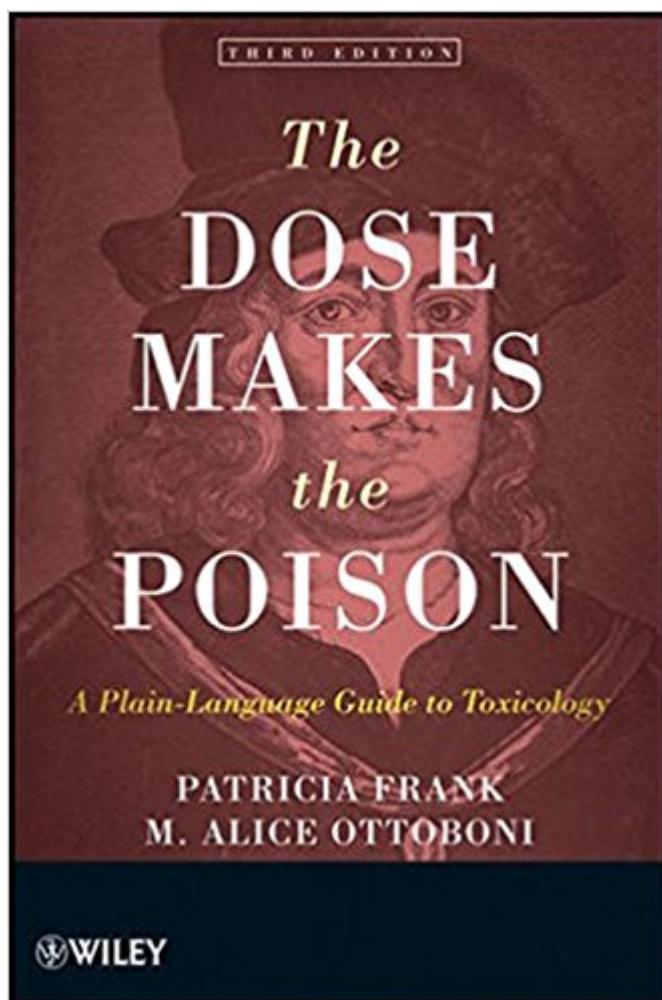


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# The Dose Makes The Poison: A Plain-Language Guide To Toxicology, 3rd Edition



## **Synopsis**

This new edition of a widely-read and highly-acclaimed book broadens the scope of its predecessors from a heavy focus on industrial chemicals as toxicants to include drugs, food additives, cosmetics and other types of compounds that people are exposed to daily. Also new to the 3rd edition are newer issues-of-the-day such as nanoparticulate toxicants, second hand smoke, food contamination, lead in toys, and others. As such, the book provides the basics of toxicology in easy-to-understand language as well as a fuller understanding of the daily insults to which our bodies are subjected.

## **Book Information**

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## **Customer Reviews**

"This is a refreshing, invigorating as well as eye-opening text, which is reading like an exciting novel - even to a seasoned toxicologist ... An appendix to clarify quantities of pollutants plus an index concludes this most valuable introduction into the science of toxicology for a broad readership." (Toxicology, 2011) "I recommend this book to anyone who has ever listened to the evening news and wondered how much of the "chemical scare du jour" is hype and how much of it is fact - and to those who might want to understand basic concepts in toxicology and the related areas of study without having to trudge through a gaggle of 1000-page textbooks." (International Journal of Toxicology, 2011) "Overall, this is a well-written work with wisely chosen and relevant topics. It will be a perfect addition to any science enthusiast's library. Summing Up: Highly recommended. Lower-level undergraduates through professionals/practitioners; general readers." (Choice, 1

September 2011) "The Dose Makes the Poison is more than just an introduction to toxicology. It is an enjoyable read with lots of interesting stories and one I can thoroughly recommend." (Chemistry & Industry, 25 July 2011) "There is much to be applauded in this book from its straightforward layout and honesty to its accessibility . . . Many good, and contemporary, examples are provided to deliver greater context for the reader." (The British Toxicology Society Journal, 1 May 2011)Â

An introductory guide to the history, concepts, and practice of toxicology With the advent of serious industrialization in non-Western economies such as China and India, the integrity of our food supply is once again in question and the safety of various consumer products and medicines at risk. Every day, people are exposed to a wide array of chemicals and other potential toxicantsâ "from industrial emissions, the natural environment, drugs, and consumer products. Using broadly accessible language and clear examples, the Third Edition of The Dose Makes the Poison updates its highly acclaimed predecessors and explains the basics and practice of toxicology in easy-to-understand language. This new edition broadens its scope from a heavy focus on industrial chemicals as toxicants to include drugs, food additives, cosmetics, and other types of compounds that people are exposed to daily. Also new to the Third Edition are recent issues-of-the-day such as bisphenol A, secondhand smoke, food contamination, lead in toys, melamine toxicity to children and pets, and drug recalls. Basic principles of how doses and routes of administration alter toxicity, testing paradigms for drugs and chemicals, and newer technology such as nanoparticles are all addressed and explained. In addition, the book: Presents case studies of historical and current interest to illustrate various aspects of toxicology Deals with all types of chemicals that we confront every day, including drugs, food additives, vitamins, and others Includes an introduction to how chemicals cause harm, the factors that influence toxicity, and the ways that chemicals and drugs are tested to determine their safety

