

## BOOK REVIEW

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### Review of: *Medical Toxicology of Natural Substances: Foods, Fungi, Medicinal Herbs, Plants, and Venomous Animals*

**REFERENCE: Barceloux DG. Medical toxicology of natural substances: foods, fungi, medicinal herbs, plants, and venomous animals. Hoboken, NJ: John Wiley & Sons, Inc., 2008, 1157 pp.**

Barceloux and Ellenhorn published the first edition of *Medical Toxicology: Diagnosis and Treatment of Human Poisoning* in 1988. This text and later editions were well-respected textbooks for medical and graduate students, and a first line reference for toxicologists around the world. Barceloux now embarks on expanding this work to four volumes, this being the first of the series, with future treatises on drugs of abuse and psychoactive plants, occupational and environmental exposures, and pharmaceutical overdoses. This expanded effort provides interdisciplinary, in-depth, evidence-based coverage of the most important natural toxins, with a standardized format providing rapid access to required information. The history, identifying characteristics and botanical descriptions, exposure, principal toxins, dose response, toxicokinetics, clinical response, diagnostic testing, and treatment of each toxin are provided. The target audience was specifically expanded from medical toxicologists to include analytical laboratories, universities, regulatory agencies, and medical examiners' offices. Besides providing interesting reading on historical outbreaks of poisoning, the text is full of pictures, structures, and helpful guidance on differentiating poisonous exposures with specific symptoms and signs, differences in diagnostic tests, and results of treatment. Of the 185 chapters, only 14 are attributed to another author, Cyrus Rangan, M.D., FAAP, suggesting that Dr. Barceloux, M.D., FAACT, FACMT, FACEP was the primary author of the rest—an overwhelming amount of work. However, a distinguished review panel of 11 specialists suggests that the work was thoroughly evaluated. In the middle of the book, there are 14 pages of color photographs of toxic plants and animals that are supplemented by black and white figures and photographs within specific toxin sections. Each chapter is extensively referenced. For example, the terrestrial snake chapter of venomous animals contained 374 references, including many older articles of historical significance, but updated with many new reports since 2000. As much of the text was previously published in a more abbreviated form in the original *Medical Toxicology: Diagnosis and Treatment of Human Poisoning*, it was gratifying to see that each chapter had been updated with new data.

This comprehensive reference is divided into five parts, food-borne and microbial toxins, fungal toxins, medicinal herbs and essential oils, toxic plants, and venomous animals. Each of these

categories contains as many as 50 chapters devoted to each type of toxin. Thus, coverage is extensive. The index also is helpful, allowing the reader to search by botanical name, common name, and symptom (i.e., gastrointestinal, dysrhythmias, etc.). Each chapter contains a wealth of information and provides interesting reading. For instance, the chapter on amatoxin-containing mushrooms begins with an explanation of mushroom structure and identification, disavowing “folk” methods of boiling a silver spoon with the mushrooms and observing whether the spoon fails to tarnish, and describing appropriate macroscopic and microscopic means of identification. This is followed by the history of amatoxin poisoning, mycological description, and estimates and description of toxic exposure. Although the historical data describe cases around the world and throughout history, the exposure section focuses on U.S. cases. This is followed by a description of the principal toxins, in this case the amatoxins, phallotoxins, and virotoxins. The mechanisms of action of these peptide toxins are provided, along with structures and amounts found in *Amanita Phalloides* mushrooms. Known data on dose–response relationships and toxicokinetics follow. The toxicokinetic data are key to managing a poisoning, with liberal references to case reports and biological tests. Within the clinical response section, the onset of symptoms, the gastroenteritis phase, latent period, and hepatorenal phase provide critical data on each stage of the poisoning. The author writes of the danger of misdiagnosis of gastroenteritis during the latent phase, with subsequent development of hepatorenal failure within 3–4 days of ingestion. Two helpful tables in the chapter differentiate mushroom poisoning with rapid (<6 h) and delayed (>6 h) onset. Analytical methods, biomarkers, and laboratory test abnormalities are discussed. The range of analytical methods includes the Wieland–Meixner Test for evaluating the presence of  $\alpha$ ,  $\beta$ , and  $\gamma$ -amanitin in fresh mushrooms that can be done in the field, albeit with less sensitivity, to multistage linear ion trap mass spectrometry. Vomitus, blood, and urine can be evaluated for presence of the toxin, with urine providing the widest window of poisoning detection. However, biomarker concentrations in urine may be low ( $\leq 6$  ng/mL) 12 h after a fatal amatoxin-containing mushroom ingestion. Treatment of amatoxin poisoning is described as generally supportive with aggressive correction of the acid-base, fluid, and electrolyte imbalances caused by the gastrointestinal phase. Later stages characterized by hepatorenal failure, hemorrhage, and coagulopathy may require fresh-frozen plasma, vitamin K, and packed red blood cell transfusions. Although amatoxin-poisoning deaths decreased substantially during the last 20 years with detoxification by plasmapheresis during the first 36 h, there are few pharmacokinetic data or controlled

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clinical trials to support the use of this intervention. No proven antidote exists for amatoxin poisoning, with good supportive care being the primary therapy. And finally, in this chapter, the options and prognosis for liver transplantation were discussed.

This text provides a comprehensive guide to the medical toxicology of natural substances and is considered an excellent reference for forensic scientists including pathologists, toxicologists, criminalists, and scene investigators.