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BODY SIZE, BODY SHAPE AND BREAST CANCER RISK – METABOLIC AND REDOX LINK

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Variations in body size and shape might be linked to different biological processes that affect breast cancer risk. Epidemiological studies have confirmed that obesity, which is characterized by increased overall adiposity and assessed using body mass index (BMI), has direct relationship with the risk of breast cancer among postmenopausal women, and opposite relationship with the risk among premenopausal women (“obesity paradox”). In addition to BMI, anthropometric descriptors of body shape, like waist and hip circumference and waist-to-hip ratio are directly associated with both pre- and postmenopausal breast cancer risk. Excess adipose tissue, adipose tissue dysfunction, and adipose tissue-to-breast cancer crosstalk have important role in the initiation and progression of breast cancer due to the altered production of proinflammatory and proangiogenic mediators, growth factors, adipokines, and sex hormones, dysregulated insulin signaling pathway, as well as mitochondrial dysfunction and oxidative stress. Fat distribution pattern exerts an effect beyond the effect of overall obesity in relation to breast cancer development because of more adverse systemic metabolic effects related to visceral adiposity. Body height and its components have direct association with postmenopausal breast cancer risk. Increased risk of breast cancer in taller persons is probably due to increased levels of insulin-like growth factor (IGF-1), which is one of the major determinants of height, plays an important role in regulating breast stem cell number, and can affect cancer growth. Adult-attained height also reflects different aspects of maturation, including genetic, nutritional, and environmental factors. Assessment of changes in body height, mass, and distribution of adipose tissue throughout life is another important aspect of understanding the complex processes of metabolic reprogramming of energy pathways in breast cancer pathophysiology. Use of anthropometric descriptors of body size and shape can provide insight into underlying biological mechanisms, which is essential for developing targeted prevention and treatment strategies.

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