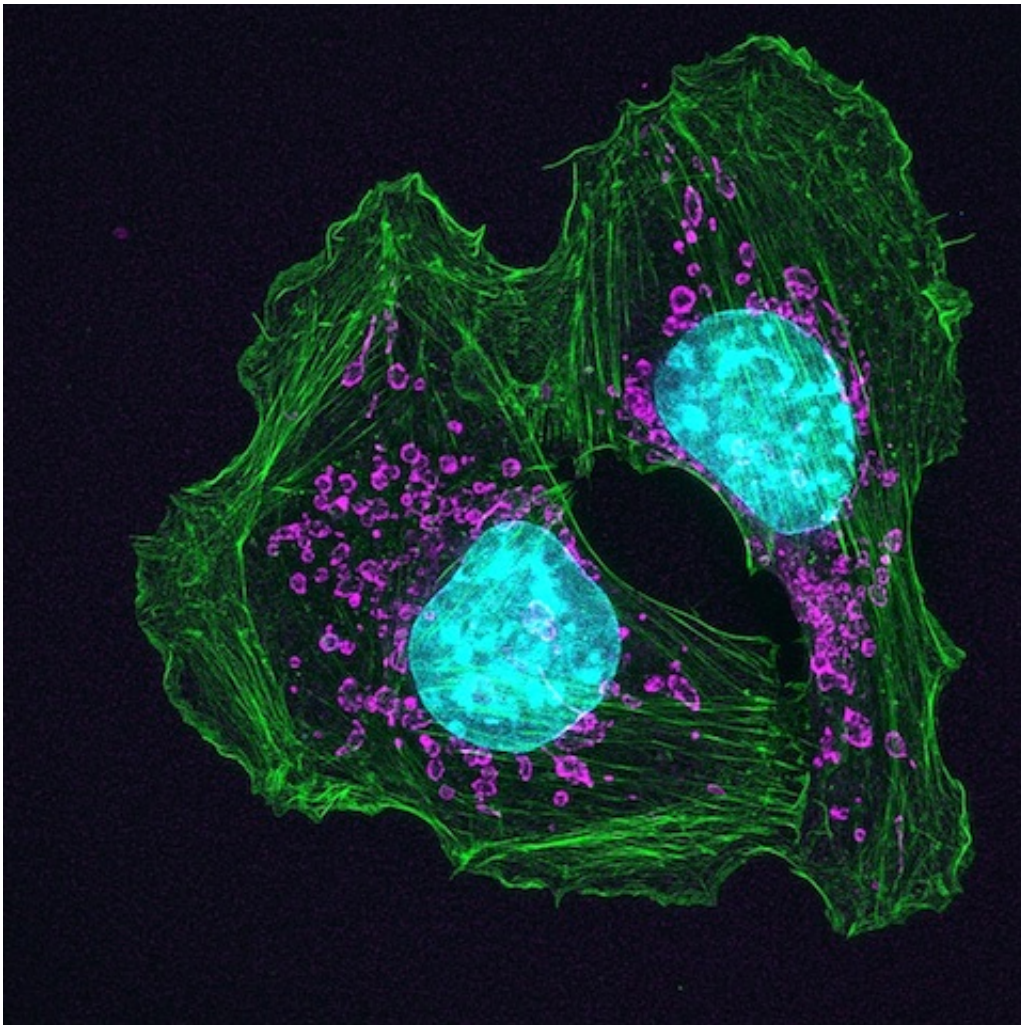


Eating habits affect skin's protection against sun

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A skin cancer cell. Credit: Knight Cancer Institute

Sunbathers may want to avoid midnight snacks before catching some rays.

A study in mice from the O'Donnell Brain Institute and UC Irvine shows that eating at abnormal times disrupts the biological clock of the skin, including the daytime potency of an enzyme that protects against the sun's harmful ultraviolet radiation.

Although further research is needed, the finding indicates that people who eat late at night may be more vulnerable to sunburn and longer-term effects such as skin aging and skin cancer, said Dr. Joseph S. Takahashi, Chairman of Neuroscience at UT Southwestern Medical Center's Peter O'Donnell Jr. Brain Institute.

"This finding is surprising. I did not think the skin was paying attention to when we are eating," said Dr. Takahashi, also an Investigator with the Howard Hughes Medical Institute.

