Understanding the biological significance of high mannose glycans in terms of ovarian cancer metastasis

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Introduction
Ovarian cancer is the deadliest gynecological cancer, which begins in the ovaries and eventually metastasizes to the abdomen and other organs. Mortality is attributed to a lack of early detection, a lack of a useful biomarker, and a lack of good second line treatments [1]. Many cancer types, including ovarian cancer, have larger proportions of high mannose N-glycans (HMG) on their surface, which are potentially linked to metastatic activity and which can potentially be used as a biomarker or drug target [2]. Currently, there are no approved diagnostics or therapeutics that make use of this. Our lab has developed a novel plant-made lectin-Fc fusion protein called Avaren Fc (AvFc) that selectively target these unique biomarkers on the surface of cancer cells and can elicit cell-mediated cytotoxicity [3].

Methods

1. Immunofluorescence (IF): used to visually demonstrate binding between AvFc and ovarian cancer cells.
2. Flow Cytometry: used to evaluate recognition to ovarian cancer cell lines MTS assay: used to determine cytotoxicity of AvFc due to cell binding.
3. ADCC: used to assess Fc-mediated cytotoxicity by the immune system.

Objective and Hypotheses
Our goal is to understand whether or not HMGs on the surface of ovarian cancer cells can be used as a biomarker or drug target as well as how these glycans affect metastatic potential. We hypothesize that AvFc can selectively recognize ovarian cancer cells and elicit ADCC, but will not be cytotoxic due to binding alone.

Results

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<th>ID8 V/D</th>
<th>IF Binding</th>
<th>MTS</th>
<th>ADCC</th>
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Conclusions and Future Directions

- **AvFc binds strongly to all 4 of the ovarian cancer cell lines.**
- **AvFc is not directly cytotoxic and does not inhibit growth, but can interact with the immune system and potentially induce ADCC against cancer cells.**
- **These data agree indicate that the mechanism of action of AvFc is mostly immune-mediated.**
- Future studies will be done to evaluate efficacy of AvFc using in vivo ovarian cancer models and the effects of HMGs on ovarian cancer metastasis.

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[References]