

## Multiple Sclerosis: The Basics

### WHAT IS MULTIPLE SCLEROSIS?

Multiple sclerosis (MS) is a chronic disease that affects the central nervous system (CNS), which is made up of the brain, spinal cord, and optic nerves. MS damages the myelin sheath, a fatty coating that surrounds and protects nerve cells, and can also damage the nerve fiber itself. This damage is caused by the body's immune system entering the CNS and mistakenly attacking the nerves. This damage slows down or blocks messages between the brain and the body. MS is classified into four types, based on progression of the disease.

- ▶ **Relapsing-remitting MS** is characterized by relapses (periods of symptom flare-up) followed by remission (periods of recovery).
- ▶ **Secondary-progressive MS** also includes relapses and partial recoveries, but the disability doesn't disappear between cycles. Instead, it progressively worsens. Sometimes relapses may occur in addition to progression. Secondary-progressive MS often develops in people who have relapsing-remitting MS.
- ▶ **Primary-progressive MS** progresses slowly and steadily from its onset. There are no periods of remission, and symptoms generally do not decrease in intensity. About 15 percent of people who have MS have this form of the disease.
- ▶ **Progressive-relapsing MS** is a relatively rare type in which people experience both steadily worsening symptoms and attacks during periods of remission.

### HOW COMMON IS IT?

Experts estimate that more than 400,000 people in the United States are diagnosed with MS. Twice as many women are affected as men.

### WHAT ARE THE SYMPTOMS?

Symptoms can include tingling, numbness, loss of balance, blurred or double vision, and weakness in one or more limbs. Muscle stiffness, pain, urinary symptoms, and cognitive problems may also develop as the disease progresses.

### HOW IS IT DIAGNOSED?

Physicians must find evidence of damage in at least two separate areas of the CNS and find evidence that the damage occurred at two different points in time and rule out all other possible diagnoses. The most common diagnostic tests include magnetic resonance imaging (MRI), lumbar puncture (spinal tap), and electrical tests that can detect evidence of nerve damage that may not show up on an examination or MRI. Blood tests may also be ordered to rule out other conditions that may mimic MS.

### HOW IS IT TREATED?

While there is no cure for MS, the disease is highly treatable. Fourteen drugs have been approved by the US Food and Drug Administration to reduce relapses and decrease inflammation and new areas of nerve damage on MRI: beta interferons (Avonex, Betaseron, Extavia, Rebif, and Plegridy); glatiramer acetate (Copaxone); fingolimod (Gilenya); natalizumab (Tysabri); mitoxantrone (Novantrone); dimethyl fumarate (Tecfidera); alemtuzumab (Lemtrada); daclizumab (Zinbryta); and teriflunomide (Aubagio).

### WHAT RESEARCH IS BEING CONDUCTED?

The National Institute of Neurological Disorders and Stroke ([ninds.nih.gov](http://ninds.nih.gov)) is one of many institutions that conducts research to create new and better therapies for MS. Much current research is focused on strategies that will not only stop damage to nerves, but also help to repair damaged nerves and restore function.

For more *Neurology Now* articles on multiple sclerosis, go to [bit.ly/NN-MS-Basics](http://bit.ly/NN-MS-Basics).

For more resources and support, contact:

- ▶ Multiple Sclerosis Association of America: [mymsaa.org](http://mymsaa.org); 800-532-7667
- ▶ Multiple Sclerosis Foundation: [msfocus.org](http://msfocus.org); 888-MSFOCUS (673-6287)
- ▶ Myelin Repair Foundation: [myelinrepair.org](http://myelinrepair.org); 408-871-2410
- ▶ National Multiple Sclerosis Society: [nationalmssociety.org](http://nationalmssociety.org); 800-344-4867

SOURCES: NATIONAL LIBRARY OF MEDICINE; NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE; NEUROLOGY NOW.