Breast Cancer Cells Are More Likely to Spread During Sleep

Researchers discovered that breast cancer tumors “wake up when patients are sleeping.”

June 29, 2022 By Laura Schmidt

For people with breast cancer, cells that can spread the cancer throughout the body are more likely to be active at night than during the day, according to new study findings published in Nature. Specifically, circulating tumor cells (CTCs) can seep into the bloodstream, travel to other parts of the body and grow into a new cancerous tumor, a process known as metastasis.

The body’s circadian rhythm has long been thought to play a role in cancer. For example, some researchers have suggested that erratic sleep schedules or lack of sleep may increase cancer risk. But this study has demonstrated that “tumors wake up when patients are sleeping,” study coauthor Nicola Aceto, PhD, of the Swiss Federal Institute of Technologysaid in a related article in Nature.

Our circadian clock operates on a 24-hour schedule and influences many processes in the body, such as metabolism and sleep. Many researchers didn’t think cancer cells conformed to such a schedule, said Aceto, a cancer biologist at the Swiss Federal Institute of Technology in Zurich.

Aceto and his colleagues observed tumors in mice and discovered that their CTC levels changed based on the time their blood was drawn. They wondered whether this also occurred in women. This led the team to collect blood from 30 women hospitalized with breast cancer; they drew the blood at 4 a.m. and then again at 10 a.m.

Almost 80% of CTCs detected in blood samples came from those taken at 4 a.m., when the women had been resting. “I was surprised because the dogma is that tumors send out circulating cells all the time,” Aceto told Nature. “But the data were very clear. So soon after being surprised, we started being very excited.”

To confirm their findings, researchers continued to test levels of CTCs in mice with tumors. The team found that during the period of rest for mice (which is the daytime, since mice are nocturnal), CTC levels reached a concentration up to 88 times higher than baseline.

Chi Van Dang, a cancer biologist at the Ludwig Institute for Cancer Research in New York City said these findings are “striking.” Van Dang underscored that the time of day a physician takes a blood

sample can provide misleading information. Moving forward, it might benefit physicians to rethink when in the day they track cancer, Van Dang added.

Researchers caution that sleep—which is necessary for proper body and brain function—is not the enemy and that many factors likely contribute to breast cancer cells increased activity at night.

To learn more about sleep and breast cancer, read "Tailored Light Therapy Improves Sleep Quality for Breast Cancer Survivors."