Chapter 1 reviews basic chemistry principles, differentiates between natural and synthetic chemicals and discusses the perception of chemicals as Ã¢ÂœgoodÃ¢Â• and Ã¢ÂœbadÃ¢Â•. Natural chemicals are chemicals produced by living and nonliving things in nature (e.g. organisms, rocks, minerals, etc.). Synthetic chemicals are made by humans in a laboratory. Unfortunately, most people perceive natural chemicals as Ã¢ÂœgoodÃ¢Â• and synthetic chemicals as Ã¢ÂœbadÃ¢Â•. This is a false perception as living organisms and humans can both produce toxic chemicals that can cause harm (some natural chemicals can be highly toxic). In chapter 2, the authors discuss the harmful properties of chemicals by the following categories: explosiveness and

reactivity, flammability and combustibility, radioactivity, corrosiveness, irritation, sensitization and photosensitization, toxicity, and hazardousness. There is also a brief discussion of the difference between a toxin and a poison. Some chemicals fit into one of these categories, but some may be classified in several of the categories. It is important to know how to categorize a chemical in order to safely handle and use that chemical. Toxicology is the main topic in chapter 3 of this book. The chapter begins with a brief discussion of the differences between empirical toxicology and the science of toxicology. This discussion is followed by an historical account of the science of toxicology, which was born out of pharmacology and evolved into modern toxicology. Today, the science of toxicology is surrounded by laws and policies to govern the handling, storage, and use of chemicals. The authors end this chapter with a brief discussion of organic vs. nonorganic food and some examples of what a toxicologist's job would be in different industries. Chapter 4 is a discussion of the factors influencing the toxic effects of chemicals. The authors begin with a detailed definition of acute vs. chronic toxicity (which is continued in chapter 5) and then proceed to discuss how dosing and the way chemicals are processed in the body affects toxicity. They give several examples of how we consume many lethal doses of chemicals (such as coffee, water, and salt) over a lifetime, but they are not lethal because they are gradual exposures;  $\infty$  divided doses. After discussing dosing of chemicals, they review routes of exposure—dermal, inhalation, oral and other, less used routes. Finally, they explain influences on toxicity, such as route of exposure, metabolism, excretion, species distinctions, gender, age, overall health, genetic predisposition, synergism and antagonism with other chemicals, tolerance over time, and physiological responses to light. The 5th chapter is an overview of the study of chemical toxicity. New chemicals that are used commercially and chemicals that are suspected of causing health problems are prioritized for toxicity testing. The authors continue their differentiation between acute and chronic toxicity from chapter 4 and define the LD50 test parameters. They next describe testing for irritants and corrosives, sensitization and photosensitization, mutagenesis, carcinogenesis, and developmental and reproductive toxicity. These descriptions are followed by sections on trace units such as ppm (parts per million), ppb (parts per billion), and ppt (parts per trillion) and analytical methods. The authors close the chapter with a brief explanation of the use of animals in laboratory testing and the issues involved therein. Chapter 6 continues the discussion of toxicology started in chapter 5 by comparing LD50 and LC50 and then explaining the significance of these numbers. Following this explanation, there is a summary of poison prevention and the lack of antidotes for most poisons. Chronic toxicity is revisited, this time along with a discussion of thresholds, margins of safety, sufficient challenge (reverse effect), and bioaccumulation. Mutagenesis and carcinogenesis

