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1: Mol Diagn. 2003 Mar;7(1):49-55.

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Breast cancer : new technologies for risk assessment and diagnosis.





Wright T, McGechan A.

Adis International Inc., Yardley, Pennsylvania, USA.

In the US, one in every eight women will develop breast cancer in her lifetime. Despite the advances made in treating breast cancer, the causal mechanisms underlying this disease have yet to be fully elucidated; 85% of breast cancer cases occur sporadically without any known genetic mutation. Too little is known about the pathogenesis of breast cancer for primary prevention to be feasible in the near- to mid-term. Secondary prevention through screening offers an alternative that has been widely adopted. For decades, breast self-examination has been touted as a technique for the early identification of breast cancer. However, it has been recently suggested that this technique is a waste of time and resources for both doctors and patients. Mammography finds breast cancer earlier than breast self-examination, and will reduce the risk of death from breast cancer by approximately 30% in women over 50 years old. Mammography is limited in that cancer, like breast tissue, appears white on the x-ray; therefore lesions may be difficult to detect in women with very dense breasts, and a tumor may not cast a significant shadow until it is quite large. Some cancers are so aggressive that they can spread quickly, before routine screening can detect them. Despite these limitations, mammography is still viewed as the best tool currently available for screening and early diagnosis. Improved methods to detect and diagnose breast cancer early, when it is most curable, are required if a significant impact on morbidity and mortality from breast cancer is to be made. Various new and innovative technologies are being investigated for improving the early detection and diagnosis of breast cancer. About 85% of breast cancers begin in the milk ductal system of the breast. As cancer develops in the breast, abnormalities occur, including atypical hyperplasia, ductal carcinoma in situ, and invasive breast carcinoma. Thus, the early screening of ductal cells can provide a parallel benefit to the 'Pap' smear, which is used virtually universally to identify the abnormal cells that can lead to cervical cancer. Two technologies to monitor for atypical ductal epithelial cells are Cytoc Corporation's FirstCyt trade mark Ductal Lavage system and Natestech Pharmaceutical Company's Mammary Aspiration Cytology Test. Matritech, Inc. is searching for

biomarkers linked to breast cancer. Researchers at Matritech have detected the presence of nuclear matrix protein (NMP) in the blood of women at the early stage of breast cancer, which is absent in the blood of healthy women, as well as those with fibroadenoma, a benign breast disease. NMP66 has been selected as a marker for further development and clinical trials of a test for use in the detection and monitoring of women with, or at risk for, breast cancer have been initiated. Technologies developed by the US Department of Defense are under investigation as breast cancer screening. Advanced Image Enhancement Inc. has licensed naval sonar technology for digital image enhancement of mammograms. New thermography applications are also being investigated in two separate projects sponsored by the US Department of Defense using military thermal surveillance tools adapted for cancer detection. Both are enhancements of older thermal imaging technology based on the principle that heat equates to unwanted activity, in the case of breast cancer, abnormal cell proliferation.

PMID: 14529321 [PubMed - in process]

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