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The Potential of Rapamycin as a Selected Drug for Apoptosis Induction in Triple Negative Breast Cancer Subtype Using High-Throughput Transcriptome Analysis

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Abstract

Triple-negative breast cancers (TNBC), which lack estrogen and progesterone receptors demonstrate HER2/ neu overexpression. The poor survival outcomes coupled with TNBC patients are partially, due to a lack of therapeutic targets. The aim of this study was to introduce a new drug among the conventional chemotherapy drugs based on the trans cripts of the patients. For this purpose, transcript of MDA-MB-468 cell line as a TNBC model was analyzed in the presence of 15 common drugs in fifteen GEO datasets. Then, reduced gene lists in the presence of each drug in three breast cancer subtypes were compared based on TCGA data. The effect of the selected drug on survival and apoptosis rates of MDA-MB-468 and MCF-7 cells (as triple positive model) were compared. The data showed that the expression of the reduced gene list in the presence of Rapamycin, significantly increased based on RNASeq data in TNBC subtype compared to the other two subtypes. In the presence of 3000 µg/mL Rapamycin there was a sharp decrease in MDA-MB-468 cell viability and a significant increase in apoptosis compared to MCF-7 cells treated with the same concentration of the drug. The expression of PSAT1 as a gene with highest score among 44 common increased genes between all three subtypes, showed a reduction in presence of Rapamycin based on microarray data and was verified *in vitro* using RT-qPCR. In summery here, we have developed a novel computational method that allows the imputation of drug response in very large clinical cancer genomics data sets, such as TCGA.

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Biography

Maryam Peymani has her expertise in cancer and genomics. She has recently published several articles in this field. She is currently an Associate Professor of Biology at University of Islamic Azad University Shahrekord branch.

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