

Abstract

Cancer is the second leading cause of death in the world. Breast cancer is one of the main causes of death in women. Many genetic and environmental factors have an effect on the disease. One of the risk factors is the level of insulin in the blood that, by binding to the INSR receptor can cause the drug resistance in cancer. In this study, the effect of insulin on the INSR, Bcl-2 and Bax proteins was investigated in terms of drug resistance induction in MCF-7 cell line. MCF-7 cells were treated with 25 μ l of insulin. Then, they were exposed to 1, 5 and 10 μ l/ml of doxorubicin and vincristine. Cell survival was evaluated by MTT assay. Biochemical parameters of apoptosis (Bax, Bcl-2 and INSR proteins) were evaluated by Western blot. *INSR* expression were evaluated by Real Time PCR. The results showed that in insulin-treated cells, the amount of INSR and Bcl-2 / Bax proteins ratio was increased compared with the control. There was a significant difference between the expression of INSR in the two groups, which was increased in the insulin-treated group ($P < 0.05$). Insulin increased the resistance to apoptosis (cell death) in the MCF-7 cell line.

Key word: Breast cancer, *INSR*, Bax, Bcl-2, Drug resistance, MCF-7.



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Title:

**The effect of insulin on *INSR* receptor and Bax and Bcl-2 protein
expression in drug resistance situation on MCF-7 breast cancer cells line**

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