A Framework for Modeling Biological Data

Chao Chen*, U.S. Environmental Protection Agency
Leonid Kopylev, U.S. Environmental Protection Agency

Abstract

In the past two decades, efforts have been made to develop biologically motivated dose-response models (BMDR) that incorporate available biological information, despite the fact that such models have rarely been used for regulatory purposes due to lack of complete understanding about biological mechanism involved. The ability to construct a BMDR model, however, is desirable because the model provides a tool for evaluating risks and/or biological implications under "what if" conditions. Furthermore, the emerging Omics technology may help making BMDR models more useful in the future. We propose a conceptually unified modeling procedure (framework) that is capable of linking observed response quantities on different level of details along the continuum from exposure to chemical and biological reactions all the way to disease endpoints. Examples are given to illustrate how the framework can be applied to real or simulated data.

Disclaimer: This abstract does not necessarily reflect the views or policies of U.S. EPA.

Keywords: Modeling procedure; Biological data; Risk estimation; Biological implication.

* Presenting author