J Cancer Sci Ther 2018, Volume 10
DOI: 10.4172/1948-5956-C10-151

The role of stemness-gene octamer-binding transcription factor 4 in tamoxifen-resistant breast cancer

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Over the years different studies have identified cancer stem cells to play a significant role in tumor initiation, self-renewal capacity and ability to differentiate into non-self-renewing cells. Octamer-binding transcription factor 4 (OCT4) a transcriptional factor is one of the major key regulators of stem cell, known to be responsible for pluripotency and self-renewal processes. Therefore, this study aims to examine the roles of OCT4 stemness gene in tamoxifen-resistant breast cancer, exploring its influence in MCF-7 tamoxifen-resistant cells (TAMR) and knockdown tamoxifen-resistant cells (TAMRK). First, the expression of OCT4 was quantitatively analyzed in TAMR cells and in WT cells using flow cytometry. Furthermore, small interference RNA (siRNA) against human OCT4 was independently transfected into tamoxifen-resistant breast cancer cells (TAMR) and WT cells using SiTran. Reverse transcription polymerase chain reaction (RT-PCR) was used in analyzing OCT4 gene quantity in TAMR/TAMRK cell lines. Then, the growth rate and the apoptotic marker (annexin-V) were assessed in TAMR/TAMRK cells in response to 4-hydroxytamoxifen (4-OHT). The results showed a significant level of expression of the OCT4 protein in TAMR cells at 60% and 16% for WT cells and significant difference in growth rate in TAMR cells as compared to TAMRK cells. Our findings suggest that knocking down OCT4 in TAMR breast cancer cells may stimulate tamoxifen sensitivity and enhance apoptosis. Results indicate that OCT4 transcriptional factor plays a substantial role in tamoxifen-resistant breast cancer and the neutralization of this biomarker reduces resistance thereby increasing response to tamoxifen therapy. This could be used as a prognostic marker for breast cancer cases that are resistant to tamoxifen therapy.

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