Lorne Muir II & Nathan Weeks
Senior Division Medicine & Health
Analyzing the Separate Toxicity of Engineered Nanoparticles on L1210 Cells

The purpose of this investigation is to analyze the separate toxicity of manganese-doped titanium dioxide, barium titanium trioxide, and silver nanoparticles on L1210 cells with flow cytometry. If barium titanium trioxide (BaTiO3), silver (Ag), and manganese-doped titanium dioxide (MnTiO2) nanoparticles are introduced to L1210 mouse leukemia cells, then the molecules Fas and B7.1 will be regulated indicating immunological changes in the cells. Testing the toxicity of separate nanoparticles on nanoparticles required several steps. To test the toxicity, L1210 cells were thawed from cryostorage, and then split for further experiments. Then the cells were treated with the nanoparticles using concentrations of 100 ppm, 10 ppm, 1 ppm, and 10 ppb. Fas and B7.1 isotypes and stains were then applied to the cells and placed under the flow cytometer. The cell's reaction was then analyzed with a flow cytometer to include the granularity, size of the cells, and the fluorescence of the fluorochromes on the antibodies of Fas and B7.1. The data collected partially supported the original hypothesis. The data did not support the hypothesis because the indicators of B7.1 and Fas did not increase from the controls to the treatments. The data did support the hypothesis because the treatments did cause a higher percentage of death in the cell. MnTiO2, BaTiO3, Ag killed slightly more cells than the no treatment. These findings lead us to believe that nanoparticles are toxic to L1210 cells at or above concentrations of 1 ppm. Nanoparticles increase cell death without increasing Fas or B7.1 levels.