

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.

Project: 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, or even from poison ivy. 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. Previously, our lab found out that substituted benzoquinones can induce protein modifications in a complex manner [2-4]. In order to examine if PAH quinones can modify proteins, the student will utilize various biotechnologies such as electrophoresis, UV-Vis, and fluorescence spectroscopy. For more information, check out the published papers of my former research students (posted outside my office).

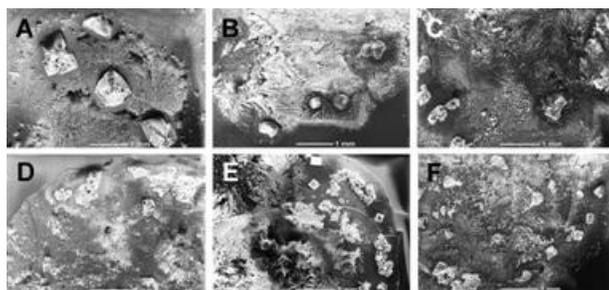
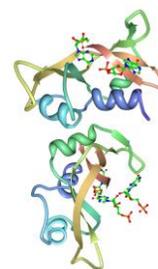


Figure Left. Microscopic images of modified RNase in the presence of *p*-benzoquinone and salts.

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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]. J. Kim, A. R. Vaughn, C. Cho, T. V. Albu, E. A. Carver, Modifications of ribonuclease A induced by *p*-benzoquinone, *Bioorganic Chemistry*, 40, (2012), 92.
 - [3]. J. Kim, "Biological implications of benzoquinones" (Book Chapter) in the book "Quinone: Occurrence, Medicinal Uses and Physiological Importance", Nova Science Publishers, Inc., 2013, ISBN 978-1-62618-323-0.
 - [4]. A. R. Vaughn; C. B. Redman; S. M. Kang; J. Kim, "Biological implications of 2-chlorocyclohexa-2,5-diene-1,4-dione toward ribonuclease A", *Advances in Biocscience and Biotechnology*, 4, (2013), 22-28.