MS Discovery
Multiple Sclerosis National Research Institute
Fall 2003 · Volume 1 Issue 3

Scientists Pioneer Novel, Targeted Interventions for the Treatment of MS

Researchers at the Multiple Sclerosis National Research Institute continue in their search for treatments and cures for Multiple Sclerosis (MS), a progressive autoimmune disease that attacks the nervous system. The disease causes numbness, tingling, muscle spasms, blurred vision and fatigue due to loss of myelin sheath cells. These cells normally insulate nerve cells and facilitate transmission of signals. Without myelin, transmission of nerve impulses becomes erratic and leads to symptoms associated with MS.

Scientists do not know what causes the disease. Leading theories suggest genetic, viral and environmental factors may be involved. Understanding how the immune system behaves in MS represents the first step toward finding a cure. Scientists at the Institute use a disease in mice, experimental autoimmune encephalomyelitis (EAE), to better understand MS in humans. Scientists know that MS is a T cell mediated disease. T cells normally function to keep the body healthy by guarding against infection and genetically altered cells. In the case of T cell mediated autoimmune disorders, T cells mistakenly attack the body's own tissues and cause disease.

Using the EAE mouse model of the disease, scientists discovered a group of faulty T cells that attack myelin basic protein (MBP), a major component of myelin cells. T cells bind to pathogens (disease causing agents) and other cells using an appendage called a T cell receptor (TCR). Institute researchers discovered a protein sequence, **Vß8.2**, unique to T cell receptors of the defective T cells that cause MS. Features unique to a cell type, like **Vß8.2**, make attractive therapeutic targets because they offer the possibility of direct modulation of the disease process without affecting normal functioning of the immune system. Institute scientists attempted to immunize mice against EAE by injecting them with a virus containing **Vß8.2**. The strategy worked and mice began to produce new T cells that would seek out and destroy the T cells responsible for EAE. "We are in an exciting phase of study wherein we will be defining a genetic blueprint of the CD8+ T cells that perform the coupe de grace of the aggressive disease-causing cells," said Dr. Vipin Kumar of the Institute.

"The success of this study provides an early proof-in-principle that a targeted immunospecific therapy can be developed for intervention in MS."

"The success of this study provides an early proof-in-principle that a targeted immunospecific therapy can be developed for intervention in MS. In addition, by targeting the T cell receptor on pathogenic cells, we can devise tests for assaying pathogenic T cells from any T cell mediated disease condition," added Dr. Todd Braciak of the Institute.

(continued on back panel)

Multiple Sclerosis
National Research Institute
3550 General Atomics Court
San Diego, California 92121 USA
(858) 455-3712 • (858) 455-3804 Fax
www.ms-national-research.org

Multiple Sclerosis National Research Institute

Scientists Pioneer Novel, Targeted Interventions for the Treatment of MS

continued from front page

The strategy devised by Institute scientists represents an exciting step toward developing new treatments for autoimmune diseases. Existing treatments often suppress the entire immune system, rendering the recipient susceptible to opportunistic infection. Institute scientists did not observe immune system suppression aside from targeted attack of T cells responsible for EAE. Future studies aim to optimize the strategy using the animal model with the ultimate goal of adapting the application to treat human autoimmune disease. Generous support from individual donors, participants in the Combined Federal Campaign (CFC), United Way and state, local and corporate campaigns ensures the important research will continue. Thank you for sharing our vision and hope of finding a cure for MS.

MS Fast Facts *MS Fast Facts* *MS Fast Facts* *MS Fast Facts* *MS Fast Facts* *MS Fast Facts*

1. Two out of three people diagnosed with MS are women.
2. MS strikes people most commonly between the ages of 20 and 40.
3. The cause of MS is unknown. Genetic, viral and environmental factors may be involved in disease genesis.
4. MS is diagnosed more frequently in people living in northern areas of the United States, Canada and Europe.
5. The four varieties of MS include benign, relapsing remitting, secondary progressive and primary progressive.
6. Approximately 2.5 million people worldwide have MS.