Inflammatory Cytokine Levels and Breast Cancer Risk Factors: Racial Differences of Healthy Caucasian and African American Women

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Prominent racial differences have been noted in the incidence of and mortality from breast cancer (BC) between African American and Caucasian women in the United States (American Cancer Society [ACS], 2011). African American women have a lower overall lifetime incidence of BC but worse age-adjusted mortality rates than Caucasian women, resulting in a disproportionately higher (greater than 65%) risk of death (Joslyn & West, 2000). Earlier onset and more aggressive (e.g., triple-negative, inflammatory tumors) and more advanced forms of BC in African American women partially explain these mortality differences (Shavers, Harlan, & Stevens, 2003; Stead et al., 2009). Other potential sources of racial differences in BC outcomes include socioeconomic (e.g., income, health insurance coverage), healthcare system (e.g., screening, high-quality healthcare access), and tumor (e.g., tumor biology) factors (Amend, Hicks, & Ambrosone, 2006; Gerend & Pai, 2008). However, even after controlling for all these factors, racial differences in BC persist (Albain, Unger, Crowley, Coltman, & Hershman, 2009), suggesting that other contributors, such as biologic factors, may exist.

Chronic inflammation has been implicated as one of the biologic mechanisms underlying several types of cancer, including BC (Goswami, Rajappa, Sharma, & Sharma, 2008). Proinflammatory cytokines, such as interleukin (IL)-6, interferon-gamma (IFN-γ), and C-reactive protein (CRP), play a central role in sustaining chronic inflammation and have been reported to facilitate tumor growth and metastasis (Cole, 2009). Although the exact causality of inflammation has not been confirmed, higher levels of inflammatory cytokines are regarded as susceptibility or prognostic factors for BC incidence and mortality (Pierce et al., 2009). In addition, previous genetic studies have shown that polymorphisms of inflammatory cytokine genes (e.g., −174G/C for IL-6 and 874T/A for IFN-γ) differ between African American and Caucasian women (Govan et al., 2003; Hassan, Aschner, Manning, Xu, & Aschner, 2003; Ness, Haggerty, Harger,