

# Disorders of the Immune System

## Section 4

### Autoimmune Diseases

The ability of your immune system to distinguish cells and antigens of your body from foreign cells and antigens is crucial to the fight against pathogens. In some people, the immune system cannot distinguish between the body's antigens and foreign antigens, causing an autoimmune disease. In an **autoimmune disease**, the body launches an immune response against its own cells, attacking body cells as if they were pathogens. The immune system cannot distinguish between antigens of "self" and "nonself." This effect may be caused by the inappropriate production of antibodies specific to the antigens of body cells.

Autoimmune diseases affect organs and tissues in various areas of the body. For example, multiple sclerosis (*skleh ROH sihs*) usually strikes people between the ages of 20 and 40. Multiple sclerosis (MS) is generally thought to be an auto-immune disease. In people with multiple sclerosis, the immune system attacks and gradually destroys insulating material surrounding nerve cells in the brain, in the spinal cord, and in the nerves leading from the eyes to the brain. This impairs and may eventually stop the functioning of these nerve cells. Multiple sclerosis causes problems with vision, speech, and coordination. **Table 1** lists and describes several autoimmune diseases.

**Table 1 Autoimmune Diseases**

Disease	Areas affected	Symptoms
Graves' disease	Thyroid gland	Weakness, irritability, heat intolerance, increased sweating, weight loss, insomnia
Multiple sclerosis (MS)	Nervous system	Weakness, loss of coordination, problems with vision and speech
Rheumatoid arthritis	Joints	Severe pain, fatigue, disabling inflammation of joints
Systemic lupus erythematosus (SLE)	Connective tissue, joints, kidneys	Facial skin rash, painful joints, fever, fatigue, kidney problems, weight loss
Type I diabetes	Insulin-producing cells in pancreas	Increased blood glucose level, excessive urine production, problems with vision, weight loss, fatigue, irritability

### Allergic Reactions

Many health problems are caused by inappropriate responses of the immune system. One example is an allergic reaction. An **allergy** is the body's inappropriate response to a normally harmless antigen. Allergy-causing antigens include pollen, the feces of dust mites, fungal spores, and substances found in some foods and drugs. Most allergic reactions are merely uncomfortable. Cells exposed to allergy-causing antigens release histamine. Histamine causes swelling, redness, increased mucus production, runny nose, itchy eyes, and nasal congestion. Most allergy medicines contain antihistamines, which are drugs that prevent the action of histamine. Severe allergic reactions, such as asthma, can be life threatening if they are not treated immediately.

#### BIOWatch



### Asthma

**A**sthma is an inflammation of the respiratory tract often caused by an allergic reaction to substances in the air. Asthma affects about 15 million Americans and causes more than 5,000 deaths each year. Inner-city residents get asthma three times as often as people who live outside cities. In some cities, the death rate from asthma is eight times the national average. Some scientists think increased asthma rates in inner-city residents is related to pollution, emotional stress, and limited access to health care. One study suggests that cockroach feces may cause asthma in many inner-city children.

#### Asthma Attack

During an asthma attack, the respiratory passages become inflamed and swollen. Then mucus collects in the lungs, restricting airflow. Finally, muscles that surround the bronchial tubes tighten, causing shortness of breath.

#### Treating Asthma

Asthma sufferers can take medicines that increase airflow by relaxing bronchial-tube muscles, but their effects wear off after a few hours. Other medicines provide long-lasting relief by preventing or reducing inflammation.

## Directed Reading

### Section: Disorders of the Immune System

Read each question, and write your answer in the space provided.

1. What is an autoimmune disease?

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2. Which autoimmune disease affects joints?

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3. Describe the symptoms of Type I diabetes.

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Read each question, and write your answer in the space provided.

8. Give two examples of allergy-causing antigens.

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9. What is histamine, and what is its role in allergic reactions?

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