Characterization of Gene Expression in p53 Activated Tumor-Initiating Cells

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This study aims to characterize the role of p53, a tumor suppressor protein, in tumor-initiating cells. An emerging theory in cancer research is that tumor progenitor cells can give rise to various tumor cells. However, the definite characteristics of these cells are still not clear. In this study, mammary epithelial cells were treated a p53 activator, nutlin-3, which resulted in increased or decreased gene expression of various p53 target genes. Microarray gene expression of tumor-initiating cells and differentiated epithelial cells were analyzed using DAVID analysis. Potential target genes revealed by DAVID were confirmed via western blotting, indicating potential cancer strategies. Target genes, such as CD44, Twist1, Src, Parp-1, and Bcl-2 were found to be upregulated in differentiated epithelial cells under the presence of a p53 activator. The same genes were down-regulated in tumor initiating mammary cells, suggesting that they would be upregulated in early tumor-initiating cells when p53 is lost. Thus, by understanding the functional and genetic differences between tumor-initiating cells and differentiated cells, stimulated pathways are potential targets in preventing cancer.

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