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Tai Chi Improves Insomnia in Breast Cancer Survivors

Nearly one-third of breast cancer survivors are plagued by insomnia, which, in turn, can lead to fatigue, depression, and an increased risk of illness. The gold standard behavioral treatment for insomnia is cognitive behavioral therapy for insomnia, or CBT-I, a form of talk therapy through which negative thoughts and behaviors that affect the ability to fall asleep and stay asleep are identified and changed. According to a recent study by Cousins Center researchers, tai chi, a form of slow-moving meditation, is just as effective as CBT-I at reducing sleepless nights.

The study, published in the Journal of Clinical Oncology, involved 90 breast cancer survivors, aged 42 to 83, who reported having trouble sleeping three or more nights per week and felt depressed and fatigued during the day. The participants were randomly assigned to weekly CBT-I sessions or tai chi instruction. They were evaluated periodically for the next year for sleep problems, fatigue levels, and depression, and then again at 15 months. In both groups, nearly half of the subjects showed robust and enduring improvements in their insomnia symptoms.

That's important, says Cousins Center Director, Distinguished Professor of Psychiatry and Biobehavioral Sciences and study lead author Michael Irwin, because CBT-I can be prohibitively expensive for some individuals, whereas free or low-cost tai chi courses are often found at local libraries and community centers; instruction is also available through smartphone apps and YouTube videos.

The Cousins Center for Psychoneuroimmunology is a research unit of the Jane and Terry Semel Institute for Neuroscience and Human Behavior at UCLA. http://www.semel.ucla.edu/cousins (310)-825-8281

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Recent studies by Cousins Center researcher Andrew Fuligni, Professor of Psychiatry and Biobehavioral Sciences and director of the Adolescent Development Lab at UCLA, are helping to paint a comprehensive picture of the role of sleep in the biological, psychological, and behavioral development of adolescents.

Fuligni's research focuses on how social and sociocultural experiences shape different aspects of development. "Right now, we're also spending a lot of time looking at issues of stress and sleep. Within the everyday life of adolescents, sleep is affected by stress and by a variety of things going on in the teens' families and in their own lives. In turn, sleep can shape other aspects of their psychological, educational, or physical development," he says.

In a recent paper in the journal Psychosomatic Medicine, Fuligni and colleagues looked specifically at how teens' sleep patterns are related to levels of a particular protein in the blood called C-reactive protein, or CRP. CRP levels rise in response to inflammation, which could place adolescents at risk for diabetes as well as cardiovascular disease as adults.

The study involved 315 teens from diverse ethnic backgrounds, ranging



from 14 to 18 years old. For eight consecutive nights, the subjects wore watches that detected their movements. Sleep was then inferred based on the adolescents' movements, as well as their reports of when they shut off the lights to go to sleep at night; the times when they got out of bed in the middle of the night; and when they arose in the morning. Blood samples were obtained from each subject through finger pricks.

In teens of all ages, larger shifts in the number of hours spent sleeping, or variability in sleep duration (for example, if you sleep eight hours one night, six the next, and eleven



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Sleeping Teens

the following night), were linked with higher levels of CRP. "This variability finding is particularly interesting," Fuligni says. "It's not just how much you sleep on average but the extent to which you're shifting around your body clock and your sleep patterns on a day-to-day basis."

The researchers also found that lower average sleep duration was associated with elevated CRP, but only in younger adolescents. "We're not exactly sure what's happening

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during these younger years," Fuligni explains. "We do know that nocturnal sleep—sleeping at night—plays a role in honing immune function. Because adolescents are still developing their immune competence as a biological system, it could be that disrupting sleep at a young age is disrupting the development of that immune system and particularly inflammatory processes."

In a related study published in the *Journal of Clinical Child and Adolescent Psychology*, Fuligni and colleagues found that younger adolescents also need sufficient sleep to maintain a good mood—although the optimum amount of sleep varies from teen to teen. In this study, the researchers had 419 ninth and tenth graders complete daily checklists for two weeks, answering questions about their previous night's sleep and their mood each day.

Most students reported being in a good mood after getting 8 to 10 hours of sleep the previous night. Younger adolescents tended to need more sleep than older teens to feel good and function well—as did kids with more frequent anxiety of depression, of all ages.

