World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

Differential Expression of Biomarkers in Cancer Stem Cells and Side Populations in Breast Cancer Cell Lines

Authors : Dipali Dhawan

Abstract : Cancerous epithelial cells are confined to a primary site by the continued expression of adhesion molecules and the intact basal lamina. However, as the cancer progresses some cells are believed to undergo an epithelial-mesenchymal transition (EMT) event, leading to increased motility, invasion and, ultimately, metastasis of the cells from the primary tumour to secondary sites within the body. These disseminated cancer cells need the ability to self-renew, as stem cells do, in order to establish and maintain a heterogeneous metastatic tumour mass. Identification of the specific subpopulation of cancer stem cells amenable to the process of metastasis is highly desirable. In this study, we have isolated and characterized cancer stem cells from luminal and basal breast cancer cell lines (MDA-MB-231, MDA-MB-453, MDA-MB-468, MCF7 and T47D) on the basis of cell surface markers CD44 and CD24; as well as Side Populations (SP) using Hoechst 33342 dye efflux. The isolated populations were analysed for epithelial and mesenchymal markers like E-cadherin, N-cadherin, Sfrp1 and Vimentin by Western blotting and Immunocytochemistry. MDA-MB-231 cell lines contain a major population of CD44+CD24- cells whereas MCF7, T47D and MDA-MB-231 cell lines show a side population. We observed higher expression of N-cadherin in MCF-7 SP cells as compared to MCF-7NSP (Non-side population) cells suggesting that the SP cells are mesenchymal like cells and hence express increased N-cadherin with stem cell-like properties. There was an expression of Sfrp1 in the MCF7- NSP cells as compared to no expression in MCF7-SP cells, which suggests that the Wnt pathway is expressed in the MCF7-SP cells. The mesenchymal marker Vimentin was expressed only in MDA-MB-231 cells. Hence, understanding the breast cancer heterogeneity would enable a better understanding of the disease progression and therapeutic targeting.

Keywords : cancer stem cells, epithelial to mesenchymal transition, biomarkers, breast cancer
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020