Potential Integrin Switch in NIH/3T3 Cells in Response to High Concentrations of Ascorbic Acid

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**INTRODUCTION**

NIH/3T3 (ATCC® CRL-1658) cells are adherent embryonic mouse fibroblast cells, used as a model in *in vitro* experiments due to their high survivability and short transition through the cell cycle. Integrins are heterodimeric transmembrane proteins found in many cell types, including NIH/3T3 cells, and are involved in extracellular matrix adhesion and cell to cell signaling. They are composed of alpha (α) and beta (β) subunits that can form 24 different heterodimer combinations, each being characterized by their individual ligand binding properties. For example, α2β1 binds to collagen, α3β1 binds to laminin, and α4β1 binds to fibronectin. In other cell lines, researchers have seen that upregulation of an integrin protein results in the down regulation of another, also known as an integrin switch. NIH/3T3 cells treated with ascorbic acid may lead to an integrin switch in genes involved in cell differentiation and proliferation. In this experiment, we explored the effects of high ascorbic acid treatment on NIH/3T3 cells, and the possibility of a resulting integrin switch.

High concentration of ascorbic acid is becoming a common cancer treatment for some individuals, and NIH/3T3 cells may serve as a model to gain a better understanding of how integrin expression on cancer-associated fibroblasts may play a role in deleterious cancers, such as breast cancer. Still, the mechanisms behind this treatment remain unclear. Additionally, contradictory evidence shows that high concentration ascorbic acid may lead to an increased expression of laminins bound to integrins, which has been found in patients with malignant breast cancer. This research will further elucidate the cellular response to high concentration ascorbic acid by exploring integrin switches, as well as possible changes in laminin expression.

**METHODS**

**HYPOTHESIS**

NIH/3T3 cells treated with high ascorbic acid concentration may cause an integrin switch, seen by an upregulation of certain integrins, and a downregulation of others.

**CONCLUSION**

Ascorbic acid is a common cancer treatment that has been utilized since the early 70s. Our study intended to analyze the efficiency of this treatment in breast cancer. What we found after treating NIH/3T3 cells was that there was an integrin switch which has been identified as a vital player in metastatic diseases such as breast cancer. Additionally we analyze our data to identify other ECM genes that may support our finding that ascorbic acid may be a detrimental treatment option for breast cancer.

**REFERENCES**