BRAIN RESEARCH SUCCESS STORIES

Multiple Sclerosis

Making a Difference Today

It strikes people during the prime of life—between ages 20 and 40—when they begin to experience a tingling sensation or numbness in a hand or a leg, blurred vision, or chronic fatigue. These seemingly minor and often temporary symptoms could signal any one of a number of illnesses.

But this is multiple sclerosis—a disease that in its advanced stages can rob people of their ability to walk, talk, or even tie a bow. About one in 1,000 mostly Caucasian young adults experiences the blurred or double vision, green and red color distortion, and even blindness associated with this lifelong chronic disease that has no cure. Multiple sclerosis costs the United States more than $9.5 billion annually in medical care and lost productivity.

Understanding a Complex Disease

In multiple sclerosis, the immune system for unknown reasons mistakenly destroys the protective myelin covering around nerves. The myelin is replaced by hardened patches of tissue called plaques that can appear throughout the nervous system. This process is similar to the loss of insulating material around an electrical wire, which interferes with the transmission of signals.

Without myelin, electrical signals are transmitted more slowly or not at all from the brain to the body, causing weakness, tremors, pain, and loss of feeling. Multiple sclerosis has an unpredictable course. A patient can go for many years without symptoms, only to have severe relapses or progressive disability later on.

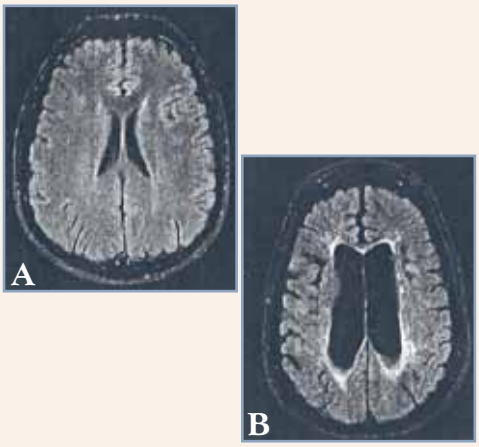
Brothers and sisters of individuals with multiple sclerosis are 10 to 15 times more likely than others to develop the disease, so it likely has a genetic component. Environmental factors may also play a role. Multiple sclerosis is five times more prevalent in temperate climates such as the northern United States and northern Europe than in tropical regions.

Research Leads to New Treatments

Fortunately, research funded by the National Institutes of Health (NIH) and others over the past two decades has led to many advances that allow physicians to diagnose multiple sclerosis earlier and better track its progress so that treatments can be more effective. Imaging techniques such as magnetic resonance imaging and magnetic resonance spectroscopy provide a window on the brain that allows physicians to better predict relapses and thus plan for patients' care.

In addition to steroids used in the past to reduce the duration and severity of attacks, there are now other drugs like interferon, glatiramer acetate, and mitoxantrone that can decrease disease severity. Studies have shown that these drugs can make relapses less frequent and severe and delay further damage from the disease.

Additional funding will help fine-tune these drugs and develop others that can more effectively ease the pain and suffering of individuals who grapple with this crippling illness during the prime of their lives.



Multiple sclerosis occurs when the body's immune system mistakenly destroys the protective myelin covering around nerves. The brain of a healthy 31-year-old man (A) shows no loss of tissue. Significant tissue loss (dark areas) is apparent in the brain of a 43-year-old woman (B) who has had multiple sclerosis for 19 years.

Continued funding for research could lead to:

- Greater understanding of the disease's genetic basis and the interaction of genes with the environment.
- Identification of more effective alternative therapies.
- Development of drugs and treatments to help the brain repair itself.

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BRAIN RESEARCH SUCCESS STORIES

Multiple Sclerosis

Making a Difference Tomorrow

Physicians today are better able than ever to help track and treat multiple sclerosis. Yet multiple sclerosis continues to devastate the lives of victims and their families. It is a major public health burden. Did you know that:

- About 400,000 Americans have multiple sclerosis. Every week, an estimated 200 more are diagnosed.
- Some 2.5 million people have multiple sclerosis worldwide.
- More women have multiple sclerosis than men.
- Multiple sclerosis costs Americans $9.5 billion in medical care and lost productivity each year.

Diseases like multiple sclerosis create a significant burden on families and society. Long-term care can cost more than $30,000 per year. Only with further research funding will scientists find the causes of and better treatments for multiple sclerosis, thus reducing the disease's costs to individuals and society.

Research into a Better Future

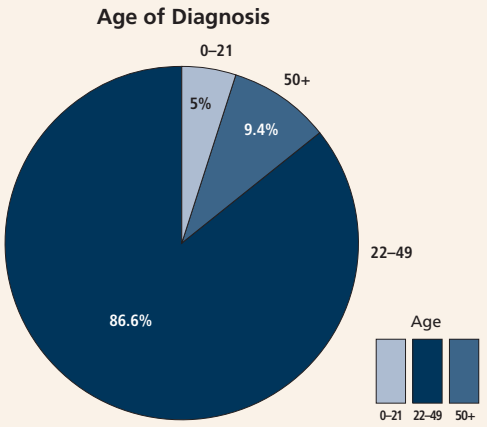
Recent studies funded by NIH and others are pointing the way toward promising new treatments. One study showed that so-called "progenitor" cells in the brain might be used to help regenerate areas of the brain that have lost myelin. And although scientists used to think that multiple sclerosis did not destroy the axons that conduct brain impulses to the body, recent studies have shown that it can. Such damage can cause permanent neurologic dysfunction. Other research in mice has suggested that injecting a kind of stem cell found in the adult brain shows promise in treating diseases like multiple sclerosis. Once injected, the cells travel to the damaged nerves and help rebuild the myelin coat that surrounds the nerves. Such findings create potential for the clinical use of stem cell therapies in treating people with multiple sclerosis.

Other studies to pinpoint the genes involved in multiple sclerosis and their interaction with the environment will provide clues to what causes the disease and how it can be prevented.

While these studies hold hope for future generations, more research is needed to help those already in the grip of the disease. Funding is needed to find out whether the drugs currently used in the early stages of the disease can delay the secondary, more debilitating stage. Most studies of multiple sclerosis have lasted only five to six years. But the disease itself can last for decades. Longer follow-up studies of patients being treated with multiple sclerosis drugs will help scientists determine how well the drugs help people over a long period of time.

Hope for Other Diseases

Research that aids multiple sclerosis will also help many other people, including those with Parkinson's, Alzheimer's, Huntington's, and Lou Gehrig's diseases. These diseases share similarities in how the brain is injured. Further research will blur some of their distinctions, clarify their differences, and lead to more logical choices in treatments. Advances in treating these diseases will mean fewer deaths, fuller lives, and less cost to the government and the public.



Multiple sclerosis strikes people during the prime of their lives, right as they are settling into their careers and families. The tremors, blurred vision, and pain associated with the disease can range from benign to disabling, and individuals can go for many years without symptoms, only to have severe relapses later. Multiple sclerosis costs Americans $9.5 billion every year in medical expenses and lost productivity.

Already research has led to:

- Earlier and more accurate diagnosis of multiple sclerosis.
- Imaging techniques that allow better prediction of relapses and thus better patient care.
- Development of drugs that can reduce the severity of symptoms.

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