Toxicology: Open Access

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# The Science of Toxicology: Modern Studies of Poisonous Substances

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## Introduction

The science of poison is known as toxicology. Animals, bacteria, plants, and chemicals are all sources of poison. Although, in the 1520s, Paracelsus, a lecturer at the University of Basel in Switzerland, proposed that an agent's potential to produce poisoning is reliant on the dose of that substance. The median lethal dosage (LD50) was established in 1920 on this premise. The LD50 is the dose that has been shown to kill 50% of the test animals. It is one of the first screening studies used with carcinogenic, anticarcinogenic, venomous, antivenomous, toxicogenic, anti-toxicogenic, immunogenic, and anti-immunogenic substances. Any substance that counteracts a poison by (a) chemically eliminating the poison, (b) physically inhibiting absorption, or (c) physiologically opposing the poison's effects in the body after absorption is referred to as an antidote. The results of median lethal estimation serve as the foundation for classification and labelling; they provide preliminary information on the mode of toxic substance action; they aid in determining a new compound's dose; and they aid in determining LD50 values, which may indicate potential drug activity types. The arithmetical method of Karber, Lorke method, arithmetical method of Reed and Muench, graphical method of Miller and Tainter, graphical method of Litchfield and Wilcoxon, revised up-and-down procedure, a modified arithmetical method of Reed and Muench, graphical method of Miller and Tainter, graphical method of Miller and Tainter, graphical method of Litchfield and Wilcoxon, revised up-and-down procedure. The total of cumulative dead and cumulative survived of each dose is used in the Reed and Muench approach. The LD50 is determined by calculating the percent survival at two doses close to the LD50. In a different study, the LD50 was determined using data on percent death rather than % survival. Saganuwan improved and validated the Reed and Muench approach by averaging the median fatal dosage (LD50) and median survival dose (MSD50), which resulted in a relatively optimal LD50. Other authors have confirmed the method's precision and accuracy. In acute toxicological tests for cyclophosphamide, cisplatin, vincristine, carmustin, campothecin, aloin, mitomycin-C, actinomycin–D, melphalan, paclitaxel, Kue. employed quick chick embryo chorioallantoic membrane (CAM) as an alternative prediction model. The scientists calculated the LD50 of all anticancer drugs using the Reed and Muench method, which was modified by Saganuwan, and found a high correlation between the ideal LD50 for the CAM and the LD50 for mice. The improved Reed and Muench technique utilises the CAM model as a replacement for toxicological research in rats, demonstrating its adaptability. The sodium silicate complex (SSC), which consists of trimeric sodium silicate (Na2SiO3)3 and sodium silicate pentahydrate (Na2SiO3)5H2O, is patented by the World Health Organization (WHO). Using two enzymatic assays, gelatinase and hide powder azure assays, SSC has antivenomous action against Crotalus atrox, Agkistrodon contortrix contortrix, and Agkistrodon piscivorus leucostoma venoms at pH 14. After 48 hours, the LD50 of SSC in mice was calculated. The LD50 was calculated using a tool on the NNTRC website (ntrc.tamuk.edu/LD50calculator.xls), which was based on Saganuwan's method. Using Sanchez approach's the anti-lethal dose assay was used to evaluate the effective dose of LIPH that neutralised LD50s of snake venoms. Using a modified Reed and Muench approach, a Bacteriovorax sp. isolate was found as promising bacteria against snake head fish pathogenic Aeromonas veronii. Aeromonasis, caused by Aeromonas veronii, is a huge problem in world aquaculture, affecting the quality of fish like Ictadarus punctatus, Colisa lalia, Misgrunus anquithcaudatus, Acipenser baelii, Astronotus ocellatus, and Lewcassi longinostris, resulting in significant losses and marketing. Using a technology pioneered by Saganuwan, Kothari et al. showed that a bivalent conjugate vaccine including PspA families 1 and 2 has the ability to protect against a wide range of Streptococcus pneumonia strains and Salmonella typhimunum. Since the method of Reed and Muench, as modified by Saganuwan, was used to determine the toxicity level of snake venom and anti-venom, anticancer drugs, the Aeromonas veronii pathogen, and a bivalent conjugate vaccine against Streptococcus pneumoniae strains and Salmonella typhimunum, there is every reason to believe that toxicology could be the foundation for the development of antidotes against cancers, snake venoms.

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