

Journey to Biochemical & Toxicological Research: Dr. Kim's Lab

Life! It is constantly bombarded with biological events which may be harmful or essential for our body. In an effort to better understand these events and hopefully improve the quality of our life, our lab focuses on investigating the roles of biologically active small molecules in bio-systems containing proteins, nucleic acids, and cells. Two projects are available: The student may work on one or both projects.

Project 1: Biological role of PAH quinones

A group of small molecules called polycyclic aromatic hydrocarbons (PAHs) can be found everywhere from grilled meats to cosmetics, medicine, *etc.* A bad news is PAHs and their metabolites such as PAH quinones are harmful to us [1]. For this project, PAH quinones are the center of interest since they are known to be involved in causing toxic abnormal cell/tissue behavior, therefore leading to cancer. As to how PAH quinones exhibit their activities, it is not clearly understood and that's why somebody has to investigate their behavior. Previously, our lab found out that substituted benzoquinones can induce protein modifications in a complex manner. One of the next goals is to examine if naphthoquinones also can modify proteins.

Project 2: Biological activities of metal complexes.

Heard of Cisplatin (*cis*-PtCl₂(NH₃)₂)? It is a metal-based anticancer drug treating various types of cancers [2]. Downside of this drug is its toxicity as well as resistance. Therefore, it is urgent to develop a new series of anticancer drugs. Dr. Grant's group synthesized a set of compounds and our group evaluates the biological activities of these compounds utilizing fundamentally important biotechnologies.

Summary: Students will learn various analytical techniques such as SDS-PAGE, fluorescence spectroscopy, and UV-VIS spectroscopy in order to conduct the proposed research activities. To find out more, please contact Dr. Kim or her students (Chris Cho, Ashley Cardenal)!

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- [1]. J. L. Bolton, M. A. Trush, T. M. Penning, G. Dryhurst, T. J. Monks, Role of quinones in toxicology, *Chem. Res. Toxicol.* **13** (3), (2000), 135-160
[2]. Rosenberg, B.; Vancamp, L.;Trosko, J.E.; Mansour, V.H. Platinum Compounds: a New Class of Potent Antitumour Agents, *Nature* **222** (5191), (1969), 385–386