# Breast Cancer Risk and Immune Responses in Healthy Women

Na-Jin Park, RN, PhD, and Duck-Hee Kang, RN, PhD, FAAN

**Purpose/Objectives:** To summarize the findings of objective and subjective breast cancer risk assessments and their association with psychological distress and immune responses in healthy women with a family history of breast cancer.

**Data Sources:** Published articles and book chapters.

**Data Synthesis:** Healthy women with a family history of breast cancer have shown decreased immune responses (i.e., low natural killer cell activity and low Th1 cytokine production), exaggerated biophysiologic reactivity to stimuli, and increased psychological distress.

**Conclusions:** Objective and subjective breast cancer risk is associated with impaired immune responses and exaggerated biophysiologic responses in healthy women with a family history of breast cancer. Increased psychological distress can contribute further to negative immune responses. Additional studies are warranted to substantiate and extend the findings based on more comprehensive assessments of objective and subjective breast cancer risk.

**Implications for Nursing:** Biophysiologic assessment is a useful approach for nurses in early identification of women at risk for breast cancer and developing appropriate strategies to reduce the risk.

## Key Points . . .

- The immune system is the major defense mechanism against tumor insult.
- The study of objective and subjective breast cancer risk on immune responses needs to be expanded.
- Impaired immune responses, either inherited or induced by psychological distress, may account for a mechanism underlying an increased risk of developing breast cancer in women with a family history of the disease.
- Selective impaired immune responses may serve as biophysiologic markers for early identification of women at increased risk for developing breast cancer.

Breast cancer is the most common cancer among American women, and an estimated 212,920 new cases will be diagnosed in 2006 (American Cancer Society [ACS], 2006). Despite advances in early detection and treatment, breast cancer remains the second-leading cause of cancer death among American women, and the incidence rate has continued to increase in the United States since the 1980s (ACS). Greater attention clearly is needed regarding early detection of at-risk women and risk reduction for breast cancer. One step toward that goal is a better understanding of breast cancer risk assessment and its relationship between breast cancer risk and immune responses.

Breast cancer is a multifactorial disease of gene-environment interactions. Breast cancer is categorized largely into hereditary and sporadic breast cancer based on its etiology. Hereditary breast cancer accounts for 5%–10% of all breast cancer cases (McCance & Jorde, 1998) and is accompanied by a strong genetic predisposition with inherited germline mutations, predominantly in the breast cancer susceptibility genes *BRCA1* and *BRCA2* (Pasacreta, 1999). Germline mutations are present in all cells of the body and can be passed on from one generation to the next. However, not all women with germline mutations develop breast cancer, indicating additional complexity and gene-environment interactions in the phenotypic expression of the disease. Most breast cancer is sporadic without genetic predisposition. In sporadic breast cancer, mutations in somatic cells are precipitated by environmental factors (Pasacreta; Pharoah, Stratton, & Mackay, 1998), clearly indicating the significance of gene-environment interactions in the development of breast cancer.

The known breast cancer risk factors are female gender, age, family history of breast cancer, reproductive and menstrual history of early menarche, late menopause, late first live birth, current and previous hormone therapy, exposure to radiation, mammographic breast density, lifestyle factors (e.g., exercise, diet, alcohol intake), and history of benign breast disease (ACS, 2006). In particular, a family history of breast cancer increases the risk for developing the disease by two to three times (Pharoah, Day, Duffy, Easton, & Ponder, 1997; Slattery & Kerber, 1993). The risk for developing breast cancer is even greater if the affected relatives are younger, the number of affected relatives is larger, and the

*Na-Jin Park, RN, PhD, was a student at the time this article was written and currently is an assistant professor and Duck-Hee Kang, RN, PhD, FAAN, is the Marie L. O'Koren Endowed Chair and Professor, both in the School of Nursing at the University of Alabama at Birmingham.* *Preparation of this article was supported by the Department of Defense Medical Research, Breast Cancer Research Program, Predoctoral Traineeship Award (W81XWH-04-1-0352) for Park and a grant from the National Institutes of Health, National Institute of Nursing Research, to Kang (R01 NR004930). The content of the article does not necessarily reflect the position or policy of the U.S. government. (Submitted November 2005. Accepted for publication February 27, 2006.)*

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