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Breakthrough Award supports research on role of chronic stress in breast cancer development

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Rutgers Cancer Institute of New Jersey resident research member Wenwei Hu, PhD, has received a \$596,250 Breakthrough Award (W81XWH-16-1-0358) from the U.S. Department of Defense through its Breast Cancer Research Program to study the role of chronic stress in breast cancer development. The focus of the work is to explore how chronic stress impacts breast cancer risk and to provide a foundation that can guide prevention strategies.

"Epidemiological studies have strongly suggested that chronic stress has significant negative influences on the onset, progression and mortality of breast cancers. For instance, disruption of marriage, extreme stress and low social support are related to increased [risk of breast cancer](#). However, the role of chronic stress in breast cancer development remains elusive due to the lack of direct evidence from animal models. This lack of understanding hinders the development of effective and safe preventive strategies for breast cancer promoted by chronic stress," notes Dr. Hu, who is part of Rutgers Cancer Institute's Genome Instability and Cancer Genetics Research Program.

The research will closely examine the role of the p53 protein, which plays a central role in preventing cancer development. Loss of its tumor suppressor function has been shown to contribute greatly to cancer development. A recent study (PNAS, May, 2012) by Hu and colleagues demonstrated that a chronic stress condition tested in mouse models greatly decreased p53 function through the release of stress hormones known as glucocorticoids to promote tumor development. p53 maintains genome integrity and prevents DNA damage accumulation. Weakening of p53 by chronic stress leads to accumulation of DNA damage, which can promote the development of cancer. Using a well-established mouse model that mimics chronic stress in humans, this new study will test the hypothesis that chronic stress reduces p53 function through the release of glucocorticoids and that the resulting increase in DNA damage promotes breast cancer development.

The study also will examine the protective effect of vitamin C and L-theanine - an amino acid found in tea - in breast cancer that is promoted by chronic stress, as these natural products have been found to decrease levels of glucocorticoids. "Because some known breast cancer risk factors such as family history, atypical hyperplasia of the breast, late menopause and others are not modifiable, novel, safe and effective strategies for prevention of breast cancer are highly desirable," adds Hu, who is also an associate professor of radiation oncology at Rutgers Robert Wood Johnson Medical School.

Source:

Rutgers Cancer Institute of New Jersey
