Pathogens.

What is a pathogen?

What are the major kinds of pathogens?

What is a microorganism?

Bacteria – Prokaryotic cells. [Figure 7.1]

Three basic bacterial shapes.

Bacterial reproduction – Binary fission. [Figure 7.2]
Viruses. [Figure 7.3]

Characteristics

Structure:

Prions – proteins of unknown function in the brains of healthy individuals. Disease occurs when certain prion proteins change their shape into an abnormal form that converts normal prion proteins into the abnormal configuration.

The Lymphatic System. [Figure 7.6]

Primary organs:
See Figure 7.7.

Secondary organs:
See Figure 7.7.
Defenses of the Immune System.

1. Nonspecific defenses.
   First lines of defense.

Second lines of defense. [Figure 7.8]
Illustrative example: Inflammatory response.

Protective Proteins.
The complement system – Includes various plasma proteins. Amplifies the inflammatory reaction by:

- Attracting phagocytes.
  What are phagocytes?

- Promoting phagocytosis.

- Some complement proteins form pores in the surface of bacteria and thereby cause them to burst. [Figure 7.9]

- Interferons – proteins produced by virus-infected cells that help noninfected cells prepare for possible viral attack.
2. Specific defenses – Acquired defenses.

<table>
<thead>
<tr>
<th>Cell</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>B cells</td>
<td>Produce plasma cells and memory cells</td>
</tr>
<tr>
<td>Plasma cells</td>
<td>Produce specific antibodies</td>
</tr>
<tr>
<td>Memory cells</td>
<td>Ready to produce antibodies in the future</td>
</tr>
<tr>
<td>T cells</td>
<td>Regulate immune response; produce cytotoxic T cells and helper T cells</td>
</tr>
<tr>
<td>Cytotoxic T cells</td>
<td>Kill virus-infected cells and cancer cells</td>
</tr>
<tr>
<td>Helper T cells</td>
<td>Regulate immunity</td>
</tr>
<tr>
<td>Memory T cells</td>
<td>Ready to kill in the future</td>
</tr>
</tbody>
</table>

B-Cells and Antibody-Mediated Immunity. [Figure 7.10]

1.

2.

3.

4.
T-Cells and Cell-Mediated Immunity. [Figure 7.12]

1.

2.

3. Antigen recognition by T-cells.

   A.

   B.

   C. [Figure 7.13]

Types of acquired immunity.
Naturally acquired active immunity.

Artificially acquired active immunity.

Naturally acquired passive immunity.

Artificially acquired passive immunity.

Monoclonal Antibodies. [Figure 7.16]
Plasma cells are fused with myeloma cells and these hybridomas produce only one type of antibody. These monoclonal antibodies are most often used in diagnostic procedures such as pregnancy tests.

Cytokines and Immunity.
Cytokines, including interferon, are used in an attempt to promote the body’s ability to recover from cancer.