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Editorial

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New Hope for Multiple Sclerosis Patients

Multiple sclerosis (MS) is a devastating autoimmune disease (the body's immune cells attack the nervous system, leading to inflammation) that affects the central nervous system (brain, optic nerve, and spinal cord), characterized by decreased nerve function.[1−4] The nature of the symptoms and the severity of symptoms vary widely, and patients cycle between unpredictable episodes of severe attacks and remission. A hallmark of MS is inflammation targeting the myelin sheath that surrounds and protects the axon of nerve cells, leading to scarring. Damage to the myelin sheath results in reduced or ablated signaling, which leads to the characteristic MS symptoms. Like many CNS disorders, no clear cause has been identified, although evidence points to viral infection, gene defect, or environmental factors. The disease typically presents between 20 and 40 years of age and is more prevalent in women than men.[1−4]

As mentioned, episodes are unpredictable and can last for days to months with varying degrees of severity. This is a very heterogeneous disorder, as demyelination can occur randomly throughout the brain and spinal cord, leading to a broad spectrum of symptoms: muscle symptoms (muscle weakness, numbness, tremor, loss of balance, difficulty walking, or moving arms/legs), bowel and bladder symptoms, optical symptoms (vision loss, eye movements/discomfort), numbness, depression, hearing loss, memory loss, speech and swallowing symptoms, sexual dysfunction, and severe fatigue.[1−4] Diagnosis of MS is also challenging and involves neurological and eye exams, followed by lumbar puncture (CSF test for oligoclonal banding), MRI brain scan, and evoked potential testing.[1−4]

Clearly, MS is a debilitating disorder that has also presented a challenge to the pharmaceutical industry to effectively treat, and as of 2013 there is still no cure for MS. As with a number of CNS pathologies, the goal of therapeutic intervention is to slow disease progression and improve quality of life. Medications are taken as long-term, chronic daily maintenance therapy and include inteferons (Rebif), methotrexate, steroids, fingolimod, IV immunoglobulin, and natalizumab to list a few. In addition, MS patients may be prescribed anticholingerics for the bowel/bladder symptoms, antidepressants, baclofen for muscle spasms, amantadine for fatigue, and various combinations thereof.[1−4] Thus, careful monitoring of drug−drug interactions is critical. Outside of pharmaceutical intervention, many MS patients benefit from physical therapy, exercise, and lifestyle modifications. However, all of these treatment options result in a huge financial burden to MS patients.

A new hope emerged in late 2012.[5,6] Genzyme (Sanofi) and Bayer Schering Pharma announced the result of the CARE MSII trial, where alemtuzumab (a monoclonal antibody developed for the treatment of leukemia that binds to CD52 and targets CD52-bearing lymphocytes) was effective in MS patients who had failed to respond to first-line therapies, as well as naïve MS patients. Alemtuzumab was found to be superior, reducing episodes by 49% over interferon β1a (Rebif) treated patients.[5,6] After one year of treatment, 65% of the alemtuzumab treated patients remained episode free, as opposed to 47% with Rebif. Both the risk of acquiring disability and worsening disability improved for patients receiving alemtuzumab, indicating a significant impact on relapse and disablement. Imaging studies demonstrated that alemtuzumab also reduced the number of new lessions and reduced the rate of brain shrinkage from the tissue damage in MS. For all of these reasons, alemtuzumab stands out as a breakthrough in MS therapy. However, it is not a panacea. Alemtuzumab was shown to cause potentially serious side effects. Approximately 20% of patients in the trial developed other autoimmune disease such as thyroid autoimmunity. Additional trials are underway alemtuzumab in combination with a novel drug to reduce the risk of developing autoimmune diseases as a side effect of treatment.[5,6] Despite this risk, many patients are desperately seeking new treatments. In the United States alone, there are over 400 000 MS patients, with worldwide estimates in the millions. This also stands out as a novel biological approach for the treatment of a CNS disorder. Beyond alemtuzumab, many new MS therapies, both small molecule and biologic, are in various stages of development, and these treatments are desperately needed. At *ACS Chemical Neuroscience*, we would be honored to publish your latest MS pharmacology, disease models, and drug discovery.

On an unrelated, yet important note, we finally cleared the last hurdle for launching a new Journal (we launched in 2010), with automated deposition of Just Accepted Manuscripts and ASAP articles to PubMed within a day or two of acceptance. Many thanks to ACS publication staff for getting this accomplished!

Craig W. Lindsley, Editor-in-Chief

AUTHOR INFORMATION

Notes

Views expressed in this editorial are those of the author and not necessarily the views of the ACS.

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