

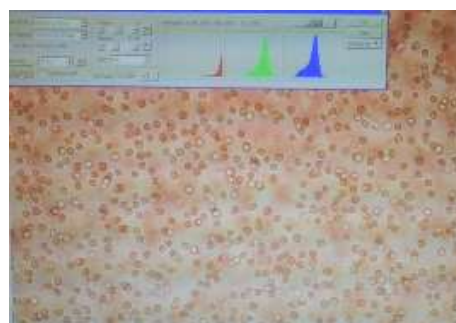


# Biology @ Acadia

## BIOLOGICAL EVALUATION OF METAL-CONTAINING COMPOUNDS TO ASSESS POTENTIAL FOR USE IN PHOTODYNAMIC THERAPY

**Colpitts, Julie A.**, McFarland, Sherri A.  
Department of Biology, Acadia University, Wolfville, NS

Current cancer therapies have many limitations; effective drugs often cause significant systemic toxicity or are prohibitively expensive. Research is currently being conducted to develop chemotherapeutic agents which are activated to express their cytotoxic effects, thereby reducing systemic toxicity and cost as a larger number of cancers can be targeted with a single drug. One such treatment is known as photodynamic therapy (PDT), which uses light to activate the drugs. Current use of PDT is limited by available drugs; metal-containing compounds are synthesized in the McFarland lab for optimal clinical relevance in PDT. To assess the effectiveness of each compound as a potential agent for PDT, a series of relatively simple biological experiments was performed. Such experiments used a variety of techniques and procedures to evaluate the presence and method of DNA binding, light-induced damage to DNA, enzyme targeting, uptake mechanisms, as well as cytotoxicity and photocytotoxicity of each compound in two cancer cell lines. A new technique to determine the mechanism of action (necrosis vs apoptosis) of cell death was employed to assess its value as a potential screening procedure for photodynamic compounds, and although it was informative, it was deemed impractical as a screening method. Experiments were implemented as a means for understanding the intricacies of each compound and to judge which compounds should be sent on through the resource intensive process of *in vivo* experiments, leading eventually to human clinical trials. Several compounds deemed successful by *in vitro* experimentation have now been used in a PDT model in mice with varying degrees of success. This process has led to an increased emphasis on complexity in models used to pre-screen effective PDT agents as *in vitro* results do not necessarily predict *in vivo* activity, and has therefore been extremely important to developing methodology in the McFarland lab.



Human leukemia cells, cultured in the lab

**Julie Colpitts** graduated from Cairine Wilson Secondary School in Ottawa, Ontario in 2009. She is currently completing her Honours thesis in her 4<sup>th</sup> year in Biology at Acadia. She has a wide range of interests within the field of biology and has used her time at Acadia to expand her knowledge and explore many different subjects. She received the award for Best Undergraduate Poster in Medicinal or Biological Chemistry at the 2012 Science Atlantic Chemistry Conference, as well as an Honours Summer Research Award from Acadia University, which funded her Honours research. She intends to pursue her Master's Degree in Evolutionary Ecology at the University of Ottawa following her graduation from Acadia in May, 2013. Julie has a passion for horses and the outdoors, so when she is not doing schoolwork or research, she is often found in a barn, and has been an active member of the Acadia Equestrian Team throughout her Undergraduate career.

