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Neoplastic transformation of mammary epithelial stem cells: Are they linked to the development of age-dependent breast cancer

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The risk of getting breast cancer increases with age. A woman is 100 times more susceptible to develop breast cancer in her 60s than in her 20s. To promote healthy aging of women, better understanding of the cellular and molecular basis linking aging with sporadic breast cancer development is urgently needed to delineate clinically relevant biomarkers for the prevention, early detection and the development of targeted therapeutics for the age associated breast cancer. Adult mammary stem cells (MaSC) and their niche responsible for tissue maintenance and repair throughout life, are subject to the environment induced stresses with possible alteration of their MaSC self-renewal/differentiation function and genetic/epigenetic changes both in the MaSC and their niche during the aging process which can transform them to tumor initiating breast cancer stem cells. Our findings indicated mammary stem cell expansion in mammary glands of old mice indicating alteration of self-renewal/differentiation function but interestingly with significantly enhanced DNA damage in MaSC and stromal niche. Further in vivo exposure of old mice to a mutagen increased MaSC frequency, in vitro self-renewal activity, DNA strand breaks and pre-neoplastic lesions in the reconstituted mammary glands generated by the old MaSC. These observations indicate that age related changes in frequency, function and genetic integrity of mammary stem/progenitor cells and in their niche may predispose them to neoplastic transformation, particularly when exposed to environmental DNA damaging agents like chemical carcinogens and radiation

Biography

Abhik Bandyopadhyay has completed his Ph.D in Biochemistry from University of Calcutta and post-doctoral studies in Tumor Biology Laboratory, University of Nebraska at Lincoln. He is dedicated to mammary gland biology and breast cancer initiation/promotion research for more than 25 years in USA. He has published more than 30 papers in reputed Journals on basic and translational cancer research including therapeutic targeting of breast cancer stem cells. Currently serving as a faculty member of the Cellular and Structural Biology department and of the Barshop Institute for Longevity and Aging Research at UT Health Science Center in San Antonio. Texas

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