

Friday, March 20th, 2020

9:00 AM

Defense held online via Zoom

Claire K. Holley

PhD Dissertation Defense

Dr. Sheereen Majd, Faculty Advisor



“Fabrication and Optimization of Dp44mT-loaded Polymeric Nanoparticles for Treatment of Malignant Cancers”

Abstract

Cancer is the second leading cause of mortality worldwide, resulting in over eight million deaths per year. In the fight against cancer, traditional chemotherapeutics are not very effective due to poor delivery, toxicity to healthy tissues, and ever increasing cancer resistance. Since neoplastic cells require increased levels of iron (Fe) to proliferate, a promising strategy for cancer treatment is Fe deprivation using metal chelators. One such chelator, Di-2-pyridylketone-4,4-dimethyl-3-thiosemicarbazone (Dp44mT), has been shown to be extremely toxic towards many types of cancer in its free form (IC_{50} of 4-500 nM), due to its ability to chelate both Fe and copper (Cu), produce reactive oxygen species (ROS) through redox cycling, and overcome multi-drug resistance in malignant cells. Therefore, Dp44mT presents a promising candidate for the treatment of highly aggressive malignant tumors. However, due to the hydrophobicity and toxicity of this compound, encapsulating Dp44mT into a nano-carrier will enhance its therapeutic effectiveness, while also preventing premature drug degradation, improving biodistribution and drug release to the tumor, and mitigating negative side effects to healthy tissues. The objective of this project was the development of a new anti-cancer nano-formulation based on Dp44mT and the *in vitro* evaluation of this formulation against malignant cancers.

Zoom link: <https://zoom.us/j/884233814>