21st Century Neurology **Spring 2006 Newsletter**
A division of Xenoscience, Inc. Stephen S. Flitman, MD, Medical Director
3100 North Third Ave Suite 100, Phoenix, AZ 85013
(602) 265-6500
www.neurozone.org
Supported by an unrestricted educational grant from Novartis

This is the Fifth Anniversary issue of our quarterly newsletter! 21st Century Neurology was founded in April of 2001 and has since grown tremendously. Neurology is a vast field which focuses on conditions affecting the body's nervous system: the brain, spinal cord, muscles and nerves. New methods are being developed to produce better means of diagnosing and treating diseases such as Multiple Sclerosis, Alzheimer's disease, Parkinson's disease, epilepsy, peripheral neuropathy, migraine and atypical pain syndromes like postherpetic and trigeminal neuralgias. At this time, Dr. Flitman and his staff are recruiting for several clinical trials aimed at providing new therapeutic approaches to these diverse conditions. If you or someone you know is interested in a clinical trial, please call us or see our website for updated information.

Multiple sclerosis (MS) is a disease affecting over 400,000 Americans. It is a common condition of the central nervous system which results from the body's own immune system attacking myelin sheaths of nerve fibers. Myelin is a fat-like substance which acts as insulation for nerve fibers, permitting them to conduct nerve signals much faster than would otherwise be possible. Damage to the sheaths is called *demyelination* and results in a nerve which cannot send signals as fast, and is also made worse when exposed to heat. This is why people with MS are so sensitive to overheating and do better in cold weather. When a new MS attack occurs (called an *exacerbation* or *relapse*), it is believed that cells of a person's own immune system attack the sheaths and produce demyelination in various places in the brain and spinal cord. Currently available treatments include four kinds of drugs:

1. Beta-interferons. These work by making the antibody side of the immune system more active than the cell-attacking side.
    a. Betaseron (interferon-beta-1b)
    b. Avonex (interferon-beta-1a)
    c. Rebif (interferon-beta-1a)
2. Copolymers. Probably works to make the cell-attacking side of the immune system less active, especially in the brain and spinal cord.
    a. Copaxone (glatiramer)
3. Antimetabolites. Knock down the production and/or function of white blood cells. These are often chemotherapy agents used in treating cancer or drugs which prevent organ transplant rejection.
    a. Prednisone
    b. Cytoxan (cyclophosphamide)
    c. Imuran (azathioprine)
    d. Neoral (cyclosporine)
    e. Novantrone (mitoxantrone)
    f. Cellcept (mycophenolate)
4. Monoclonal Antibodies.
    a. Tysabri (natalizumab)

Of these, the newest is Tysabri, which was briefly on the market in 2004 and then removed when concern was raised about safety. At present, it looks good for returning to the market, which will be a boon for patients with MS who have not been able to tolerate the other medications. The interferons and Copaxone have been around for 10 years and are used the most, and are probably equally good at protecting MS patients from new attacks. None of them provide 100% protection but a decade of experience shows very good safety and efficacy over the long term. Less used are the antimetabolites, but they may be appropriate if a person's MS changes to a progressive condition or if the other drugs are not helping.

New ideas in MS include combination therapy trials. One such trial is Teva Pharmaceuticals phase IV trial of Copaxone and Prednisone. This ongoing study is trying to look scientifically at a common practice among neurologists of giving steroids periodically on top of regular therapy, but instead of having to take steroids intravenously this will test an equivalent dose of oral steroid.

A particularly desirable goal in MS is an all-oral treatment regimen. Cellcept, a drug for preventing organ rejection, has been studied in several trials. It may carry risks of secondary malignancy, also seen with the approved drug Novantrone, but further work is necessary to prove safety and efficacy. Other oral agents have been looked at with varying results; at present none is particularly close to marketing approval.

Diseases which make the immune system attack the tissues of the body like MS could be cured if a T-cell vaccine approach was successful. These vaccines are made from a patient's normal T-cells, a component of the immune system, and then are exposed in the laboratory with an antigen, typically a protein marker which is the target that abnormal T-cells are sensitive to. This can produce T-cells which could be given as an injection to turn the patient's immune system against rogue T-cells. A number of companies are pursuing this route. This would be more than a treatment since if it works the rogue cells thought to be the cause of MS would be eliminated, and no further therapy would be needed—in short, a true cure. What is intriguing is that the field of MS research has reached the point where talking about a cure is not pie in the sky, but potentially within reach.

New technologies may make the diagnosis of conditions like MS more accurate. Xenoscience is currently collaborating with Sandia National Laboratories to produce a microfluidic platform which will aid medical diagnosis. Microfluidic systems can be fabricated like computer chips and allow precise control and analysis of important biochemicals like DNA, RNA, and proteins. ❊