

## Multiple Sclerosis: An Immune-Mediated Disease

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### EDITORIAL NOTE

The immune system, in its natural state, is a sophisticated mechanism that defends our bodies against illnesses. Protective cells can be found in our skin, lungs, and stomach. If we become infected with a bacterium, virus, or parasite, our immune system activates a large number of additional cells. White blood cells, or lymphocytes, are two major kinds of immune system cells. These are triggered by signals from the immune system that indicate the presence of a foreign intruder. B cells (so named because they grow in the bone marrow) identify and make antibodies against certain types of foreign cells. T cells (so named because they grow in the thymus gland, a tiny organ) are responsible for a range of different immune responses.

Multiple sclerosis is an immune-mediated illness in which the immune system of the body affects the central nervous system. Damage to the myelin layer around nerve fibres in the central nervous system and to the nerve fibres themselves interferes with nerve signal transmission between the brain, spinal cord, and the rest of the body in multiple sclerosis (MS). MS symptoms are caused by disrupted nerve impulses, which vary from person to person and over time for each individual, depending on where and when the damage occurs.

The presence of at least two sites of CNS injury that happened at distinct periods is required for the diagnosis of MS. Although no particular antigens have been found in MS, most doctors feel it is an autoimmune illness. Psoriasis, Crohn's disease, rheumatoid arthritis, systemic lupus erythematosus, and insulin-dependent (Type 1) diabetes mellitus are some of the disorders known to have an autoimmune foundation. In MS, the immune system targets and destroys myelin (the fatty coating that covers and protects nerve fibres), oligodendrocytes (myelin-producing cells), and nerve fibres beneath myelin.

The aberrant immune response found in MS involves a variety of cells. T cells and B cells are two essential kinds of immune cells.

T cells are activated in the lymphatic system and enter the CNS via blood arteries in MS. T cells emit substances that induce inflammation and damage once they enter the CNS. Myelin, nerve fibres, and the cells that create myelin are all damaged as a result of this. T cells are also necessary for activating B cells and enlisting the support of other immune system cells in the immunological onslaught. T regulatory cells are a kind of T cell that helps to reduce or stop inflammation. T regulatory cells do not function properly in MS, and they are unable to efficiently turn off inflammation. T cells that are cytotoxic or "killer" assault and destroy cells that have particular features. With the support of T cells, B cells get activated. In MS, B cells create antibodies and activate other proteins, which cause CNS damage.

Multiple Sclerosis treatments that target the immune system: Disease-modifying medicines for MS function through a variety of methods, with each therapy having a unique mechanism of action. These mechanisms include the following:

- T-cell activation is being disrupted.
- Inflammation and immunological activity are being reduced.
- Immune system cells are being stopped from moving.
- Immune system cell counts are being depleted.
- Immune cell entrance into the CNS is restricted.

While much has been discovered about the immune response in MS and the processes that produce inflammation and damage, more study is needed to better understand the MS disease process, including disability progression, and find therapies to slow, reverse, and eventually cure MS. MS treatment begins with a diagnosis and continues for the rest of one's life. Multiple Sclerosis management is a continuous procedure that begins with the onset of symptoms and continues throughout the course of the disease.

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