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The role of stemness gene OCT4 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 tumour initiation, self-renewal capacity and ability to differentiate into non-self-renewing cells. *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 analysed 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, growth rate and the apoptotic marker (annexin-V) were assessed in TAMR/TAMRK cells in response to 4-hydroxytamoxifen (4-OHT). The results showed significant level of expression of *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 neutralisation 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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