

# INFOCUS



## Autoimmune Diseases Association

American Autoimmune Related Diseases Association, Inc.

A nonprofit association bringing a national focus to autoimmunity, the major cause of chronic diseases

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### Evidence suggests a pathogenic role of brain autoimmunity in central nervous system diseases

—by Vijendra K. Singh, Ph.D., Director of Research, Brain State Technologies, Scottsdale, AZ



More than 50 million people in the United States suffer from autoimmune diseases due to an abnormal immune reaction called autoimmunity. Autoimmunity is a major cause of many chronic diseases. This number, however, does not include several brain diseases and mental illnesses for which brain autoimmunity has been experimentally demonstrated. For example, a huge population with autism spectrum disorders (ASD), Alzheimer's disease (AD), Tourette's syndrome (TS) and obsessive-compulsive disorder (OCD) has been found to have autoimmunity to brain. This patient population is never included in epidemiological studies of the autoimmune diseases.

If you have an autoimmune disease, your immune system goes haywire and begins to attack healthy cells, tissues, and organs. However, this must happen in a highly select way. Thus, in the case of NeuroAutoImmunity (NAI), the immune system will elicit autoimmune response towards the brain or nerve tissue. To that end, the term "NeuroAutoImmunity" (NAI) has recently been used to refer to this autoimmune response that is directed against the brain or nerve tissue. Our immune system and nervous system are connected with each other via the so-called neuro-immune circuitry; and when this circuitry is disrupted, the most common problem manifested is autoimmunity to brain. Then, people commonly show a wide spectrum of neurological and psychiatric health problems.

What causes autoimmune diseases is not well known. The common belief is that they are triggered by environmental factors, in particular viruses; for example, human herpes virus-6 in multiple sclerosis (MS), measles virus in autism spectrum disorders, and herpes simplex virus in Alzheimer's disease. Virus infection is now known to change the permeability of the blood-brain barrier, which permits the entry of immune cells and proteins into the brain. Inside the brain, the microglial cells can also produce immune proteins that are involved in the autoimmune process commonly referred to as brain inflammation or neuroinflammation.

Like all typical autoimmune diseases, the autoimmunity to brain has been found through laboratory studies of specialized proteins of the immune system (for example, antibodies and cytokines), autoimmunity testing, and immunotherapy. Immune activation, which is the first step in the onset of autoimmunity, has been shown in patients with multiple sclerosis, autism spectrum disorders, Alzheimer's disease, Tourette's syndrome, and obsessive-compulsive disorder. Patients with these diseases also harbor elevated levels of autoantibodies that bind specifically to brain proteins—for example, antibodies to caudate nucleus of the basal ganglia (a brain region involved in Parkinson's disease) in autism spectrum disorder, Tourette's syndrome, and obsessive-compulsive disorder; antibodies to amyloid protein-beta in Alzheimer's disease; and antibodies to myelin basic protein in autism spectrum

disorder and multiple sclerosis. Interferon-gamma and interleukin-12, the two proteins of the immune system that initiate autoimmunity, are also activated in patients with brain diseases. Furthermore, many patients also show improvement when administered with immunotherapy using intravenous immunoglobulin, plasmapheresis, transfer factor, and other immune modulating agents.

Clearly, several lines of scientific evidence suggest a pathogenic role of brain autoimmunity or NeuroAutoImmunity in central nervous system diseases. This patient population must be included in all future epidemiological studies if we are going to realize the overall impact of autoimmune diseases. Immunotherapy with immune modulating agents offers a novel promising approach to helping those affected with these medical conditions. Autoimmunity in the brain may also cause a shift in brain waves or states, thereby resulting into a

functionally "imbalanced brain." To that end, a novel approach of Brain State Conditioning (BSC) that stems from brain plasticity (brain's ability to re-wire and heal itself) might also be quite important in helping people who suffer from brain diseases and mental illnesses involving autoimmunity.

According to the World Health Organization (W.H.O.), the financial burden of all brain diseases and mental illnesses surpasses that of cancer and heart disease. Up to 75-80 percent of

### You Did It!

Thanks to YOU, our Autoimmune Action 2009 annual holiday appeal measures up to last year's total! Especially considering the current economic conditions, that is amazing! You've given the organization a generous hand-up into this new year. As you surely know, AARDA's existence depends almost entirely on the donations of individuals and foundations, large and small. Thank you for your continuing support of AARDA's mission.

## Bone health information available through the NIH

The National Institutes of Health (NIH) Osteoporosis and Related Bone Diseases--National Resource Center (ORBD-NRC) is offering free publications focusing on osteoporosis, a "silent" disease in which bones become weak and subject to breakage. Although this frequently is considered a women's problem, it also affects a surprisingly large number of men.

*Bone Health for Life: Easy-to-Read Information for Patients and Families* is an illustrated 20-page booklet that provides readers with valuable information and describes strategies to improve bone health at any age. It includes topics such as "Why does bone health matter?" and "What lifestyle approaches can help to promote bone health for life?"

*The 2009 Pocket Planner With Tips and Resources for Healthy Bones for Life* provides simple tips for improving bone health and provides links to Federal resources and more detailed information on the NRC Web pages. The planner includes space to plan activities for optimizing bone health as well as a list of selected calcium-rich foods and their calcium content.

• Both *Bone Health for Life* and the *2009 Pocket Planner* are available free to anyone on request. Contact the NIH ORBD-NRC at 1-800-624-2663 or use the order form at <http://catalog.niams.nih.gov/>.

