

Description of data sets for statistical support contract proposals
Data are available at <http://www.niehs.nih.gov/research/atniehs/labs/bb/contract.cfm>

For each data set, clearly and in detail, describe the data analytic methods that you use. Then present the results of your analyses.

Data set 1: Six B6C3F1 mice were exposed to cobalt metal dust and lung tumor tissue was collected; six B6C3F1 mice were not exposed to cobalt metal dust and lung tumor tissue was collected; six B6C3F1 mice were not exposed to cobalt metal dust and normal lung tissue was collected (see table below). Gene expression from the sampled tissue was measured on Affymetrix Mouse 430v2 arrays. The data consists of separate .CEL files for each mouse. Which genes/pathways are specific to cobalt-induced pulmonary carcinogenesis?

Group	Animal ID numbers
Cobalt-exposed, Tumor tissue	8666, 8667, 8668, 8669, 8670, 8671
Control, Tumor tissue	8672, 8673, 8674, 8675, 8676, 8677
Control, Normal tissue	8678, 8679, 8680, 8681, 8682, 8683

Data set 2: Groups of pregnant female Swiss CD mice were exposed to 0, 50, 100, 200 or 300 mg/kg AZT and their pups were followed for up to 2 years. Body weights were measured on each animal periodically throughout the study. At death or sacrifice, animals were necropsied and the occurrence of tumors in various tissues was recorded. Taking possible litter effects into account, compare body weights each dose level to the controls and compare tumor incidences between each dose level to the controls. Also test for dose-related trends in body weights and in tumor incidences.

Notes about the data

Sex: M = Male; F = Female

Tumor sites and types: 0 = No tumor; 1 = Tumor present; 9 = Tissue absent

Removal reason: TSAC = Terminal sacrifice; MSAC = Moribund sacrifice; NATD = Natural death

Data set 3: Compound X was administered in a single dose to rats either intravenously (iv, 1 mg/kg) or orally (0.3 mg/kg or 3 mg/kg), then groups of 3 to 5 rats were sacrificed at various times up to 36 hours and the concentration of Compound X in the blood was determined. Compound X was also administered orally in a single dose to rats at 0.3, 2, 3, or 10 mg/kg and concentrations of the compound were measured in blood, brain, liver and fat in groups of 3 to 10 rats sacrificed at various times up to 504 hours. Estimate the bioavailability of the compound by iv and orally, along with any other relevant toxicokinetics parameters. Also fit a physiologic-based pharmacokinetic (PBPK) model of the absorption, distribution, metabolism and excretion of Compound X and provide estimates of relevant PBPK parameters and plots of the model fit.