Somya Shanmuganathan et al., J Nutr Food Sci 2014, 4:5
http://dx.doi.org/10.4172/2155-9600.S1.014

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Nutrition & Food Sciences
September 23-25, 2014 Valencia Convention Centre, Spain

Discovery of novel markers and targets for therapy of breast cancer via phyto-chemoprevention

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Complementary Alternative Medicine (CAM) is increasingly being practiced worldwide due to its safety and beneficial therapeutic effects. A number of phyto-compounds have been used in CAM, individually or in combination for cancer therapy, particularly at late and desperate stages. In the present study, we hypothesized that a combination three well documented phyto-compounds (Resveratrol - RE, Indole 3 Carbinol - I3C and Quercetin - QURC) used at sub-optimal levels can induce 100% killing of breast cancer (BC) cells in-vitro without toxic effects on normal cells.

To test the hypothesis, normal breast epithelial cells (MCF-10A; Control) and also two Breast Cancer (BC) cell lines (MDA-MB-231 and MCF-7) were treated with RE, I3C, QURC both individually and in combination at sub-optimal levels. Alamar-Blue assay and Flow Cytometry revealed that the combination of RE+I3C+QURC induced 100% death of BC cell lines but not normal cells. In addition, wound healing and invasion assays revealed loss of cell migration/invasion through Matrigel. Western Blot analysis was used to examine the expression of genes associated with apoptosis (BcL-2 family members and Survivin), cell motility (CD44) and cell proliferation, (PCNA, Rb, CDK4) in the BC cell lines. Microarray analysis revealed several differentially expressed key genes and four unique genes were highly and differentially up-regulated (ARC, GADD45B, MYLIP and CDKN1C). The present study identified RE+I3C+QURC as a powerful combination that induced 100% BC cell death and determined its underlying molecular players.

Ongoing in vivo experiments aim to evaluate the efficacy of this 3-SC in preventing tumor growth using xenograft mouse BC model, and further validate the functional relevance of its underlying key genes.

Biography

Somya Shanmuganathan is currently pursuing her third year PhD in Genomics of Breast Cancer at the Sultan Qaboos University, Oman. Prior to her PhD, she completed her Master of Business (Merit) at the Australian National University (Australia), Master of Biotechnology at the University of Queensland (Australia) and Master of Science in Applied Microbiology at the VIT University (India). She has been a reviewer for a number of articles in several reputed international journals and is currently involved in several breast cancer research works.

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