

Immunogenic Protocells for Ovarian Cancer Immunotherapy

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Problem:

Current cancer treatments expose the whole body to high levels of toxicity leading to adverse side effects and patient suffering

Goal:

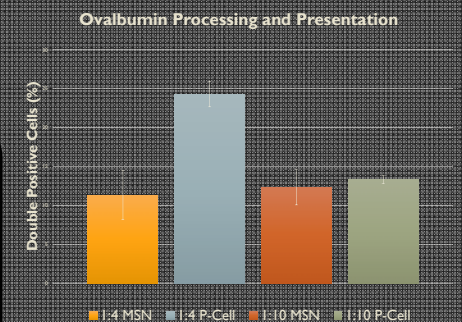
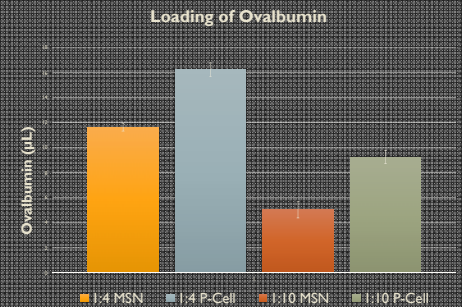
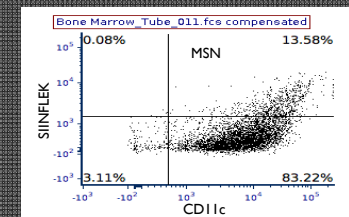
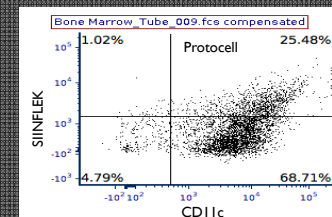
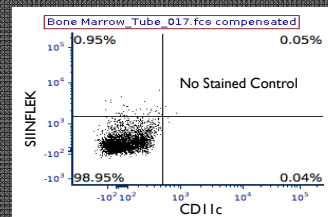
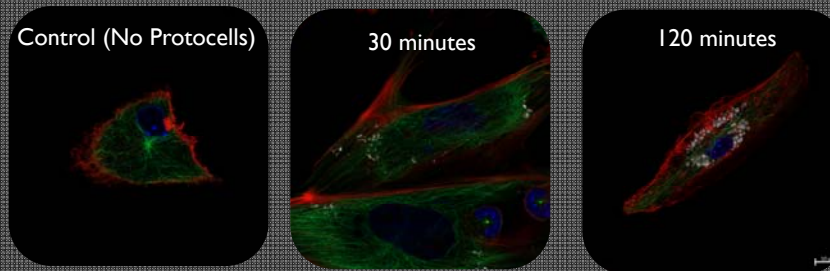
To stimulate a cancer specific immune response using immunogenic mesoporous silica nanoparticle supported lipid bilayers (Protocell)

Methodology:

- Grow dendritic cells from bone marrow extracted from mice
- Prepare the lipids
- Form the protocell loaded with Ovalbumin and Monophosphoryl Lipid A (MPL)
- Stain the cells using antibodies and perform phenotype analysis
- Use the flow cytometer to analyze for activation and presentation of the antigen
- Use confocal and scanning electron microscopy to image cells and nanoparticles

Results:

- Protocells are internalized and traffic along microtubules to the perinuclear region of the cell.
- Protocells are more effective than the Mesoporous Silica core for loading Ovalbumin
- Processing and presentation of the antigen by the dendritic cells was superior for the Protocell compared to the Mesoporous silica core



Ratios: silica core (µg) to ovalbumin (µg)

Future Work:

- Continue optimization of the protocell for immunotherapy
- Temporal optimization of antigen processing and presentation
- Test protocells in vivo using ovalbumin transformed ID8 ovarian cancer mouse model