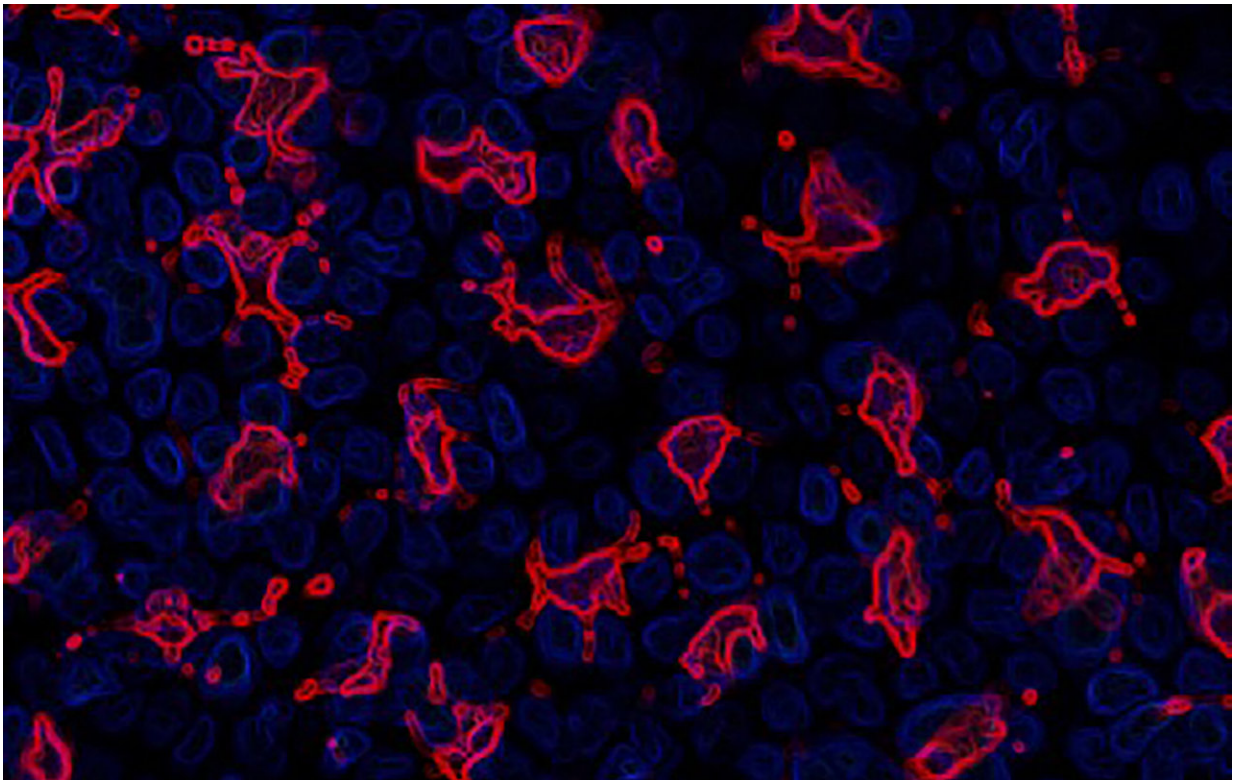


# Researchers uncover immune cell dysfunction linked to photosensitivity

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Langerhans cells (red) are immune cells in the skin and keratinocytes (blue) are the cells that make up the top layer of the skin. The image here shows Langerhans cells positioned in close association with the keratinocytes that Langerhans cells protect against sunlight-induced injury. Credit: W.D. Shipman

Researchers at Hospital for Special Surgery (HSS) have discovered that a

type of immune cell known as Langerhans appears to play an important role in photosensitivity, an immune system reaction to sunlight that can trigger severe skin rashes.

The study, a collaborative effort among scientists at HSS and other institutions nationwide, appeared online in the journal, *Science Translational Medicine* on August 15. Photosensitivity, in which even ambient exposure to the sun's ultraviolet rays can result in a blistering or scaly, thickened [skin](#) rash, affects 30 to 60 percent of people with lupus. It can also occur in individuals with other autoimmune diseases or dermatologic conditions. The skin lesions can be disfiguring, contributing to feelings of low self-worth and depression. In lupus patients, [photosensitivity](#) is also associated with systemic disease flare-ups.

"Photosensitivity is poorly understood, and we launched the study to gain insight into the underlying cause," explained Theresa Lu, MD, Ph.D., lead investigator and associate scientist in the Autoimmunity and Inflammation Program at HSS. "Current treatment consists mainly of sun avoidance and sunscreen to prevent the skin rash. A better understanding of the cellular mechanisms involved in photosensitivity could lead to improved treatment."

Dr. Lu and colleagues zeroed in on Langerhans [cells](#) (LCs), immune cells that sit in the epidermis, the top layer of the skin, hypothesizing that these cells might have a protective function. Cells in the top layer of the skin known as keratinocytes depend on epidermal growth factor family (EGF) cytokines to remain healthy. When LCs are functioning well, they express a molecule called ADAM17 that is activated when exposed to UV light. ADAM17 is responsible for activating cytokines in the EGF family.

"Our laboratory study found that Langerhans cells played an important

role in protecting the skin from UV light-induced injury. In models of lupus, LCs express less of the ADAM17 molecule, so they are less effective at activating the EGF family cytokines that play a role in protecting the skin. In other words, the cellular pathway is not working as it should," Dr. Lu explained.

Dr. Lu notes that the study uncovered an important new function for Langerhans cells. "We knew that they were [immune cells](#) that protect against infection, so this is a new role for them in terms of protecting the health of the skin exposed to UV light," she explained. "We're excited about these findings because they provide new insight into photosensitivity, and we now have a potential pathway of molecules and cells to target for a possible treatment down the road."

She said her laboratory will continue to conduct research to further elucidate the biological underpinnings of photosensitivity and determine why [lupus patients](#) are susceptible to the condition.

**More information:** William D. Shipman et al. A protective Langerhans cell–keratinocyte axis that is dysfunctional in photosensitivity, *Science Translational Medicine* (2018). [DOI: 10.1126/scitranslmed.aap9527](#)

Provided by Hospital for Special Surgery

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