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By Chandra Shekhar

NEWS **Vitamin D protects the skin?**

Sunlight-induced vitamin D triggers an immune response in the skin, a finding that adds to an ongoing debate over the potential benefits of sun exposure

[Published 29th January 2007 06:31 PM GMT]

January 2007

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Vitamin D generated by sunlight may help protect the skin from cellular damage, including damage caused by sunlight itself, suggests a new study published in this week's *Nature Immunology*. The researchers found that dendritic cells can convert vitamin D3 -- generated under the skin by sunlight -- into its active hormonal form, and induce T cells to migrate to the skin.

"It's a new action for a chemical we've known to be present for a long time," said [Clay Cockerell](#), a dermatologist at the University of Texas Southwestern Medical Center at Dallas, who was not involved in the study. "We may eventually find that [the T cell response] is protective in some way against skin cancer."

However, this does not mean that more time in the sun is good for the skin, Cockerell stressed. On the contrary, he said, the study implies that excessive sun exposure could trigger a cutaneous inflammation -- providing yet another reason to stay out of the sun.

Previous studies found that vitamin D3 generated under the skin by the sun's ultraviolet rays can be converted into its active form, calcitriol (1,25 dihydroxy-vitamin D3), by enzymes in the liver and kidneys. The new study shows that human dendritic cells could accomplish the same conversion without involving the endocrine



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system at all. "We propose that the whole thing could be happening in the skin itself," first author Hekla Sigmundsdottir of the Stanford University School of Medicine told *The Scientist*.

In 2004, [research](#) showed that vitamin A could induce T cells to move to the gut. Since the receptors for vitamins A and D are very similar in structure, and the chemokines expressed by epithelial cells in the gut and skin are also closely related, Sigmundsdottir and her colleagues hypothesized a similar T cell homing function for vitamin D, but with the skin as the target.

Using a chemotaxis assay on a co-culture of T and dendritic cells, they showed that vitamin D did attract T cells towards CCL27, a chemokine expressed by skin cells. Indeed, vitamin D not only activated the T cells' skin-homing receptor CCR10, it suppressed the corresponding gut-homing receptor CCR9 that vitamin A activates. "The two vitamins seem to compete with each other," Sigmundsdottir noted.

Vitamin D2, the primary nutritional form of the prohormone, was much less effective in inducing CCR10 expression in T cells than vitamin D3, the sun-induced version. "A little sunshine may be good for your immune system," Sigmundsdottir concluded. "This is what attracts T cells to the skin."

This study adds to a long-standing debate between two research groups: Vitamin D experts, some of whom who argue some [sun exposure may be beneficial](#), and dermatologists (such as Cockerell) who generally advise against any sun exposure, and recommend supplements to meet the body's vitamin D requirements. The new study determined, however, that the levels of vitamin D needed to initiate a T cell response exceed those found in normal serum, even when taking supplements. "This suggests that UV production -- leading to the high local vitamin D levels -- is necessary," said [James Fleet](#) of Purdue University in West Lafayette, Ind., who studies nutrition and vitamin D, but was not involved in the study.

Fleet offered a possible compromise -- a topical application of vitamin D, which would protect the skin without putting it at risk from sunlight exposure. (Fleet said he has no financial ties to companies marketing topical vitamin D products.) Sigmundsdottir acknowledged that topical vitamin D -- just like its sun-induced counterpart -- might also be able to draw T cells to the skin. That could perhaps explain why topical vitamin D is [effective against psoriasis](#) and other skin conditions, she added.

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Links within this article

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