

# SciAnews

*Interaction between biologically active agents is of great importance in normal/abnormal physiology, toxicology, the control of environmental pollution and in therapeutics.*

*Combinations of drugs are often used to achieve better efficacy and/or reduce toxicity in the treatment of disorders that range from malignancies and severe cardiovascular disease to infections, asthma, diabetes and arthritis.*

*An adequate rationale for treatment with drug combinations is often missing and a trial and error method of screening/evaluating drug combinations is therefore a necessary and potentially rewarding avenue of research. The following paper will introduce our readers to the most frequently used methods in the analysis of drug interaction.*

## **Different Approaches for Analysis of Drug Combination Effects:**

Comparisons Based on the Analysis of a Real Data Set

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### **Introduction**

Drugs are often administered in combinations for the treatment of various cancers, infections, and other diseases. Such drug combinations are expected to provide various therapeutic advantages over single drugs due to drug interactions, such as increased therapeutic efficacy and/or decreased toxicity toward the host or toward non-target tissues. An understanding of drug interaction can therefore be very helpful in the design of a successful clinical treatment strategy. The combination effects of active drugs are generally described as being additivity, synergism, or antagonism. Additivity (zero interaction) is the case when the observed effect of a drug combination is of the expected magnitude based on the dose-response data of each single drug component. When the observed effect is greater or less than the expected effect of additivity, the combination effect is described as synergism or antagonism, respectively. However, there exists wide spread disagreement in the definition as well as the methods for determining the expected effect of additivity. Widely used methods for analysis of drug combination effects include *the isobole method* (Berenbaum 1985), *the fraction product method* (Webb 1963), *the combination index method* (Chou and Talalay 1984), and *the universal response surface approach* (Greco, Park, and Rustum 1990). In this paper, we will discuss these methods for a general case B analysis of combination effects of drug  $x$  and drug  $y$  and compare them in the analysis of a real data set.