*The Surgeon General's Report on Bone Health and Osteoporosis: What It Means to You*, also called "The People's Piece," is now available in Chinese as well as English and Spanish. This publication provides essential information on risk factors for osteoporosis, how to prevent falls, tips for talking to your doctor, and strategies to enhance bone health.

• To order *The Surgeon General's Report on Bone Health and Osteoporosis*, contact the NIH ORBD-NRC at 1-800-624-2663 or [NIAMSBoneInfo@mail.nih.gov](mailto:NIAMSBoneInfo@mail.nih.gov).

NOTE: Health care providers, community centers, and others involved with health promotion may be interested in ordering multiple copies to give to patients and distribute at community health events.

--Source: NIAMS IRPartners, newsletter for patients of the Intramural Research Program (IRP), National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), Winter 2008

### AARDA Memorial / Tribute Program

Write or call us for full details of this program. It can be handled by mail or by phone using Visa, MasterCard, or American Express.

Memorial and Tribute contributions bring great satisfaction to donors AND to the recipients (or their families).

They also help greatly in our ongoing fight against all autoimmune diseases.

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**To our readers:** Autoimmune diseases are conditions in which the body's own immune system can (among other things) cause damage to the skin, joints, and internal organs. Although most autoimmune diseases are not yet preventable or curable, most can be controlled to varying degrees. It is because of the wide variance and severity that the **individualization of medical management** is so important. It is vital that persons diagnosed with (or suspected of having) an autoimmune disease consult with their physician or with the appropriate division at a major teaching hospital to assure proper evaluation, treatment, and interpretation of information contained in this newsletter. Opinions expressed in this newsletter do not necessarily reflect the views of the American Autoimmune Related Diseases Association or its Scientific Advisory Board.

If you belong to a Service Organization or Fraternal (or other) group which provides financial contributions to charitable organizations, please ask them to consider the AARDA as a potential recipient. Your thoughtfulness could provide a vital link in helping our efforts to promote autoimmune research, education and awareness. (The AARDA is a fully accredited IRS 501 (c) (3) tax exempt organization.)

### "Evidence suggests" continued from page 1

patients with brain diseases have autoimmunity, which means that a significant proportion of this population could potentially benefit from interventions directed towards autoimmunity in the brain.

--Further Reading: *Annals of Clinical Psychiatry* (March, 2009); *Neurology* 71:265-271 (2008); *Tics and Tourette's* (S.J. Rogers, ed.), Chapter 15:163-169 (2005); *Neuroscience Letters* 355:53-56 (2004); *Journal of Biomedical Science* 9:359-364 (2002); *CMAJ* 165:1353-1358 (2001); *Gerontology* 43:79-94 (1997); *Progress in Drug Research* 48:129-146 (1997); *Molecular & Chemical Neuropathology* 28:105-111 (1996).

### "Affording medications" continued from page 4

back on your medical care when there are unexplored options from which you may be able to benefit. Let AARDA be your information source. Below you will find a few links to programs that may be able to provide assistance. If one of these programs does not attend to your needs, give us a call.

- ◆ Partnership for Prescription Assistance - [www.pparx.org](http://www.pparx.org); 1-888-477-2669
- ◆ [www.needymeds.com](http://www.needymeds.com)
- ◆ Abbott-adalimumab - 1-866-448-6472
- ◆ Amgen/Wyeth-etanercept - [www.enbrel.com](http://www.enbrel.com); 1-888-436-2735
- ◆ Centocor-infliximab - 1-866-489-5957
- ◆ Genentech-rituximab - [www.gene.com](http://www.gene.com); Access to Care Foundation 1-800-530-3083
- ◆ Pfizer-celecoxib - [www.pfizerhelpfulanswers.com](http://www.pfizerhelpfulanswers.com); 1-866-706-2400
- ◆ Roche-mycophenolate mofetil - 1-877-757-6243
- ◆ Sanofi Aventis-leflunomide - 1-866-325-8233

### "Ban on incandescent" continued from page 4

In the meantime, in choosing fluorescent lamps, consumers will want to look for a product that has a nanometer (nm) reading of 380 to 400. This will ensure the complete filtering of UVC, UVB, and virtually all UVA exposure.

Ultraviolet (UV) refers to all electromagnetic radiation with wavelengths in the range of 10 to 400 nanometers, or frequencies from 7.5E14 to 3E16 Hz. A nanometer is a common unit used to describe wavelengths of light or other electromagnetic radiation such as UV.

--Source: Adapted from "Lupus, Photosensitivity and Exposure to Ultraviolet Light," *Lupus Foundation of America*

### "Diet and exercise" continued from page 6

two new Web-based diet and physical activity evaluation tools. One is called ACT-24 (Activities Completed over Time in 24 Hours), which asks the respondent to enter the activities engaged in during the previous day. The other is called ASA24 (Automated Self-Administered 24-Hour Dietary Recall), which asks the respondent to report the foods eaten on the previous day. Future NIH-AARP Diet and Health Studies will employ these Web-based questionnaires to improve the understanding of diet, physical activity, and disease.

For up-to-date information about the study, go to <http://dietandhealth.cancer.gov>.

--Source: *Diet & Health Study News*, Fall 2008

Since the time of this publication, the knowledge, science and technology behind Brainwave Optimization™ has advanced rapidly, and in keeping with those changes, the language has also changed. We have retired the terms “brain state conditioning” and “brain training” in favor of the term Brainwave Optimization™, which more accurately reflects the way in which the technology works. The scientific term for Brainwave Optimization™ is High-resolution, Relational, Resonance-based Electroencephalic Mirroring (HIRREM).