

1135-VT-1012 **Steven B Kim*** (stkim@csumb.edu), 907 Walnut Street B, Pacific Grove, CA 93950. *An Alternative Parameterization for Hormesis Problem in Toxicology*. Preliminary report.

In toxicology, hormesis refers to a phenomenon where exposure to low doses of a harmful agent may result in a beneficial effect. For example, if an outcome of interest is tumor development in an animal-based experiment, hormesis theory assumes that a small dose of carcinogen may reduce the risk of tumor development. Even if hormesis exists, researchers can fail to provide significant evidence for hormesis due to a small number of experimental doses and sparse data. In this talk, we compare hypothesis testing under three- and four-parameter logistic regression models using a simulation design similar to a typical experimental design. In the simulation, we observe high statistical power under correct specification, but the power is extremely low even under slight misspecification. To address the impact of misspecification, we discuss an alternative parameterization to improve the robustness. The alternative parameterization allows discontinuity in the dose-response relationship between the zero dose (i.e., control group) and the first non-zero dose (lowest experimental group), and we can still address the scientific question (testing hormesis). At the end of the talk, we discuss the use of the alternative parameterization for future direction. (Received September 18, 2017)