

BOOK REVIEW

Cynthia L. Morris-Kukoski,¹ *BSP Pharm, PharmD, DABAT*

Review of: *Riot Control Agents*

REFERENCE: Olajos EJ, Stopford W, editors. *Riot control agents*. 1st ed. Boca Raton: CRC Press, 2004, 353 pp.

This reference book is written for use by clinical pharmacologists/toxicologists, occupational/public health professionals, as well as physicians and other medical health care providers. Due to the wide range of informational discussion topics, this book is also useful for forensic pharmacologists/toxicologists, chemists/biochemists, environmental scientists, safety officials, and regulatory personnel.

The book contains 18 chapters and 3 appendices, summarized into the following sections of riot control and crowd dispersal agents (RCAs): Chapter 1 introduction & history, Chapter 2 applications & use, Chapter 3 synthesis & chemical analysis, Chapter 4 biochemistry, biological interactions, and pharmacokinetics, Chapter 5 acute sensory irritation, Chapters 6 and 7 pharmacology & toxicology, Chapter 8 chronic toxicity, Chapter 9 reproductive & developmental toxicology, Chapter 10 genetic toxicology, Chapter 11 human exposures, Chapter 12 forensic aspects, Chapter 13 risk assessment, Chapter 14 occupational exposures, Chapter 15 risk management & public health, Chapter 16 environmental issues, Chapter 17 genomics, proteomics & computational toxicology, Chapter 18 issues & concerns, and emerging concepts/trends, APX A definitions & terminology, APX B decontamination & treatment, and APX C agent formulations.

The introduction (Chapter 1) reviews historical developments and applications of RCAs. It discusses the many classifications and types of RCAs, including those in use today. It lays the ground rules for current categorization of RCAs stressing that RCAs should only include those agents that are peripheral acting chemicals with short-term, reversible physiological effects. Chapter 2 provides the reader with a historical perspective of RCA applications and uses. A brief description of RCA agents with a general overview of chemical synthesis, chemical properties, and analytical detection are found in Chapter 3. Analysis sections frequently list weight amounts without volume (i.e., $\mu\text{g/mL}$) and references a "sensitive and selective method" for oleoresin capsicum without any validation parameters. Chapter 4 displays a great overview of RCA pharmaco-kinetics, mechanisms, and interactions.

Physiological effects of RCAs are presented in Chapters 5–11. Chapter 5 focuses on individual RCAs and effects on specific organ systems [eyes, lungs, & skin]. Chapters 6 and 7 reveals the pharmacology/toxicology of RCAs in animals with some correlation to human exposure and organ specific toxicity [eye, lung, skin,

immune system, & endocrine]. It also covers RCA formulations, and degradation products with a good review of acute/repeated dose toxicity from carrier solvents and propellants. A review of chronic or acute/persistent toxicity of RCAs in animals by agent and then organ system are evaluated in Chapter 8. This chapter contains some human data, although its introduction states otherwise. Chapter 9 addresses the need for further RCA reproduction/developmental toxicity research but does provide the reader with some limited animal data-reviewing agents themselves as well as carriers/solvents. Chapter 10 offers a good review of genetic tests themselves rather than specific RCAs. A review of (sub)acute organ specific [lungs, eyes, skin] effects in humans during (un)intentional exposure as well as controlled human research studies are made available in Chapter 11. However, Chapter 11 contains animal studies belonging in Chapter 8, refers to appendix A for terminology definitions which are not there, and inadvertently doesn't refer reader to Appendix B for decontamination/medical management.

Chapter 12 tells us what to expect if a peacekeeping operation occurs; roles and expectations of those using RCAs from a law enforcement, medical, and legal perspective. It demonstrates types of studies needed for forensic application of data, physical & chemical injuries associated with RCA use, and triage (decontamination & medical management) information. Chapter 13 is very complimentary to previous chapter; it imparts insight into risk characterization framework (probabilistic software model) and forensic aspects of RCAs. Occupational exposures from manufacturing, training exercises and operative use are explained in Chapter 14. Risk management and public health information, in Chapter 15, appears to be a disjointed continuation of Chapter 13 or 14. Environmental issues (soil, water, aquatic toxicity, atmosphere), including biodegradation and sorption onto building materials are illustrated in Chapter 16. Chapters 17 and 18 gives one an idea about future concepts, new research avenues, and issues/concern of RCAs.

Appendix A and C allows the reader to review pertinent definitions and terminology, and exhibits very helpful RCA tables. Appendix B (decontamination/medical management) brief overview lacks up-to-date ocular decontamination procedures, and dermal exposure treatments to oleoresin capsicum agents.

Overall, this book affords one a thorough review to all aspects of RCAs. Although its chapters seem slightly out of sequence and the format of information is somewhat disjointed, the book offers the reader a comprehensive resource for RCAs.

¹ Federal Bureau of Investigation Laboratory Chemistry Unit, 2501 Investigational Parkway, Quantico VA 22135.