are the focus of chapter 7. The chapter begins with a review of basic genetics and mutations, and then launches into a description of mutagenesis and its role in cancer. Radiation-induced mutagenesis is discussed at length and the authors describe how the behavior of radiation is used as a model for chemical mutagens. They also discuss the differences between radiation and chemical mutagens and the question of whether our understanding of chemical mutagens should or should not be based on our understanding of how radiation behaves. Next, they describe carcinogenesis and define different forms and causes of cancer, followed by a discussion of carcinogen categories, the long induction times for cancer, and whether or not thresholds exist for chemical carcinogens. They wrap up the chapter by reminding the reader that people synthesized and worked with the chemicals we currently use long before they became available for public consumption and therefore, are most likely not carcinogens if not labelled as such. Chapter 8 focuses on the toxic effects of chemicals on reproduction and development. The chapter begins with a brief review of the male and female reproductive systems and finishes with a discussion of the impact of teratogens (agents that cause an abnormality in a developing organism), mutagens (agents that cause changes in the genetic code of a cell), and other things which can cause abnormalities in or harm to a developing embryo/fetus (e.g. exposure to lead, internal environment, hormonal imbalances, disease states, and radiation). The authors also mention that very little research has been done on the effects of environmental chemicals on the human reproductive system during the timeframes of conception to birth and birth to puberty. In chapter 9, the authors look at several specific examples of chemical pollutants. They begin with disasters in Seveso, Italy (dioxins), Kyushu, Japan (Yusho Disease; PCBs and dibenzofurans), Bhopal, India (methyl isocyanate), and Minamata City, Japan (methyl mercury), followed by a brief history of DDT and the environmental crisis brought to light by Rachel Carson. Next, they focus on several chemicals used in consumer products: metals such as lead, cadmium, and zinc, and plastic additives such as phthalates and Bisphenyl A. The chapter closes with discussions of indoor air pollution caused by chemicals in furnishings, clothing, structural materials, etc., global water pollution, and three pharmaceuticals (Fen-Phen, Vioxx, and Thalidomide) that were recalled because the Therapeutic Index dropped as they were used by more people for a longer timeframe. Epidemiology is the topic of chapter 10. Patricia Frank and M. Alice Ottoboni spend about half of the chapter discussing epidemiology and defining Koch's Postulates as they might apply to chemical agents as opposed to living organisms. The remainder of the chapter focuses on the importance of being informed about chemical agents and their toxicity so people can make decisions based on facts, not fear. The chapter closes by offering reasons for contradictory information in the media about

chemicals and the risks they pose. Chapter 11 is all about risk: inherent risk (unchangeable unless the conditions producing the risk are changed), risk assessment (how to estimate the chance that a negative effect will occur), perceived risk (specific to the individual and his/her experiences and outlook; public perception of risk influences governmental decisions), acceptable risk (societal vs. personal views of whether or not a risk is worth it), risk benefit vs. cost benefit (the benefits of some action vs. the costs of the action), risk communication (how risks are communicated to the public), and risk management (controlling risk by removing or changing the conditions). At the end of chapter 11, the authors conclude the book in one paragraph. A conclusion that, I felt, should have been longer and more final. I finished the book wanting more closure than the authors provided. Overall, I found this book to be an enlightening read. I felt like the authors presented the material concisely and objectively. Their use of specific examples and case studies to illustrate the diverse topics was especially helpful to my understanding of some of the more complex topics (such as dioxins, PCBs, and dibenzofurans in chapter 9). In addition, I appreciated the factual nature of the book—“I realized that my understanding of the risks posed by many chemicals discussed in the book have been strongly influenced by the media and not necessarily the facts. I found myself being reassured by the information presented in this book, and would highly recommend it. Some extras included in the book are a detailed table of contents that lists the subtopics in each chapter, a listing of abbreviations used in the book, a moderate glossary, an explanation of how to calculate the number of molecules in a quantity of chemical, and an extensive index.

I was surprised how much I liked this book. It was written well and clearly, but also managed to give what I think was a very good introduction to toxicology. I came away with a lot of new information, and it was set up in the book in such a way that I didn't actively feel like I was learning or working for it. I can feel your skepticism from here: "the book is about toxicology?" It is. In this book you will learn how a substance is determined to be safe, and all the ways an unsafe substance can be unsafe. You will learn how it is determined that a substance that causes cancer 10 years after exposure was identified as the cause. You will learn why it is actively dangerous to only test new drugs on only one or two animal species. You will learn about nuclear fallout and how the government of Japan covered up not one but 2 instances of mass mercury poisoning. You will learn WHY X-rays cause cancer. You will learn that a large deal of your radiation exposure comes from the ground, and the walls of buildings, and you will learn why this isn't such a big deal. The book never speaks down to you, but it still will teach you an awful lot more than you might think coming in. It may not be a page turner (you may want to skip Ch5), but important information rarely is.

A good book to start off the study of toxicology. Easy read and easy to understand.

Required reading for class. As described.

Great fundamentals book.

the book came in handy. the story were good. the title was great. i showed to my friends to see what they think.

I am going to find this a very useful book. Having watched for many years how health advice gets promulgated and then gets turned upside down, it is refreshing to see something that is very knowledgeable and yet backed by real information. This is not the kind of book that you sit down and read within a few days. It is the kind of book that you will browse and then be using for reference for years to come.

I bought this because I wanted an introduction to toxicology. I should have looked at the authors' credentials more closely before I gave money to these people. One author works for "a consulting firm . . . that assists companies in the registration of human and veterinary pharmaceutical agents." In other words, big pharma. The other works for the California Dept of Public Health, in other words a captured regulatory agency. The whole book is just a great example of industry propaganda, systematically underplaying the risks of toxics. A very bad book.

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