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Different expression of ERK1/2 and pERK proteins in MDA-231 and MCF7 cells after chemotherapy with doxorubicin or docetaxel

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Objective(s): Curative treatment of breast cancer patients using chemotherapy often fails as a result of intrinsic or acquired resistance of the tumor to the drug. In this study, cytotoxicity and the expression of Erk1/2 and phospho-Erk was compared in MDA-231 (ER-) and MCF7 (ER+) cell lines after treatment with doxorubicin (DOX) or docetaxel (DOCT).

Materials and Methods: Cell cytotoxicity of DOX or DOCT was calculated using MTT assay. Immonofluorescent technique was used to show Mdr-1 protein in MDA-231 and MCF7 cells after treatment with DOX or DOCT. The expression of ERK1/2 and phpspho-ERK was assayed with immunobloting.

Results: Comparing IC_{50} values showed that MDA-231 cells are more sensitive than MCF7 cells to DOX or DOCT. Immonofluorescent results confirmed the expression of Mdr-1 in these two cell lines after DOX or DOCT treatment. In MDA-231 cells the expression of ERK1/2 and pERK was decreased after DOX treatment in a dose-dependent manner. In contrast in MCF7 cells the expression of ERK1/2 and pERK was increased after DOX treatment. DOCT treatment resulted the same result with less significant differences than DOX.

Conclusion: The heterogeneity seen in cell lines actually reflects the heterogeneity of breast cancers that is why, patients categorized in one group respond differently to a similar treatment. These results emphasize the importance of a more accurate classification and a more specific treatment of breast cancer subtypes.

Keywords: Breast Cancer, pERK, MDA-231, MCF7, Doxorubicin, Docetaxel

Biography

Aliakbar Taherian completed his bachelor of science in Biology in Tarbiat Moallem University in Tehran. After a few years he was accepted in Medical School of Tehran University and received his Master of Science in Human Histology. After working in Kashan university of Medical Sciences for a few years teaching Human Histology to Medical students, he received a scholarship from the university to study his PhD. He was accepted in University of Saskatchewan to work with Dr. Patrick Krone and Nick Ovsenek in the Anatomy and Cell Biology Department. During his study he would publish two papers (1,2) and clone two genes (submitted to Genbank). After completing his PhD he worked as a postdoc in the same department with Dr Haas for a few years. In the postdoc period, He published one paper and has another submitted paper (3,4). Now he is working in Kashan University of Medical Sciences, teaching Human Histology to medical and paramedical students. Besides teaching he has a few research projects that occupies most of his time in university and home. The project that has been recently completed and submitted for publication (5) is about the different responses of breast cancer to chemotherapy.