

# Autoimmune Diseases: When the Immune System Attacks Instead of Protects

## What is an autoimmune disease?

An autoimmune disease occurs when the immune system malfunctions and attacks rather than protects the body's own organs, tissues or cells.<sup>i,ii</sup> Normally the immune system recognizes the difference between its own self and foreign substances that are potentially dangerous. In autoimmune diseases, the body is unable to tell the difference. Seeing "self" as dangerous, the immune system may create antibodies that attack normal cells by mistake while other cells called regulatory T cells may fail to keep the immune system in check. The immune system can attack different parts of the body which determines the specific type of autoimmune disease.<sup>iii</sup>

## What causes autoimmune disease?

What causes the immune system to malfunction is not known. The collaboration among the JDRF International, the Lupus Research Alliance and the National Multiple Sclerosis Society is funding innovative research projects to explore the common elements between type 1 diabetes, lupus and multiple sclerosis with the goal of finding what goes awry in each.

## How many autoimmune diseases exist? How many people are affected?

The National Institutes of Health estimates more than 80 autoimmune diseases affect more than 24 million Americans.

## What are the most common autoimmune diseases?

The NIH notes that the most well-known autoimmune diseases include type 1 diabetes, multiple sclerosis and systemic lupus erythematosus, as well as rheumatoid arthritis.<sup>iv</sup>

## What is type 1 diabetes?

Type 1 diabetes (T1D) is an autoimmune disease that occurs when a person's pancreas is mistakenly attacked by the immune system. When the pancreatic beta cells are destroyed, the body stops producing insulin, the hormone that controls blood-sugar levels. People with T1D depend on external insulin to survive. The cause of T1D is still being researched, however scientists believe there are genetic and environmental components. Some 1.6 million Americans are living with T1D, including about 200,000 youth (less than 20 years old) and more than 1.4 million adults (20 years old and older). Although T1D is a serious and challenging disease, long-term management options continue to evolve, allowing those with T1D to have full and active lives.<sup>v</sup>

## What is multiple sclerosis?

Multiple sclerosis (MS) is an unpredictable, often disabling disease of the central nervous system. There is currently no cure for MS. Symptoms vary from person to person and range from numbness and tingling, to mobility challenges, blindness and paralysis. An estimated 1 million people live with MS in the United

States. Most people are diagnosed between the ages of 20 and 50, and it affects women three times more than men.<sup>vi</sup>

### **What is systemic lupus erythematosus?**

Systemic lupus erythematosus (SLE), commonly referred to as lupus, is a debilitating autoimmune disease marked by its complexity or heterogeneity—meaning it affects each person differently and can change over time. In lupus, the immune system mistakenly attacks the body’s own tissues and vital organs. According to the U.S. Centers for Disease Control and Prevention, a conservative estimate suggests 322,000 Americans have definite or probable SLE. 90% of people diagnosed with lupus are women, typically during childbearing years, ages 15-44. Lupus is two to three times more common and its symptoms tend to be more severe among African Americans, Hispanics, Latinos, Native Americans and Asians than Caucasians.<sup>vii</sup>

### **What do these three autoimmune diseases have in common?**

The JDRF International, Lupus Research Alliance and National Multiple Sclerosis Society have joined forces to better understand the commonalities among type 1 diabetes, lupus and multiple sclerosis. The aim is to gain deeper knowledge of the immune system and the shared and distinct pathways that are affected in these diseases. These insights into disease heterogeneity will allow novel developments of better diagnosis and treatment.

i Autoimmune Diseases. National Institutes of Health. Accessed at: <https://www.niaid.nih.gov/diseases-conditions/autoimmune-diseases>

ii Autoimmune Diseases. National Institutes of Health. National Institute of Environmental Health Sciences. Accessed at: <https://www.niehs.nih.gov/health/topics/conditions/autoimmune/index.cfm>

iii Autoimmune Diseases. U.S. Department of Health & Human Services. Office on Women’s Health. Accessed at: <https://www.womenshealth.gov/a-z-topics/autoimmune-diseases>.

iv Autoimmune Diseases. National Institutes of Health. National Institute of Environmental Health Sciences. Accessed at: <https://www.niehs.nih.gov/health/topics/conditions/autoimmune/index.cfm>

v Type 1 Diabetes Facts. JDRF. Accessed at: <https://www.jdrf.org/t1d-resources/about/facts/>

National Multiple Sclerosis Society. Read more here: <https://www.nationalmssociety.org/What-is-MS>.

vii Lupus Fact Sheet. The Prototypical Autoimmune Disease. Lupus Research Alliance. Accessed at: <https://www.lupusresearch.org/wp-content/uploads/2021/01/Lupus-Fact-Sheet-Updated-1.7.21.pdf>