

CHAPTER 17
FAILURES OF THE IMMUNE
RESPONSE

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IMMUNODEFICIENCIES
CAUSED BY INFECTION - HIV

- ◆ Infection with HIV can lead to acquired immunodeficiency syndrome (AIDS)
- ◆ One target of the HIV virus is the helper T cell (CD4)
- ◆ HIV requires the presence of co-receptors on the T cell to infect the T cell successfully

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IMMUNODEFICIENCIES
CAUSED BY INFECTION - HIV

- ◆ HIV is transmitted sexually or through body fluids
- ◆ HIV uses the enzyme reverse transcriptase to convert its RNA genome into DNA that can be integrated into the host chromosome
- ◆ There are three phases of HIV infection: acute, asymptomatic, and symptomatic with the development of AIDS

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IMMUNODEFICIENCIES CAUSED BY INFECTION - HIV

- ◆ High rates of mutation by HIV make the infection very hard to treat
- ◆ Patients with AIDS die from secondary infections or cancer which take hold because the immune system is severely disabled

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OTHER INFECTIONS CAUSED BY IMMUNODEFICIENCIES

- ◆ HIV is not the only pathogen that can suppress the immune response
- ◆ One example is *Neisseria gonorrhoeae*

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PRIMARY IMMUNODEFICIENCY DISEASES

- ◆ Primary immunodeficiency can be caused by mutations in immune response genes
- ◆ Primary immunodeficiency is usually identified by overwhelming infections in young children
- ◆ Inherited immunodeficiency is caused by recessive gene defects

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PRIMARY IMMUNODEFICIENCY DISEASES

- ◆ Defects in B cells can result in severe and repeated infections with encapsulated bacteria
- ◆ Defects in T cell function result in severe combined immunodeficiency syndrome (SCID)
- ◆ Primary immunodeficiency can also be the result of defects in host defense other than T cells or B cells

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AUTOIMMUNE DISEASE

- ◆ In autoimmune reactions, the immune system reacts against the host
- ◆ Tolerance to self antigens normally prevents the development of autoimmune disease
- ◆ Many autoimmune diseases are the result of production of autoantibodies, but multiple parts of the immune response are usually involved

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AUTOIMMUNE DISEASE

- ◆ Specialized regulatory T cells (Treg cells) control the development of an autoimmune response
- ◆ Some people are genetically predisposed to autoimmune disease

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AUTOIMMUNE DISEASE

- ◆ Autoimmunity can be organ-specific such as type 1 diabetes mellitus, which affects cells in the pancreas
- ◆ Autoimmunity can also be systemic, such as systemic lupus erythematosus which affects many organs

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HYPERSENSITIVITY (ALLERGIC REACTIONS)

- ◆ An allergic response is a type of immune response
- ◆ This response is generated against allergens (antigens) such as peanuts, pollen, dust-mite feces, or animal dander

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HYPERSENSITIVITY (ALLERGIC REACTIONS)

- ◆ Mast cells, basophils and eosinophils play a role in allergic reactions
- ◆ Allergic responses are usually not life-threatening but can sometimes cause anaphylaxis, a condition that can be fatal

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**HYPERSENSITIVITY
(ALLERGIC REACTIONS)**

- ◆ There are four types of hypersensitivity responses
- ◆ Clinical effects of allergic reactions include vomiting, diarrhea, rhinitis, conjunctivitis, asthma and anaphylactic shock

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