Medical Xpress

Clues to pregnancy-associated breast cancer found

March 29 2010

Expression of inflammatory-related genes in breast tissue of women who have previously given birth may explain the aggressiveness and frequency of pregnancy-associated breast cancer, according to new research at the University of Illinois at Chicago.

Pregnancy at a relatively young age reduces the risk of breast cancer over the long term, but epidemiological studies have found that women are at an increased risk for breast cancer during pregnancy and for up to 10 years after giving birth, said Debra Tonetti, associate professor of pharmacology and lead researcher on the study. These pregnancy-associated breast cancers also carry an unusually high risk of spreading to nearby organs and for lethality as compared to breast cancers in women who have never been pregnant, she said.

Tonetti and her research team examined the level of expression of 64 genes in tissue from benign breast biopsies and breast-reduction surgeries at the University of Illinois Medical Center at Chicago. The women, who were between the ages of 18 and 45, were divided into three categories: those who had never been pregnant, those who had been pregnant within the past two years, and those who had been pregnant five to 10 years previously.

The set of examined genes included genes known to be related to immunity and inflammation, extracellular matrix remodeling, angiogenesis (the growth of new blood vessels vital to wound healing) or hormone signaling.

Twenty-two percent of the examined genes showed significant difference in expression in the breast tissue of women who had never given birth compared with those who had. Inflammation-related genes, as a class, were more active in women who had borne a child. Involution -- the process by which the breast returns to normal following lactation -- could be a cause of the inflammation, she said.

"Our results showed an increase in immune/inflammatory activity in the post-pregnant breast," Tonetti said. "Interestingly, this response was not limited to the recently pregnant group, but also characterized more distant pregnancies as well."

A surprising finding was evidence of a protective effect of pregnancy as well, since the expression of many hormone and growth factor signaling genes suggests protection. These findings indicate that a balance between high risk inflammatory and protective hormone signaling gene expression may ultimately determine a woman's individual breast cancer risk, she said.

The researchers were not only interested in determining whether pregnancy and involution are associated with gene expression changes in the normal breast, but whether such changes stay for a short period of time or are permanent, Tonetti said.

The study is among the first to use samples from normal breast tissue to determine whether there is a time-dependent effect on breast cancer risk, she said.

The results will help understand the mechanisms behind pregnancy-associated breast cancer and will indicate potentially effective prevention strategies for women at high risk, such as use of anti-inflammatory agents. In addition, more effective therapeutic approaches may be developed based on the specific molecular pathways involved,

Tonetti said.

More information: The findings are published in the March issue of the journal *Cancer Prevention Research.*

Provided by University of Illinois at Chicago