

Glucosamine-Like Supplement Suppresses Multiple Sclerosis Attacks, Study Suggests

ScienceDaily (Sep. 30, 2011) — A glucosamine-like dietary supplement suppresses the damaging autoimmune response seen in multiple sclerosis, according to a UC Irvine study.

UCI's Dr. Michael Demetriou, Ani Grigorian and others found that oral N-acetylglucosamine (GlcNAc), which is similar to but more effective than the widely available glucosamine, inhibited the growth and function of abnormal T-cells that in MS incorrectly direct the immune system to attack and break down central nervous system tissue that insulates nerves.

Study results appear online in the *Journal of Biological Chemistry*.

Earlier this year, Demetriou and colleagues discovered that environmental and inherited risk factors associated with MS -- previously poorly understood and not known to be connected -- converge to affect how specific sugars are added to proteins regulating the disease.

"This sugar-based supplement corrects a genetic defect that induces cells to attack the body in MS," said Demetriou, associate professor of neurology and microbiology & molecular genetics, "making metabolic therapy a rational approach that differs significantly from currently available treatments."

Virtually all proteins on the surface of cells, including immune cells such as T-cells, are modified by complex sugar molecules of variable sizes and composition. Recent studies have linked changes in these sugars to T-cell hyperactivity and autoimmune disease.

In mouse models of MS-like autoimmune disease, Demetriou and his team found that GlcNAc given orally to those with leg weakness suppressed T-cell hyperactivity and autoimmune response by increasing sugar modifications to the T-cell proteins, thereby reversing the progression to paralysis.

The study comes on the heels of others showing the potential of GlcNAc in humans. One reported that eight of 12 children with treatment-resistant autoimmune inflammatory bowel disease improved significantly after two years of GlcNAc therapy. No serious adverse side effects were noted.

"Together, these findings identify metabolic therapy using dietary supplements such as GlcNAc as a possible treatment for autoimmune diseases," said Demetriou, associate director of UCI's Multiple Sclerosis Research Center. "Excitement about this strategy stems from the novel mechanism for affecting T-cell function and autoimmunity -- the targeting of a molecular defect promoting disease -- and its availability and simplicity."

He cautioned that more human studies are required to assess the full potential of the approach. GlcNAc supplements are available over the counter and differ from commercially popular glucosamine. People who purchase GlcNAc should consult with their doctors before use.

Lindsey Araujo and Dylan Place of UCI and Nandita N. Naidu and Biswa Choudhury of UC San Diego also participated in the research, which was funded by the National Institutes of Health and the National Multiple Sclerosis Society.

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1. A. Grigorian, L. Araujo, N. N. Naidu, D. Place, B. Choudhury, M. Demetriou. **N-acetylglucosamine inhibits T-helper 1 (Th1) / T-helper 17 (Th17) responses and treats experimental autoimmune encephalomyelitis.** *Journal of Biological Chemistry*, 2011; DOI: [10.1074/jbc.M111.277814](https://doi.org/10.1074/jbc.M111.277814)

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