

Applied Statistics in Toxicology and Pharmacology

Edited by

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About the Book

Successful research in toxicology and pharmacology requires the ability to navigate the waters of statistical reasoning. This book can serve as an excellent field guide to applied toxicology and pharmacology investigators. It is an easy-to-read compilation of topics in applied statistics that might be considered a FAQ or perhaps more properly, a compilation of answers to questions that should be frequently asked, but often are not. Applied toxicologists and pharmacologists as well as researchers in similar disciplines will find this book useful.

Contents

- The standard deviation and standard error
- How to deal with outlier
- Normal value
- The Box-and-Whisker plot
- The null hypothesis
- Why is the significant level 5%?
- Which should be used: 'less than 5%' or '5% or less' for p value?
- The t -test
- Which should be used: A two-sided (2a) or one-side (a) test?
- The type I error (error of the first kind)
- Dunnett's multiple comparison test can be used to compare two groups
- The differences in power between the t -test and Dunnett's test
- The multiple comparison (range) test
- Scheffe's multiple comparison test has a very low power
- A significant difference is observed by Dunnett's multiple comparison test even when a significant difference is not observed by analysis of variance
- The rate of detection of a significance different in a low dose group by Dunnett's multiple comparison test

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- The power varies with the number of groups in the multiple comparison test
- The trend test
- The tests for homogeneity of variance
- Is Bartlett's test necessary?
- The rank sum tests (generally called nonparametric test)
- The relationship between number of samples in a group and power of rank sum test
- An example of a rank sum test
- The Dunnett-type rank sum test has a low power
- The chi-squared test and Fisher's probability test
- The risk assessment of carcinogen
- Comparison of very low pathological incidence with historical data
- A case in which a high dose group showed a large variance
- A case in which there were few animals in the high dose group
- A case in which no significance difference was obtained even with a very high value against the control group
- Appropriate expression of the results in which a significant difference was observed by the non-parametric test
- Statistical analysis of pathological findings shown by grade score
- Comparison of spontaneous malignant tumors in human, rats, mice and dogs
- The test of fitness by the chi square test (comparison of occurrence and theoretic values)
- Comparative studies on effects of administration by feeding and gavage, on survival rate, accidental death rate and final body weight, surveyed in carcinogenicity studies of National Toxicology Program, U.S.A.
- Statistical methods used in the National Toxicology Program, U.S.A.
- The Peto-test
- A correlation
- Transformation of quantitative data to homogenize variance
- Selection of a statistical method for quantitative data
- The decision tree
- How to evaluate the results of a statistical analysis
- Acute toxicity and medium effective dose

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