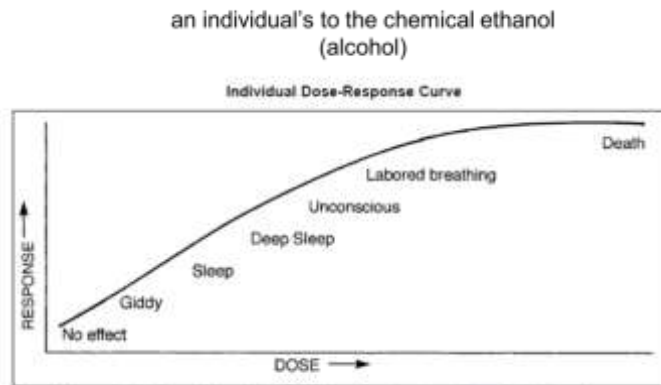


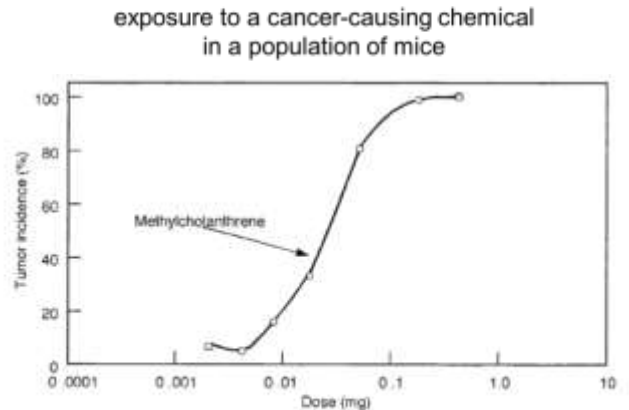
AIM: How do scientists determine toxicity?

1. Case reports (physicians, autopsies) → not totally reliable because can be incomplete histories
2. Controlled lab experiments to test effects of a chemical
(including the tracking of metabolites ← substances formed when processed by liver that can be toxic themselves)

DOSE-RESPONSE MODELS



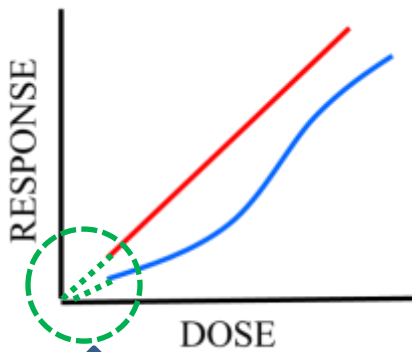
From: Marczewski, A.E., and Kamran, M. Toxicology for the citizen (Figure 6). Institute for Environmental Toxicology, Michigan State University, reprinted with permission.



Adapted from: Eaton, D.L., and Klaassen, C.D. 1996. Principles of toxicology. In Casarett & Doull's toxicology: The basic science of poisons (5th ed.). New York: McGraw-Hill.

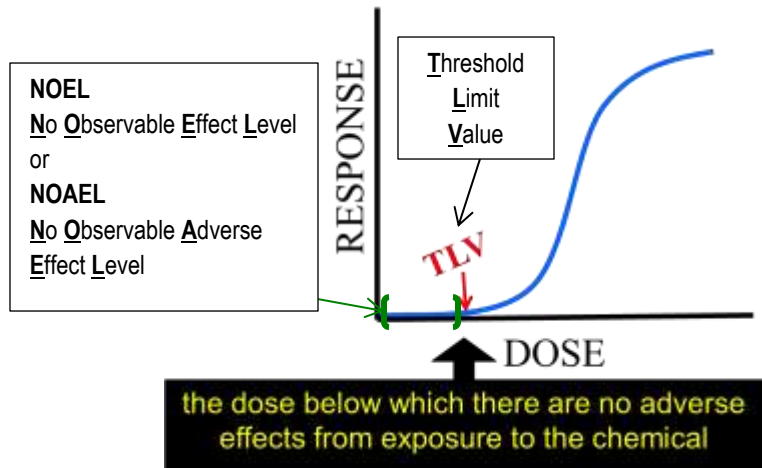
TYPES OF DOSE-RESPONSE MODELS

a. linear / non-linear (no threshold)

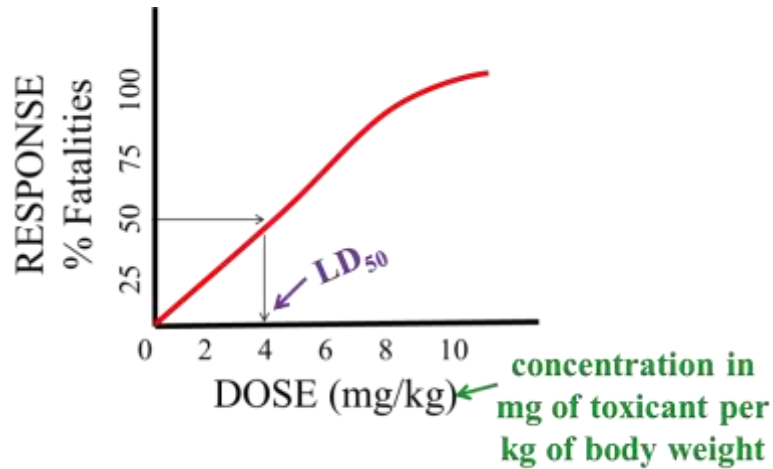


many studies do not test very low concentrations; in these cases, scientists extrapolate assuming a linear model

b. threshold

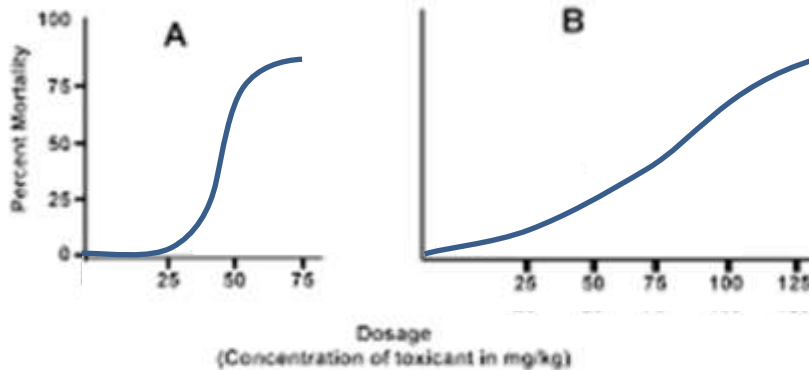


Using the Dose-Response Curve to Determining LD₅₀ of a Toxicant



Dose-Response and Potency

highly potent chemical evokes a given response at low concentrations



a chemical of lower potency evokes the same response only at higher concentrations

3. **Epidemiology** - the study of the distribution and determinants of health-related events
- human population studies
 - experimental group v. control group
- } source tracking

****Because the study of toxicity by any of the 3 aforementioned methods always has limitations,**

exposure standards are set at levels 100-1000 times lower than the estimated harmful level**