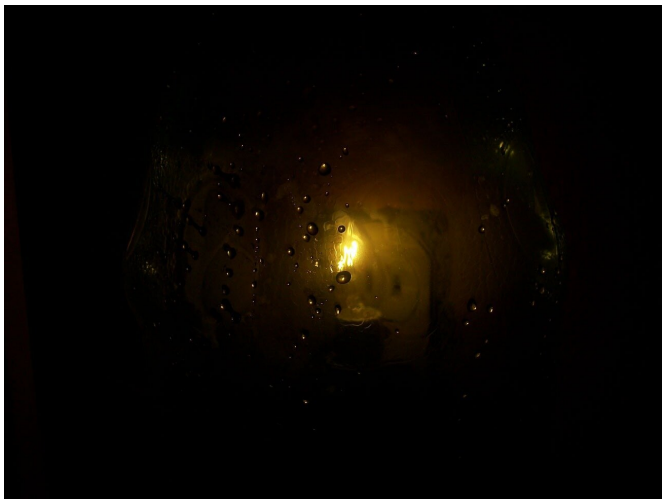
Breast cancer may be likelier to spread to bone with nighttime dim-light exposure

23 March 2019



Credit: CC0 Public Domain

Exposure to dim light at night, which is common in today's lifestyle, may contribute to the spread of breast cancer to the bones, researchers have shown for the first time in an animal study. Results of the study will be presented Saturday at ENDO 2019, the Endocrine Society's annual meeting in New Orleans, La.

"To date, no one has reported that exposure to dim light at night induces circadian disruption, which then increases the formation of bone metastatic breast cancer," said Muralidharan Anbalagan, Ph.D., assistant professor, Tulane University School of Medicine in New Orleans, La.". "This is important, as many patients with breast cancer are likely exposed to light at night as a result of lack of sleep, stress, excess light in the bedroom from mobile devices and other sources, or night shift work."

More than 150,000 U.S. women had breast cancer in 2017 that metastasized, or spread outside the breast, according to an estimate from the National Cancer Institute. When breast cancer spreads, it often goes to the bones, where it can cause severe pain and fragile bones.

In this preliminary study funded by the Louisiana Clinical and Translational Science Center (LACATS) in collaboration with Louisiana Cancer Research Consortium (LCRC) & Tulane Center for Circadian Biology, the researchers created a mouse model of bone metastatic breast cancer. They injected estrogen receptor-positive human breast cancer cells that have a low propensity to grow in bones into the tibia, or shinbone, of female mice. Like humans, the mice used in this study produce a strong nighttime circadian melatonin signal. This nighttime melatonin signal has been shown to produce strong anti-cancer actions and also promotes sleep.

All mice were kept in the light for 12 hours each day. One group of three mice was in the dark the other 12 hours, which helped them produce high levels of endogenous melatonin. Another group spent 12 hours in light followed by 12 hours in dim light at night, which suppresses their nocturnal melatonin production. The dim light was 0.2 lux, which is less than a night-light or a display light from a cell phone, according to Anbalagan.

X-ray images showed that mice exposed to a light/dim light cycle had much larger tumors and increased bone damage compared with mice kept in a standard light/dark cycle, he reported.

"Our research identified the importance of an intact nocturnal circadian melatonin anti-cancer signal in suppressing bone-metastatic breast tumor growth," Anbalagan said.

The ultimate goal of their research, he said, is to find a way to inhibit or suppress the progression of breast cancer metastases to bone.

Provided by The Endocrine Society