Innate defenses against infection

<table>
<thead>
<tr>
<th></th>
<th>Innate immunity (24.1-3)</th>
<th>Acquired immunity (24.8-13)</th>
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<tbody>
<tr>
<td></td>
<td>Responses is the same whether</td>
<td>Found only in vertebrates;</td>
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<td></td>
<td>or not pathogen has been</td>
<td>previous exposure to pathogen</td>
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<tr>
<td></td>
<td>previously encountered</td>
<td>enhances immune response</td>
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<td>External barriers</td>
<td>Skin/epithelium</td>
<td>Antibodies (24.8-10)</td>
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<tr>
<td></td>
<td>Secretions</td>
<td></td>
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<td></td>
<td>Mucous membranes</td>
<td>Lymphocytes (24.11-14)</td>
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<tr>
<td>Internal defenses</td>
<td>Phagocytic cells</td>
<td></td>
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<tr>
<td></td>
<td>NK cells</td>
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<td></td>
<td>Defensins/peptides</td>
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<td>Inflammatory response (24.2)</td>
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The lymphatic system (24.3)

The Inflammatory Response

Diagram 1: The inflammatory response

1. Tissue injury: release of chemical signals such as histamine
2. Lysis and increased migration of leukocytes; migration of phagocytes to the area
3. Phagocytes (monocytes and macrophages) consume bacteria and cell debris; tissue heals
The Lymphatic System

Figure 1: The human lymphatic system

The Acquired Immune Response

Figure 2: A soldier receiving a smallpox vaccination

Lymphocytes mount a dual defense

Figure 3: The development of B cells and T cells
Antigens have specific regions where antibodies bind to them.

Figure 4: The binding of antibodies to antigenic determinants

Clonal Selection Musters Defensive Forces Against Specific Antigens

Diagram 2: Clonal selection of B cells in the primary immune response

Clonal Selection Musters Defensive Forces Against Specific Antigens (cont.)

Diagram 3: Clonal selection of B cells in the secondary immune response
Antibodies are the weapons of the humoral immune response

**Figure 5:** Antibody structure with an antigen-binding site

Antibodies mark antigens for elimination

**Diagram 4:** Effector mechanisms of the humoral immune response

Monoclonal antibodies are powerful tools in the lab and clinic

**Figure 6:** Monoclonal antibodies used in a home pregnancy test
Helper T cells stimulate the humoral and cell-mediated immune responses

Diagram 6: The activation of a helper T cell and its roles in immunity

Cytotoxic T cells destroy infected body cells

Diagram 7: How a cytotoxic T cell kills an infected cell

HIV destroys helper T cells, compromising the body’s defenses