Avaren-Fc, a Novel Immunotherapeutic, Recruits NK Cells in B16F10 Melanoma Tumor Tissue

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Abstract

Melanoma is the fifth most common cancer in the US, with limited effective immunotherapeutic options available for patients. Avaren-Fc (AvFc) is a novel experimental immunotherapeutic agent with a unique “lectibody” property. It is capable of targeting cancer cells through the selective recognition of high mannose glycans, which are aberrantly overrepresented on the surface of malignant cells. AvFc can interact with circulating effector immune cells equipped with Fc receptors, such as natural killer (NK) cells to induce antibody-dependent cell-mediated cytotoxicity (ADCC) and kill cancer cells. Previous work has shown that AvFc effectively induces ADCC activity against B16F10 cancer cells *in vitro*. Furthermore, flow cytometry analysis revealed that AvFc treatment exhibited a trend towards increased NK cell infiltration within the B16F10 flank tumor tissue of C57bl/c mice.

The objective of the current study is to assess the B16F10 tumor microenvironment by immunohistochemistry, quantifying NK cells and an associated NK cell activation signal in AvFc-treated B16F10 tumor tissue compared to untreated tissue. Based on our previous flow cytometry analysis data, we hypothesized that AvFc-treated tissue may have an elevated NK cell count, indicative of AvFc-mediated recruitment of NK cells.

The study utilized fluorescent immunohistochemistry, which probed for NK cells (NK1.1) and NK cell activation (CD107a). The results demonstrated a significant increase in the number of NK-1.1+ cells ($p = 0.0056$, Wilcoxon Rank Sum Test) and CD107a+ signal ($p = 0.0009$, Wilcoxon Rank Sum Test) in AvFc-treated tissue when compared to untreated tissue. Colocalization of NK-1.1 and CD107a was also deemed significant in AvFc-treated tissue ($p = 0.0032$, Wilcoxon Rank Sum Test), thus supporting the presence and associated activation of NK cells in the tumor microenvironment.

These results warrant further analysis to elucidate the underlying mechanism by which AvFc recruits additional NK cells to the tumor tissue. Overall, the results from this study corroborate that AvFc’s anti-cancer activity is mediated via NK cell activation and support its development as a potential immunotherapeutic for melanoma treatment.

Sreevatsa Vemuri, a UofL undergraduate student, is presenting in the rover category.