"Increasingly, we're getting evidence that sleeping better helps kids to manage stress in their lives and the numerous challenges that they may face going through the teenage years," Fuligni says. "If we're going to get teenagers to have better sleep, particularly those who are at risk for psychological or physical health problems, we can't just tell them to sleep more. We need to structure their lives to make the opportunity for sleep to be a possibility."

A new Cousins Center study suggests that our unconscious verbal tics can provide unique insight into the physical toll of stress on our bodies. For the study, appearing in the journal the Proceedings of the National Academy of Sciences, 143 adult volunteers wore audio recorders that switched on and off every few minutes for a period of 48 hours, capturing audio clips of the subjects' daily interactions; nearly 23,000 clips were collected in all. Following the two days of recordings, each volunteer gave a blood sample that was analyzed for the expression of a set of 50 genes in white blood cells that are known to be influenced by adverse life circumstances such

Stress Speak

as low socioeconomic status, social isolation, diagnosis with a life-threatening illness, and posttraumatic stress.

In analyzing the volunteers' language, the researchers, led by Steve Cole, Professor of Psychiatry and Biobehavioral Sciences and Director of the UCLA Social Genomics Core Laboratory, were particularly interested in the use of so-called "function words," such as pronouns, articles, and adverbs. Because function words are used relatively automatically, Cole and his colleagues suspected that they might provide insight into a speaker's state of mind. Analysis of the recordings revealed that subjects whose gene-expression

patterns indicated high stress more frequently used adverbs such as "really" and "incredibly," which can function as "intensifiers," than did less-stressed individuals. These highly stressed individuals also used fewer third-person pronouns like "they" or "their," suggesting more focus on themselves than on others. Such speech patterns were better predictors of disease-related molecular profiles in the body than the volunteers' own reports of stress, anxiety, or depression. The findings, Cole and his co-authors say, suggest that doctors assessing stress should listen to not just to what their patients say—but how they say it.

Evaluating the Link between Inflammation and Depression in Breast Cancer Patients



It is generally accepted that depression is common in cancer patients—indeed, according to one review, approximately one-sixth of cancer patients have a diagnosis of depression in the first five years after their cancer is detected. When depression occurs, notes Cousins Center research scientist Julienne Bower, "it is associated with poor outcomes, so it is important regardless of prevalence."

In particular, the pathways linking depression with inflammation, as well as other behavioral symptoms that are common in cancer patients and survivors, are of keen interest to Bower, a Professor of Psychology and Psychiatry and Biobehavioral Sciences at UCLA. Although psychosocial factors including the stress of a cancer diagnosis have long been associated with an increased risk of depression in cancer patients and survivors, Bower's lab is also looking for potential *neurobiological* markers that could signal a patient's increased likelihood of becoming depressed—even before any symptoms appear.

In one recent study, she and her colleagues examined the functioning of the hypothalamic-pituitary-adrenal (HPA) axis in women with early-stage breast cancer. The HPA axis, which is known to be altered in individuals with depression, is a component of the body's physiological stress response system that, for example, controls the release of the stress hormone cortisol.

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Among healthy individuals, the amount of cortisol present in saliva samples shows predictable daily variation, with a high concentration of cortisol present right after waking followed by an immediate increase within 30 to 40 minutes, known as the cortisol awakening response (CAR), and then a steady decline during the day.

The study, appearing in the journal Psychosomatic Medicine, found that women with early-stage breast cancer who had a larger CAR at a baseline assessment (usually occurring after tumor surgery but before treatments such as chemotherapy and radiation) had more depressive symptoms six months after their treatment ended. "This study suggests that an elevated CAR may be a risk factor for elevated depression in the aftermath of breast cancer diagnosis and treatment, and potentially a mechanism," says Bower, who notes that evaluating CAR might help identify women with breast cancer who would benefit from psychosocial interventions to prevent depression.

More broadly, she and her colleagues are involved in intervention studies that target inflammation and depression. One such study, the Pathways to Wellness project, is assessing the usefulness of different behavioral interventions, including survivorship education and mindfulness meditation (a practice that teaches individuals to pay attention to, but not react to, their moment-by-moment thoughts, emotions, and physiological responses and sensations), in younger breast cancer survivors, to determine how well the practices can help reduce stress and improve quality of life.