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## Lights at Night Are Linked to Breast Cancer

Study Bolsters Theory About Interference With Production of Key Hormone

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Women who live in neighborhoods with large amounts of nighttime illumination are more likely to get breast cancer than those who live in areas where nocturnal darkness prevails, according to an unusual study that overlaid satellite images of Earth onto cancer registries.

The finding adds credence to the hypothesis that exposure to too much light at night can raise the risk of breast cancer by interfering with the brain's production of a tumor-suppressing hormone.

"By no means are we saying that light at night is the only or the major risk factor for breast cancer," said Itai Kloog, of the University of Haifa in [Israel](#), who led the new work. "But we found a clear and strong correlation that should be taken into consideration."

Scientists have known for years that rats raised in cages where lights are left on for much of the night have higher cancer rates than those allowed to sleep in darkness. And epidemiological studies of nurses, flight attendants and others who work at night have found breast cancer rates 60 percent above normal, even when other factors such as differences in diet are accounted for.

On the basis of such studies, an arm of the [World Health Organization](#) announced in December its decision to classify shift work as a "probable carcinogen." That put the night shift in the same health-risk category as exposure to such toxic chemicals as trichloroethylene, vinyl chloride and polychlorinated biphenyls (PCBs).

The mechanism of such a link, if real, remains mysterious, but many scientists suspect that melatonin is key. Secreted by the pineal gland in the brain, the hormone helps prevent tumor formation. The body produces melatonin primarily at night, and levels drop precipitously in the presence of light, especially light in the blue part of the spectrum produced in quantity by computer screens and fluorescent bulbs.

In keeping with the melatonin hypothesis, mice in cages with night lighting have normal cancer rates if they get shots of the hormone. And blind women, whose eyes cannot detect light and so have robust production of melatonin, have lower-than-average breast cancer rates.

Kloog and his colleagues took a previously untried approach to testing the link. They obtained satellite data from [NASA](#) that showed in great detail how much light was emitted spaceward from neighborhoods throughout Israel.

Although the light levels that reached the satellite were about one-tenth their intensity on Earth, the approach provides an accurate measure of which areas are brighter or darker than others and by how much.

The team then overlaid that map with local statistics on cases of breast cancer and, for comparison, lung cancer, which is caused mostly by smoking and so would not be expected to be linked to light.

After using neighborhood data to correct for other factors that can affect cancer rates, including wealth, ethnicity and the average number of children in families living in those localities, the researchers found no link between night lighting and lung cancer, they report in this week's online issue of the journal *Chronobiology International*.

But the researchers found the breast cancer rate in localities with average night lighting to be 37 percent higher than in communities with the lowest amount of light; and they noted that the rate was higher by an additional 27 percent in areas with the highest amount of light.

Abraham Haim, a University of Haifa chronobiologist involved in the study, said the findings raise questions about the recent push to switch to energy-efficient fluorescent bulbs, which suppress melatonin production more than conventional incandescent bulbs. "This may be a disaster in another 20 years," Haim said, "and you won't be able to reverse what we did by mistake." He called for more research before policies favoring fluorescent lights are implemented, and for more emphasis on using less light at night.

Jim Burch, a [University of South Carolina](#) epidemiologist and biostatistician familiar with the study, called the approach and findings "fascinating."

"The study has limitations," including not measuring levels of indoor lighting, "but it supports the overall idea," Burch said. "I think there is enough evidence to suggest we ought to be thinking about this more carefully."

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