**MicroRNA5903P suppresses cell survival and triggers breast cancer cell apoptosis via targeting sirtuin-1 and deacetylation of p53**

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**Abstract**

Downregulation of microRNA-590-3p (miR-590-3p) is a frequently occurring, nonphysiological event which is observed in several human cancers, especially breast cancer. However, the significance of miR-590-3p still remain unclear in the progression of this disease. This study explored the role of miR-590-3p in apoptosis of breast cancer cells. Gene expression of miR-590-3p, Sirtuin-1 (SIRT1), Bcl-2 associated X protein (BAX), and p21 was evaluated with real-time polymerase chain reaction (PCR) and SIRT1 protein expression was assessed by Western blot analysis in breast cancer cell lines. Bioinformatics analysis and luciferase reporter assay were used to evaluate targeting of SIRT1 messenger RNA (mRNA) by miR-590-3p. Cells were transfected with miR-590-3p mimic and inhibitor and their effects on the expression and activity of SIRT1 were evaluated. The effects of miR-590-3p upregulation on the acetylation of p53 as well as cell viability and apoptosis were assessed by Western blot analysis, WST-1 assay, and flow cytometry, respectively. miR-590-3p expression was considerably downregulated in breast cancer cells which was accompanied by upregulation of SIRT1 expression. SIRT1 was recognized as a direct target for miR-590-3p in breast cancer cells and its protein expression and activity was dramatically inhibited by the miR-590-3p. In addition, there was an increase in p53 and its acetylated form that ultimately led to upregulation of BAX and p21 expression, suppression of cell survival, and considerable induction of apoptosis in breast cancer cells. These findings suggest that miR-590-3p exerts tumor-suppressing effects through targeting SIRT1 in breast cancer cells, which makes it a potential therapeutic target for developing more efficient treatments for breast cancer.

**Keywords**

Author Keywords: apoptosis; breast cancer; miR-590-3p; p53; SIRT1