The study showed that mice given food only during the day - an abnormal eating time for the otherwise nocturnal animals - sustained more skin damage when exposed to ultraviolet B (UVB) light during the day than during the night. This outcome occurred, at least in part, because an enzyme that repairs UV-damaged skin - xeroderma pigmentosum group A (XPA) - shifted its daily cycle to be less active in the day.

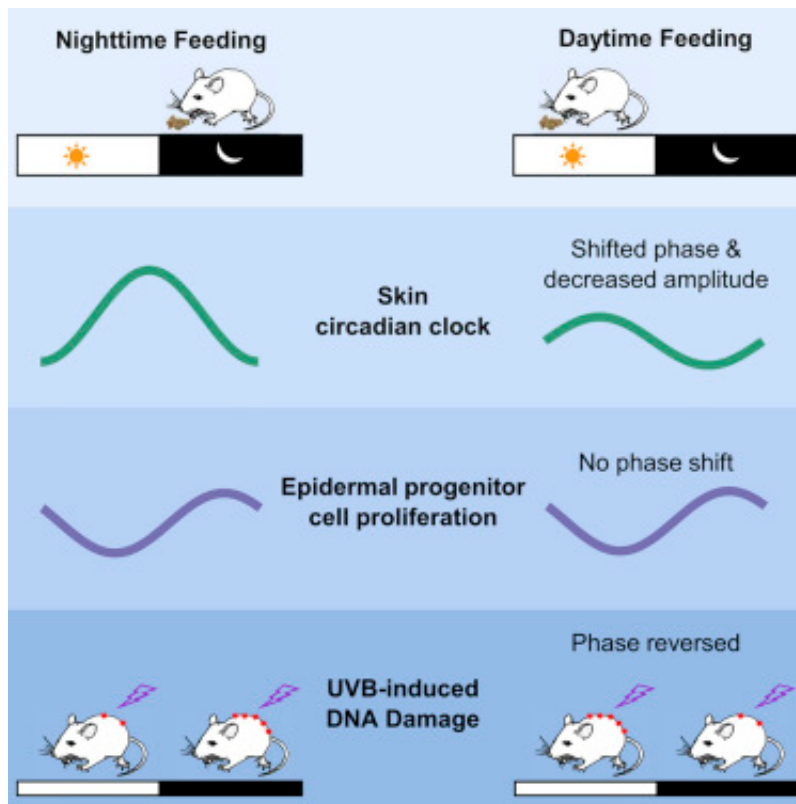
Mice that fed only during their usual evening times did not show altered XPA cycles and were less susceptible to daytime UV rays.

"It is likely that if you have a normal eating schedule, then you will be better protected from UV during the daytime," said Dr. Takahashi, holder of the Loyd B. Sands Distinguished Chair in Neuroscience. "If you have an abnormal eating schedule, that could cause a harmful shift

in your skin clock, like it did in the mouse."

Previous studies have demonstrated strong roles for the body's circadian rhythms in skin biology. However, little had been understood about what controls the skin's daily clock.

The latest research published in *Cell Reports* documents the vital role of feeding times, a factor that scientists focused on because it had already been known to affect the daily cycles of metabolic organs such as the liver.



Cell Reports (2017). DOI: 10.1016/j.celrep.2017.07.022

The study found that besides disrupting XPA cycles, changing eating

schedules could affect the expression of about 10 percent of the skin's genes.

However, more research is needed to better understand the links between eating patterns and UV damage in people, particularly how XPA cycles are affected, said Dr. Bogi Andersen of University of California, Irvine, who led the collaborative study with Dr. Takahashi.

"It's hard to translate these findings to humans at this point," said Dr. Andersen, Professor of Biological Chemistry. "But it's fascinating to me that the [skin](#) would be sensitive to the timing of food intake."

Dr. Takahashi, noted for his landmark discovery of the *Clock* gene regulating [circadian rhythms](#), is researching other ways in which eating schedules affect the [biological clock](#). A [study](#) earlier this year reinforced the idea that the time of day food is eaten is more critical to weight loss than the amount of calories ingested. He is now conducting long-term research measuring how feeding affects aging and longevity.

More information: Hong Wang et al. Time-Restricted Feeding Shifts the Skin Circadian Clock and Alters UVB-Induced DNA Damage, *Cell Reports* (2017). [DOI: 10.1016/j.celrep.2017.07.022](https://doi.org/10.1016/j.celrep.2017.07.022)

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