How Does Sleep Affect Our Cancer Risk?

Thanks to scientific breakthroughs that have deepened our understanding of circadian rhythms, sleep is now being used as a therapeutic tool to treat cancer.

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It's a question I'm asked a lot: What is the connection between sleep and cancer?

People are often really asking: if I sleep poorly, does my cancer risk go up? That's one important aspect of the relationship between sleep and cancer. But there are others, too. Sleep can be a key preventative strategy that may help reduce your risk of cancer. Thanks to scientific breakthroughs that have deepened our understanding of circadian rhythms, sleep is now being used as a therapeutic tool in the treatment of cancer. And for people living with cancer, sleep can be both a challenge and an opportunity—a challenge to sleep well, and an opportunity to use sleep to strengthen the body's natural powers to push back against cancer.

In a series of articles, I'll unpack and explore the complex relationship between cancer and sleep, and look at some of the cutting-edge scientific discoveries that are informing how we approach cancer prevention, and making sleep an emerging player in the world of cancer therapy.

Sleep and cellular health

Before we jump into looking at how some specific sleep issues may influence cancer risk, let's take a step back and examine some fundamentals about both sleep and cancer.

Sleep, we know, is absolutely essential to the body's cellular health. During sleep—especially during deep, slow-wave, sleep—the body goes to work to repair damaged cells and DNA, promote healthy new cell growth, fortify and strengthen the immune system.

Research points to the deeply restorative power of sleep: A 2014 study found that getting enough high-quality sleep is linked to slower cellular aging in healthy adults. Scientists measured cellular age using telomere length, which is considered a key cell-age indicator. Older adults who slept enough and slept well had longer telomeres—a sign of "younger" cells.

Studies also show the risks to cell and DNA function when we don't get enough high-quality sleep. Another 2014 study found lack of sleep increases damage to DNA, injury and dysfunction to cells, including heightened cell death, increased cell proliferation, and increased risk for cell replication

errors.

Why all this attention to sleep's role in protecting cellular and DNA health? Cancer is a disease of many forms, but all types of cancer involve out-of-control growth and replication of damaged, abnormal cells. DNA plays an elemental role in cancer, because our genes exert control over how our cells behave, including how they grow, repair, and replicate.

We have a great deal to learn about how sleep affects the risks for and development of cancer. But it's not difficult to imagine a fundamental connection between sleep—with its essential role as a time for the body to restore and maintain healthy cell function—and cancer.

With those fundamentals in mind, let's take a closer look at how different sleep patterns and sleep issues may affect our cancer risk.

Does sleeping too little increase risks for cancer?

Lack of sufficient sleep is an epidemic problem in our society, one that's been growing for decades. More than 1 in 3 American adults get less than the recommended minimum 7 hours of nightly rest. Sleep deprivation and sleep debt are also rampant among teenagers, with as few as 15 percent of teens getting the 8-10 hours of nightly sleep they need. Short sleep has been scientifically linked to increased risks for serious and chronic illnesses including heart disease and stroke, obesity and type 2 diabetes. What about cancer?

The scientific research right now is mixed. A couple of recent reviews of studies have found no statistically significant increased risk of cancer from insufficient sleep. At the same time, other studies have shown a lack of sleep is tied to elevated risks for several different types of cancer. Studies have shown short-sleep duration—that's another way of saying not sleeping enough—is linked to a higher risk of colorectal cancer. Insufficient sleep has also been identified as a factor in elevating risk for colorectal adenomas—these are polyps found in the colon, which can sometimes develop into cancer. And multiple studies –including this long-term, large-scale study published recently–show that short sleep may increase breast cancer risk, one of the most-studied forms of cancer.

Can sleeping too much increase cancer risk?

The scientific picture is similarly mixed when it comes to oversleeping and cancer risk. The health risks of oversleeping tend to be overlooked, compared to not sleeping enough. But they're real. Oversleeping is linked to depression and other mood disorders, obesity, cardiovascular disease, neurodegenerative diseases such as Alzheimer's. As with short sleep, there's not yet a clear picture of how extended sleep duration—typically defined as sleeping more than 9 hours a night—impacts cancer risk.

Some of the reviews of studies that show no elevated risk from short sleep also show no elevated cancer risk connected to long sleep. And yet there are studies indicating links between specific types of cancer and sleeping too much. Research in postmenopausal women showed an increased risk of liver cancer associated with sleeping more than 9 hours a night. Some research shows

breast cancer risk may rise with longer sleep duration, while other studies investigating breast cancer risk found no link to long sleep duration. In particular, the risks of estrogen-positive forms of breast cancer appear to be increased by sleep duration.

Why this lack of clarity about the impact of sleep amounts on cancer risk? Sleep is a tremendously complex phenomenon. Cancer is a tremendously complex disease. Tracking and attributing the effects of one on the development of the other is a difficult endeavor, one that requires close, rigorous, long-term observation. We need to continue to search for better, more thorough answers about how sleep duration influences the development of cancer.

With cancer, as with other aspects of health, it's not only sleep duration—or quantity—that matters. Sleep quality, as well as the timing and routine of sleep, also can have an enormous impact. And there's compelling research showing that disrupted, poor quality, and irregularly-timed sleep may have a significant impact on cancer risk.

