Prolonged Maternal Separation Increased Breast Cancer Risk in Neonatal Mice

AACR

• Study adds to evidence that psychosocial stress affects cancer risk.
• Brief maternal separation did not have the same effect.
• Prolonged separation increased ER alpha expression in mammary glands.

PHILADELPHIA — Young mice that experienced the psychosocial stress of prolonged separation from their mothers had a higher incidence and faster onset of breast tumors compared with young mice who did not experience this stressful life event. Specifically, neonatal mice separated from their mothers for a prolonged period of time developed mammary tumors twice as fast as mice that experienced short or no maternal separation.

The results of this study, conducted by Leslie Kerr, Ph.D., associate professor of biology and psychology at Trent University, Peterborough, Ontario, and colleagues, add to the increasing amount of research examining the effects of stress and other social experiences on cancer development. Much of this research has been published in *Cancer Prevention Research*, a journal of the American Association for Cancer Research.

“So far, we have not really understood, or really sifted through and found factors in the environment that cause a predisposition to the development of breast cancer, or any cancers,” Kerr said. “For example, how does the environment or experiences of an animal, including humans, affect physiological function and how might that influence risk for developing breast cancer?”

Examining environmental effects related to breast cancer development is of increased interest because, like the brain, breast tissue develops postnatally. This means that changes in developmental environment including changes in hormonal activity may increase an animal’s risk for developing breast tumors, Kerr said.

Social experiences are one of the keystones of life, according to Kerr. Two other studies published in Cancer Prevention Research within the last year explored whether social isolation- another psychosocial stress-affected breast cancer risk.

“The studies by Conzen et al and Schuler *et al* compared social housing vs. individual housing and its effect on breast cancer risk,” Kerr explained. “Animals are born and reared in a group, so when they are isolated as an individual it is an environmental stress.”

Both studies looked at mice at puberty that were housed individually compared with mice housed in groups. Conzen and colleagues found that social isolation altered the expression of certain genes, increasing tumor growth. Schuler and colleagues

found that social isolation affected breast cancer development, but that the connection between environmental stressors and cancer may not be as clear as initially hypothesized.

Although the results of the two studies differed slightly, Kerr said that important result is that the environment, specifically the psychosocial environment, likely affects cancer risk.

“In contrast to these studies, ours was designed to show whether neonatal experiences, including either mild or moderate stress because of maternal separation experiences, affect normal breast development or predisposed the animal to carcinogen-induced breast cancer,” Kerr said.

Kerr and colleagues examined how either brief maternal separation – for 15 minutes daily – or prolonged separation – for four hours daily – during the first three weeks of life influenced the development of normal and cancerous mammary gland development in female mice. These mice were compared with mice that did not experience any maternal separation.

When the mice reached puberty and young adulthood, the researchers measured the levels of estrogen receptor alpha and p53, the levels of which have been linked to breast cancer development in prior research. All the mice were then exposed to a known carcinogen in order to assess breast tumor incidence and invasiveness.

The researchers found that 300 days after exposure to the carcinogen 53 percent of the mice exposed to prolonged separation had developed palpable breast lesions compared with 20 percent of mice exposed to brief or no maternal separation. The cancers in mice with prolonged separation were also more invasive.

In addition, mice exposed to prolonged separation had 200 percent greater expression of estrogen receptor alpha levels compared with mice that had no separation, and 30 percent higher levels than mice exposed to brief separation. No differences in p53 expression were found between mice that were exposed to different neonatal conditions.

Follow the AACR on Twitter: @AACR [1] #AACR [2]
Follow the AACR on Facebook: http://www.facebook.com/aacr.org [3]

Subscribe to the AACR Scientific Podcasts via iTunes [4] OR an RSS Reader [5] to download the video podcasts and recordings of the press conferences.

The mission of the American Association for Cancer Research is to prevent and cure cancer. Founded in 1907, the AACR is the world’s oldest and largest professional organization dedicated to advancing cancer research. The membership includes 32,000 basic, translational and clinical researchers; health care professionals; and cancer survivors and advocates in the United States and more than 90 other countries. The AACR marshals the full spectrum of expertise from the cancer community to accelerate progress in the prevention, diagnosis and treatment of

cancer through high-quality scientific and educational programs. It funds innovative, meritorious research grants, research fellowships and career development awards. The AACR Annual Meeting attracts more than 18,000 participants who share the latest discoveries and developments in the field. Special conferences throughout the year present novel data across a wide variety of topics in cancer research, treatment and patient care. Including *Cancer Discovery*, the AACR publishes seven major peer-reviewed journals: *Cancer Research; Clinical Cancer Research; Molecular Cancer Therapeutics; Molecular Cancer Research; Cancer Epidemiology, Biomarkers & Prevention*; and *Cancer Prevention Research*. AACR journals represented 20 percent of the market share of total citations in 2009. The AACR also publishes *CR*, a magazine for cancer survivors and their families, patient advocates, physicians and scientists.

Media Contact:
Jeremy Moore
(267) 646-0557
jeremy.moore@aacr.org [6]
Press Room, Nov. 7-10:
(215) 418-2076

Add a Comment
[7] [8] [9] Tweet it!
[10] [11] [12] [13]

SOURCE [14]

Source URL (retrieved on *04/17/2014 - 4:20am*):
http://www.mdtmag.com/news/2010/11/prolonged-maternal-separation-increased-breast-cancer-risk-neonatal-mice

Links:
[1] http://twitter.com/aacr
[2] http://search.twitter.com/search?q=+%23AACR
[3] http://www.facebook.com/aacr.org
[4] http://itunes.apple.com/podcast/aacr-scientific-podcasts/id337541769
[5] http://feeds.feedburner.com/AacrScientificPodcasts
[6] mailto:jeremy.moore@aacr.org
[7] http://feeds.wordpress.com/1.0/gocomments/aacrnews.wordpress.com/1672/
[8] http://feeds.wordpress.com/1.0/godelicious/aacrnews.wordpress.com/1672/
[9] http://feeds.wordpress.com/1.0/gofacebook/aacrnews.wordpress.com/1672/
[10] http://feeds.wordpress.com/1.0/gotwitter/aacrnews.wordpress.com/1672/
[11] http://feeds.wordpress.com/1.0/gostumble/aacrnews.wordpress.com/1672/
[12] http://feeds.wordpress.com/1.0/godigg/aacrnews.wordpress.com/1672/
[13] http://feeds.wordpress.com/1.0/goreddit/aacrnews.wordpress.com/1672/
[14] http://feedproxy.google.com/~r/aacr/~3/Y9KgJ4zgMDA/