

A Novel Synergistic Approach for Enhancing Immunotherapy in the Treatment of Melanoma

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Immunotherapy represents one of the more promising approaches to treating melanoma, the most deadly form of skin cancer. This type of therapy involves boosting the immune system's ability to recognize and destroy cancer cells. However, immune cells often fail to do this, resulting in ineffective therapy. Decades of research involved manipulating the immune cells to become better at recognizing cancer cells with minimal success. This study was the first to target the tumor rather than the immune cells. Using a novel screening process to look at 850 chemotherapy agents, I found that inhibiting a protein called Topoisomerase I (Top1) in combination with immunotherapy led to a beneficial synergistic treatment effect. I conducted a synergy assay with multiple melanoma cell lines to validate and qualify these findings. Using mass and flow cytometry assays, I demonstrated that the deactivation of Top1 inside the melanoma cells caused them to exhibit more adhesive and death-inducing markers on the cell surface, thereby facilitating recognition by the immune system. My study has laid the groundwork for the novel use of Top1 inhibitors in combination with immunotherapy to improve therapeutic response in melanoma patients. Clinical trials will begin within the next 2 to 3 years. Ultimately, this combinatorial approach represents a new paradigm in cancer therapy whereby older, "off-the-shelf" treatments like chemotherapy are coupled with newer treatments like immunotherapy resulting in more saved lives.

Awards Won:

Serving Society Through Science: Award of \$250

First Award of \$5,000