The Blue in Your City Lights Increases Risk of Breast and Prostate Cancer, Study Finds

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When you think about the word carcinogenic, maybe you cast a nervous glance at the burnt edges of the meat on your dinner plate or imagine the asbestos fibers in the cracked walls of old buildings. But what about forgetting to turn off your lights when you go to bed? The new "blue light filter" or "night light" features appearing on electronic devices in recent years may have tipped you off to the dangers of artificial light, specifically in the blue light spectrum. A 2018 study published in *Environmental Health Perspectives* determined that exposure to outdoor artificial blue light can lead to a 1.5 fold risk increase in breast cancer and 2 fold risk increase in prostate cancer. The paper is a collaboration with many Spanish institutes, and authored by Ariadna Garia-Saenz of Barcelona Institute for Global Health and 23 other researchers.

Scientists followed approximately 2,000 cancer patients and 2,000 control individuals across 11 Spanish regions from 2008-2013. The exposed levels of artificial light were evaluated from self-reported surveys of exposure and satellite images. Over the years, cities have multiplied and grown substantially brighter as human activity increased. Light in populated areas can be clearly seen in images from space. In a 2016 worldwide evaluation of light pollution, Fabio Falchi et al. stated, "We found that about 83% of the world's population and more than 99% of the U.S. and European populations live under light-polluted skies."[1] A vast majority of people are affected by artificial light, so it is extremely important to discover what this does to humans and the environment.

To understand why blue light is so damaging at night, think about a gas stovetop flame and the rainbow. The fire coming right out of the burner is a glistening bluish-white, while the color of the cooler tip of each flame is red. Colors in a rainbow separate out based on the wavelength, which also ties into its energy. On one side of the spectrum, red light has low energy while on the other side, blue light has high energy. So, a higher temperature is associated with more damaging light, and the color is a visual cue. In the natural world, the primary source of light is from the sun. Such a powerful and bright light source contains a large amount of blue light. The sky bleeds red during a sunset as the temperature drops. From

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[1] Fabio Falchi et al. "The new world atlas of artificial night sky brightness." *Science Advances*, 2016 Jun; 2(6): e1600377. https://dx.doi.org/10.1126%2Fsciadv.1600377.

evolutionary development in this cycle of colors, blue light has become a regulator of daily function. Artificial lights producing false daytime impact the body strongly. Incandescent lighting has been used for many years, and gives off an amber, low temperature glow. But in recent years, LED lighting has made great strides as brighter and more energy efficient sources. However, the white light contains a great amount of blue spectrum. This leads to a confusion of fundamental biological workings and becomes a risk to health.

The International Agency for Research on Cancer (IARC) declared in 2007 that disruptions to circadian rhythm due to work shifts have carcinogenic effects, and research relating to this conclusion began. One of the larger discoveries regarding this phenomenon surrounds the function of melatonin in the body. Most people are aware of the role melatonin plays in sleep, as it is a common sleep medication. Studies have shown that melatonin production is affected by light and also acts in a defensive role in our health. “Melatonin could be an excellent candidate for the prevention and treatment of several cancers, such as breast cancer, prostate cancer, gastric cancer and colorectal cancer.”[2] The body’s ability to produce melatonin is compromised by extended exposure to artificial light. Increased cancer risk then becomes a reality. This discovery is not the only source for the increase in cancer risk, and scientists are developing a deeper understanding to improve current light usage in populated areas.

For now, it is impossible to ignore the statistically significant risk increase in breast and prostate cancer due to artificial light. The best course of action is to educate yourself about these effects. Light pollution not only erases the Milky Way from visibility, but also has the potential to hurt our lives.

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[2] Ya Li et al. “Melatonin for the prevention and treatment of cancer.” *Oncotarget*. 2017 Jun 13; 8(24): 39896-39921. https://dx.doi.org/10.18632%2Foncotarget.16379.

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