Sun exposure may trigger certain autoimmune diseases in women

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Ultraviolet (UV) radiation from sunlight may be associated with the development of certain autoimmune diseases, particularly in women, according to a study by researchers at the National Institute of Environmental Health Sciences (NIEHS), part of the National Institutes of Health.

"This study found that women who lived in areas with higher levels of UV exposure when they developed an autoimmune muscle disease called myositis were more likely to develop the form known as dermatomyositis, which weakens the muscles and causes distinctive rashes, instead of the form called polymyositis that does not have a rash," said Frederick W. Miller, M.D., Ph.D., chief of the Environmental Autoimmunity Group, Program of Clinical Research, at NIEHS. "Although we have not shown a direct cause and effect link between UV exposure and this particular autoimmune disease, this study confirms the association between UV levels and the frequency of dermatomyositis that we found in a previous investigation," said Miller.

The study, published in the August issue of *Arthritis & Rheumatism*, is also the first to evaluate and find a possible UV radiation association in autoimmune diseases in women.

According to Miller, women are more likely than men to develop many autoimmune diseases, but the reasons for this have not been clear. "We only found the association between UV exposure and dermatomyositis in women and not in men, and it could be that inherent differences in how

women and men respond to UV radiation may play a role in the development of certain autoimmune diseases," said Dr. Miller. Miller also noted that other researchers have shown that female mice develop more skin inflammation after UV light exposure compared to male mice and these effects may be related to the new findings in dermatomyositis.

The study was designed to determine if there was a relationship between the level of UV exposure at the onset of the disease and the type of myositis and autoantibodies that people developed. Dermatomyositis and polymyositis are the two major forms of myositis and both are considered autoimmune diseases, in which the body's immune system attacks muscle or skin and sometimes other tissues. Dermatomyositis is typically accompanied by a distinctive reddish-purple rash on the upper eyelids or over the knuckles and is often made worse with sun exposure.

To conduct the study, the NIEHS researchers collaborated with myositis centers across the country that had seen 380 patients who had been diagnosed with dermatomyositis or polymyositis and determined their autoantibodies. "Patients with autoimmune diseases make a variety of autoantibodies that are unique to different conditions. One autoantibody specifically associated with dermatomyositis is called the anti-Mi-2 autoantibody and we know from our previous research that UV radiation increases levels of the Mi-2 protein that this autoantibody binds to," said Miller.

In addition to finding an association between the level of UV radiation and the proportion of women who developed dermatomyositis compared to polymyositis, the researchers found an association between UV levels and the proportion of women with the anti-Mi-2 autoantibody. "More research is clearly needed to understand the potential links between UV radiation and the development of autoimmune diseases and autoantibodies in women," said Miller.

"While the causes of autoimmune diseases are not known, we suspect from emerging research that they develop after one or more environmental exposures in genetically susceptible people," said NIEHS Director Linda Birnbaum, Ph.D. "This study adds UV radiation to the growing list of environmental exposures possibly important in the development of autoimmune diseases."

More information: Love LA, Weinberg CR, McConnaughey DR, Oddis CV, Medsger TA, Reveille JD, Arnett FC, Targoff IN, Miller FW. "Ultraviolet Radiation Intensity Predicts the Relative Distribution of Dermatomyositis and Anti-Mi-2 Autoantibodies in Women." *Arthritis & Rheumatism*. August, 2009.

Source: NIH/National Institute of Environmental Health Sciences