

Alicia Benz  
1825 College Lane #32  
Spearfish, SD 57783  
September 28, 2015

National Council on Undergraduate Research  
NCUR Abstract Submission

To Whom It May Concern:

CdTe quantum dots (QD) have been synthesized and made water-soluble by a phase transfer reaction. These fluorescent materials have strong potential as bio-imaging materials. The analysis of the toxicity of the QD solution has been made over a series of treatments to remove excess, harmful free Cd ions. A multi-endpoint strategy for toxicity measurement indicates that the QD toxicity differs significantly from a solution of free cadmium ions.

In order to analyze the toxicity of QD, we first have to collect a valuable cell line. Buffalo rat liver (BRL-3A) cells will be used to determine what effects the concentration of nanomaterials have in relation to exposure, and its exposure time. Initial exposure will be given to cells that have been grown into 96-well plates. Then, by exposing our cells in triplicate, we will have general information on aerosol and ingested exposure of one nanomaterial versus another. Cells are cultured on site to focus on the replication of cells while being exposed through ingestion of the nanomaterials. Cells will be analyzed for the differences of changes of nanomaterial concentration, along with the length of exposure the cells underwent.

Analysis of changes in external structure will be done using a secondary electron microscopy in addition to imaging for cell death using a fluorescence microscope. Determining the changes in shape, size and appearance of the cultured cells with the nanomaterial exposures will be an important starting point. The first step in the assay is determining the optimum cell number for the protocol. When cell death occurs, the bursting of the membrane releases LDH into our culture media where it can be accounted for. The final tests of the cell culture represent vital cellular functions. By using a lactate dehydrogenase (LDH) assay we will be able to look at the effects of concentration and time exposure.