

Biostatistics in experimental Pharmacology

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Introduction

- Biostatistics has an important role in both designing a pharmaceutical experiment and evaluating its result. Randomization techniques are essentially important in designing an experiment.
- The goal of randomization is transforming systematic errors into random errors and confirming comparability among experimental groups. Randomization also provides a rationale for applying statistical tests.
- Combining randomization techniques with blinding and local control enables us to construct a scientifically reliable and effective experiment. An appropriate statistical analysis absolutely depends on the method of randomization. In order for a pharmacological study to be successful, it is very important to consider statistical aspects in the designing stage.

- **Analysis of Variance (ANOVA Test)**
- It refers to the examination of differences among the samples, is very useful technique in research in Biology.
- Using this method, multiple groups can be compared at one time: assuming that each sample is taken randomly from the normal population, and they have same variance as that of population [A comprehensive view on Statistical methods in Experimental].

- **The Tukey Test** (or Tukey procedure), also called Tukey's Honest Significant Difference test, is a post-hoc test based on the studentized range distribution. An ANOVA test can tell you if your results are significant overall, but it won't tell you exactly where those differences lie. After you have run an ANOVA and found significant results, then you can run Tukey's HSD to find out which specific groups's means (compared with each other) are different. The test compares all possible pairs of means.

- here are **two types of chi-square tests**. Both use the chi-square statistic and distribution for different purposes:
- A **chi-square goodness of fit test** determines if a sample data matches a population. For more details on this type, see: *Goodness of Fit Test*.
- A **chi-square test for independence** compares two variables in a contingency table to see if they are related. In a more general sense, it tests to see whether distributions of categorical variables differ from each another.
 - A **very small chi square test statistic** means that your observed data fits your expected data extremely well. In other words, there is a relationship.
 - A **very large chi square test statistic** means that the data does not fit very well. In other words, there isn't a relationship.