Red Fluorescent Visualization of Chimeric Antigen Receptor Expression on T Cells to Detect Immune Response Capability of Targeting Tumor-Associated MUC1

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Cancer has threatened the lives of individuals all over the globe. With the rise of this infamous disease, prevention techniques such as radiation therapy and chemotherapy have been introduced yet it has the potential to hurt patients by damaging the organs that are near the intended target of the radiation and drugs. This experiment involved engineering human immune cells, or T cells, to be able to actively seek and destroy tumor cells with specific receptors that bind to antigens expressed on the surface of tumorigenic cells, or tumor associated MUC1. The primary focus of it was to use red fluorescence to visualize expression of these specific receptors on the surface of T cells. Before engineering the chimeric antigen receptor (CAR) T cells, the DNA that was responsible for causing the cell to express the receptors was given a genetic sequence for the fluorescent proteins. Under a fluorescent microscope, T cells showed the abundance of their newly developed chimeric antigen receptors on their surface through the fluorescent proteins that they contained. As expected, the post-experimental analysis of the T cells showed great levels of CAR expression, confirming the T cell's capability of targeting tumors. This process highlights the ability to create an efficient method of immunotherapy that does not have any negative impacts against patients and will ultimately lead to the cure for cancer.