

## Shining the light on how UV exposure protects against MS

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Sunshine makes most of us feel happier, but there appears to be greater benefits other than just making us feeling good. In moderation, sunlight appears to have health benefits.

There is growing evidence that sunlight has a protective effect against MS, and other immunologically based diseases. Data from large population studies has demonstrated that there is a “latitude gradient” showing those living further away from the equator have an elevated risk of developing MS.

This latitude gradient has given vital clues to the possible causes of multiple sclerosis (MS). Some studies suggest the protective effect of sunlight is mediated by vitamin D, which is synthesised in the skin in response to UV light. However, evidence from other studies, including the MS Research Australia-supported [AusImmune study](#), also show that UV light can have direct effects on other biological processes in the body.

A MS Research Australia funded study (with support from the MS Saints) carried out by [Associate Professor Scott Byrne](#), has shown substantial changes to the immune system following exposure to UV light. The study recently published [in the Journal of Autoimmunity](#), demonstrates how UV light can affect cells in the body which control the immune system, protecting against autoimmune disease. The immune system is a hugely powerful and complex system capable of causing great destruction of foreign invaders –keeping us safe from diseases. However, if it malfunctions, it can end up targeting our own body, leading to autoimmune diseases and immune-based diseases such as MS. The immune system is built of a number of different cell types each with specific tasks, some of the cells with names like natural killer cells or dendritic cells are important in recognising and destroying invaders, whereas there are other, regulatory, cells which keep the immune system in check and maintain a fine balance.

Associate Professor Byrne has shown that UV light can help reduce disease in mice with an MS-like illness. He has now discovered that in the lymph nodes under the skin of animals exposed to UV light, equivalent to approximately 10-15 mins of the midday sun, there were changes in immune cell composition. There appeared to be an increase in a unique subset of the ‘regulatory’ B cells- a type of white blood cell, and it is this subset which helps control the immune system and reduce MS-like disease in the mice. The cells appear to at least in part achieve this by releasing an anti-inflammatory signalling molecule called interleukin 10 (IL-10). The scientists showed that if animals lacked B cells they had a more severe MS-like disease and did not respond to UV light. However, if they injected the animals with B cells donated from UV-exposed animals they could restore protection against the MS-like disease.

All this evidence points to sunlight activating a unique subset of B cells in lymph nodes, and this is an important event in UV-mediated protection from autoimmune demyelination.

This study is a significant step in understanding how sunlight can affect the immune system, potentially modifying an individual’s risk of developing MS.