How does irregular, disrupted sleep affect cancer risk?

While the research about cancer risk and sleep duration is mixed, the scientific links between poor quality sleep and variable sleep schedules are more clear. Restless, fragmented sleep and irregular sleep patterns have both been linked to elevated cancer risk, in a body of research that continues to grow.

Studies show increased risks for several types of cancer—including breast, prostate, and thyroid—are linked to disrupted, poor quality sleep. Disrupted sleep may also contribute to making cancer more aggressive.

You hear me talk a lot about the importance of consistency in sleep routines. Sticking to a regular sleep schedule, one that aligns with the body's natural circadian rhythms, is the single healthiest sleep habit you can adopt. For many people, however, that's easier said than done. Overburdened schedules, stress, excessive exposure to screens and artificial light at night are some of the many challenges we face in sticking to a regular, restful sleep routine. For millions of Americans, their work schedules don't allow them to sleep during the night, in alignment with the body's circadian clock. Millions of shift workers work evenings, overnights, and early mornings. Awake at times when the body would naturally be sleeping, they must sleep during "off hours," when the body (and society at large) are designed to be awake.

There's a strong and growing body of research showing that people who work night shifts are at higher risk for developing several types of cancer. Many studies have investigated the effects of nighttime shift work on breast cancer, showing an increase in breast cancer risk comes with night work, as well as nighttime exposure to light. Studies show the risks cancers, including colorectal cancer, gastrointestinal cancer, skin cancer, and lung cancer, may also rise when people adhere to schedules that keep them awake at night.

A 2018 study of women who worked long-term night shift schedules found they had a 19 percent higher overall risk of cancer, compared to women who didn't engage in long-term shift work. Risks

for specific types of cancers, including breast, gastrointestinal, and skin, were even higher. And the longer the women stayed with night work, the higher their cancer risk became: researchers found that every 5 years of night shift work was connected to a 3.3 percent higher risk for breast cancer. Because of the strength of this research, night shift work is now identified as a likely carcinogen, or cancer-causing factor, by the International Agency for Research on Cancer and the World Health Organization.

These studies don't only present a concern for the estimated 15 million Americans who work shifts. Their results point to an increasing concern among scientists and medical professionals: that risks for cancer may increase alongside irregular sleep schedules that cause people to function at odds with their natural circadian rhythms.

Our circadian rhythms guide and govern our sleep-wake cycles, as well as many of our body's fundamental processes, including digestion, immune function, and hormone production. Disrupted circadian rhythms are often an underlying factor in restless, poor quality sleep and in sleep disorders. They're also linked to chronic health problems and disease, including depression and other mood disorders, diabetes, obesity—and to cancer. Studies show circadian disruptions linked to the increased risk of several types of cancer.

I'll talk more about the complex, important relationship among sleep, circadian rhythms, and cancer in an upcoming article, as well as about the exciting emerging field of chronotherapy in cancer treatment—a therapy that uses the powerful influence of circadian rhythms to treat cancer.

Are there links between sleep disorders and cancer?

Sleep disorders such as insomnia, restless leg syndrome, and sleep apnea affect both sleep quantity and sleep quality. They also can be both a symptom of—and a contributor toward—disruptions in circadian sleep rhythms.

There is research that has identified links between several common sleep disorders and higher cancer risk. A 2015 study found people with insomnia, obstructive sleep apnea, and parasomnias all had elevated risks for developing several types of cancer, including breast, oral, and prostate. (Parasomnia includes a broad range of disruptive, sleep-related experiences, including teeth grinding, nighttime seizures, sleep-based movement disorders, and night terrors.)

The scientific links between obstructive sleep apnea and cancer risk appear especially strong. OSA is a disorder that disrupts breathing during sleep, temporarily compromising or interrupting the flow of breath. Research links obstructive sleep apnea to greater risk for developing cancer, as well as to more aggressive cancers and to higher mortality rates among cancer patients with OSA. A 2016 study found obstructive sleep apnea and its accompanying disrupted sleep associated with a more aggressive form of lung cancer. Studies have also shown OSA connected to more aggressive forms of melanoma.

There hasn't been enough research done to be conclusive, and we've seen some mixed results in the cancer-OSA research that's been conducted. Another 2016 study found OSA linked to a higher

risk for a few types of cancer (melanoma, pancreatic, and kidney), while also linked to lower rates for breast, colorectal, and prostate cancers. This same study found no increased risks of cancer-related death for people with sleep apnea, and found no higher risk for metastatic cancer.

This is still an emerging area of research. There's much more work to do to fully understand the direct relationship between sleep apnea, other sleep disorders and cancer development. We know sleep apnea is harmful to health in a number of ways, hazardous to the brain and to cognitive health, elevating risks for cardiovascular disease, obesity, and diabetes, as well as to accidental injury and death. While we continue to learn about the effects of sleep apnea and other sleep issues on cancer risk, it's important to follow through on diagnosis and treatment of any type of disordered sleep, including sleep apnea.

Next in this series, we'll look more closely at some of the mechanisms by which sleep may affect cancer development, including the role of circadian rhythms, sleep's effects on our immune system, and key hormonal changes that occur when sleep is disrupted or curtailed.

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