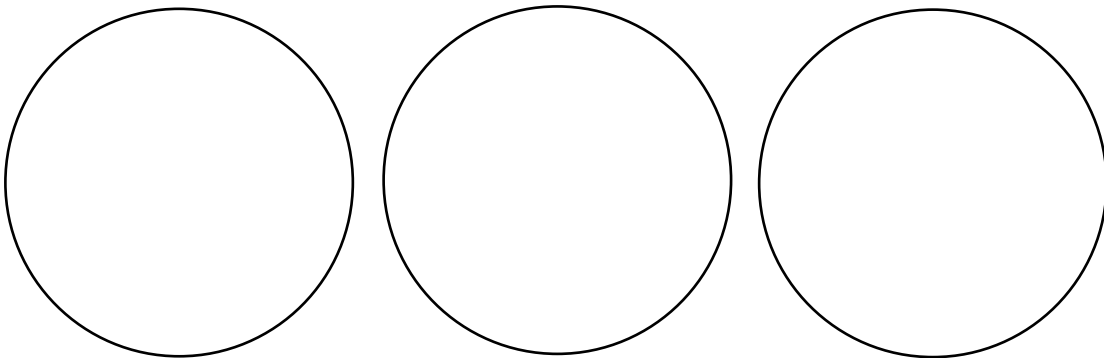
	cocci: single, clusters, tetrads	Cocci: single, pairs, chains	cocci: diplococci	rods: large; single, chains, with endospores
	1	2	3	4
	rods: short (coccobacilli), single, chains	rods: long, single, chains	rods: pleomorphic	rods: curved or spiral
	8	7	6	5

Data continued

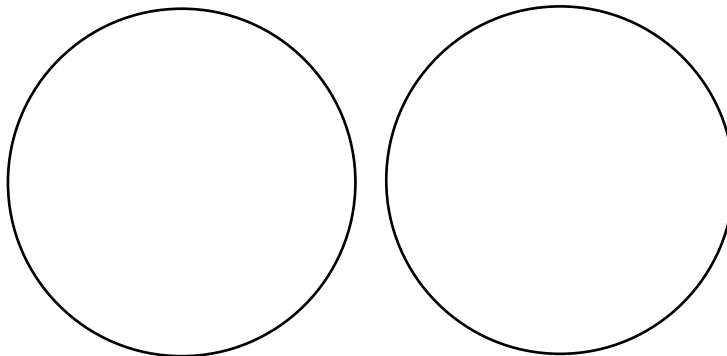
Use the circles provided from drawing more of the organisms seen under oil immersion (100X) from the slides provided.



1. _____ 2. _____ 3. _____

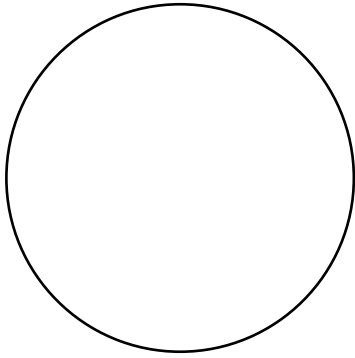


4. _____ 5. _____ 6. _____

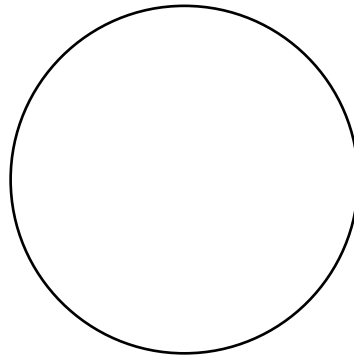


7. _____ 8. _____

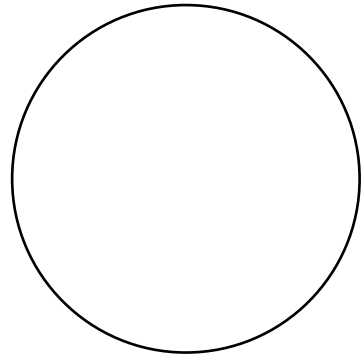
Data continued:



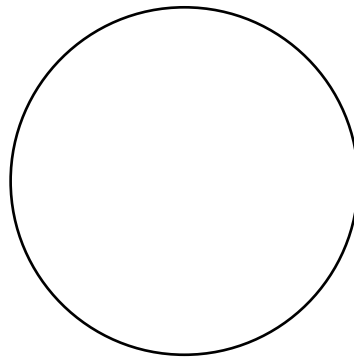
9. _____



10. _____



11. _____



12. _____

