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Technical Books Section

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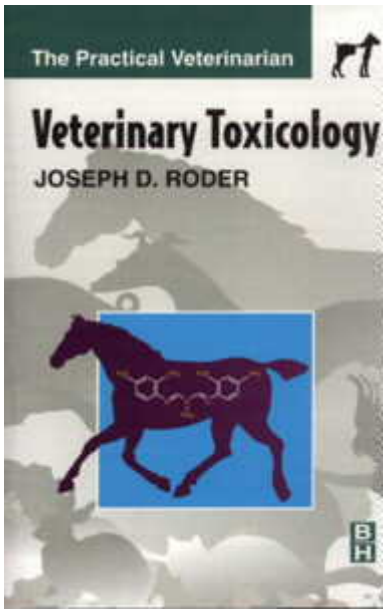
POISONS TOXIC TO ANIMALS

Veterinary Toxicology, 1st Edition *by* Joseph D. Roder,
Butterworth Heinemann, PO Box 382, Halley Court, Jordan Hill, Oxford, OX2 8RU; x + 403 pages: ISBN 0-7506-7240-4. Publication Date 2001: Price, £32.50.



This book on veterinary toxicology is a sheer pleasure to read from beginning to end. The thing that impressed me most was that the information is given in very short succinct sentences, trimming off the "extra fat" so to say. The book is divided into six chapters of which the fourth (Alphabetical listing of common poisons) forms the major bulk of the book.

As a forensic toxicologist, what interest did I have in veterinary toxicology? Well, I discovered that most of the poisons we study in human poisonings are the same in veterinary toxicology too. There is mention of Spanish Fly, arsenic, cyanide, copper, cannabis and a host of other poisons which we encounter day in and day out in our casualty wards. The additional spin-off was that I discovered how animals are treated. Stomach wash in humans for instance is a rather "taken-for-granted" procedure, in which we don't anesthetize the patient. This is quite natural because we can explain to the patient what we are doing is for his benefit. This obviously can not be done with animals, and thus we hear that the animal has to be anesthetized before carrying out this procedure.

A complete listing of poisons dealt with in this book. Readers may want to compare this list with that appearing in "Drug effects on Psychomotor Performance" (page 3) and "Disposition of Toxic Drugs and Chemicals in Man" (page 4)

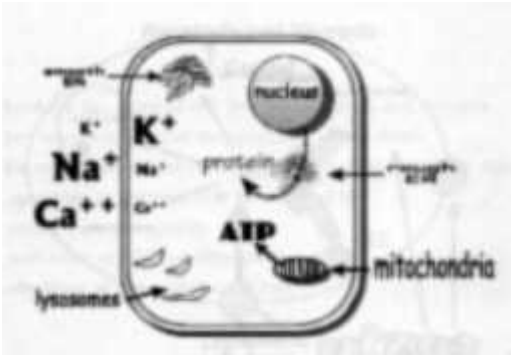
1. Acetaminophen
2. Acute Bovine Pulmonary Edema (3-Methyl Indole)
3. Aflatoxin
4. Allium (Onion intoxication)
5. Amitraz
6. Anticoagulant rodenticides
7. Arsenic
8. Black Walnut (*Juglans nigra*)
9. Bluebonnets
10. Blue-Green Algae
11. Botulism
12. Bracken Fern
13. Bromethalin
14. Bufo (Toad poisoning)
15. Cantharidin (Blister Beetle)
16. Cardiac Glycosides
17. Chocolate poisoning (Theobromine)
18. Cholecalciferol
19. Coal Tar
20. Cocklebur
21. Copper
22. Corrosives
23. Cyanide
24. Death Camas (*Zigadenus spp.*)
25. Fescue (*Festuca Arundinacea*)
26. Fluoride
27. Fumonisin
28. Gossypol
29. Herbicides
30. Hydrogen Sulfide
31. Insoluble Oxalate Containing plants
32. Ionophores
33. Iron
34. Ivermectin
35. *Lantana camara*
36. Larkspur
37. Lead
38. Locoweed
39. Marijuana
40. Metaldehyde
41. Molybdenum
42. Mycotoxins
43. Nitrate Intoxication
44. Nonprotein Nitrogen
45. NSAIDs
46. Noxious gases
47. Oak (*Quercus* spp.)
48. Organochlorines
49. Organophosphorus and carbamate
50. Petroleum products
51. Phenolics and Coal Tars
52. Pigweed
53. Poison Hemlock
54. Pyrethroids
55. Pyrrolizidine Alkaloids
56. Red Maple
57. Selenium
58. Senna
59. Slaframine
60. Soaps and Detergents
61. Sodium ion Toxicosis
62. Soluble oxalate containing plants
63. Sorghum
64. Spiders
65. Strychnine
66. Sulfur
67. Trichothecenes
68. Tricyclic antidepressants
69. Venomous reptiles
70. Water Hemlock
71. White snakeroot
72. Yellow Star Thistle
73. Zinc

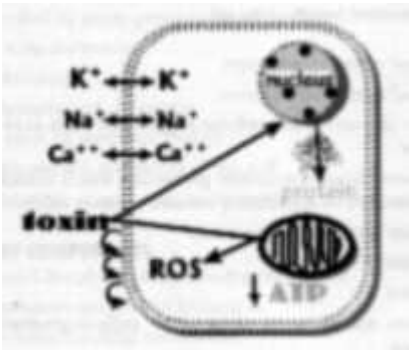
The author seems to have a knack of explaining difficult concepts in simple terminologies and in short sentences with very few words. Sample this piece on page 14-15, where he explains the "not-so-easy" concept of *Volume of Distribution* in these lines:

- Mathematical description of the volume of fluid in the body in which a toxin must be dissolved to equal the serum concentration.
- Vd is often larger than body water volume
- Vd is not a physiologic parameter
- The term Vd also may be used for estimation of elimination mechanisms
- If Vd is large (>5 L/kg)
    - plasma concentration is low
    - toxin is bound or concentrated in tissues
    - toxin is not amenable to dialysis
    - **examples:** digitalis, organochlorines, opiates
- If Vd is small (<1 L/kg),
    - Plasma concentration is high
    - Toxin is more accessible for dialysis
    - **examples:** ethanol, salicylate, theophylline

Undoubtedly these few lines go a long way in clarifying the concept of *Volume of Distribution* in the mind of students and experts alike.

Through clear, simple and illustrative diagrams like this, the author has been able to explain several difficult concepts very easily. In this couple of diagrams (appearing on page 57), the author shows a fully functional cell on the left. The cell membrane can easily be seen to be acting as an effective barrier to some ions, which is necessary for the integrity of the cell. On the right is shown a dysfunctional and dying cell, whose cell membrane has been rendered dysfunctional by a toxin. All ions can move freely across the cell membrane. This rapidly brings the cell machinery to a stop.





The author follows this approach of presenting the information in short succinct sentences throughout the book. At several places difficult concepts are explained with the help of clear line diagrams. On page 57 for instance, the author explains how toxins bring about the cell death in two simple diagrams. In the first diagram, a fully functional cell is shown with an intact cell membrane, which is able to keep potassium, calcium and sodium ions in different compartments. In the second diagram a cell damaged by a hypothetical toxin is shown. The cell membrane is shown to be broken (intramembrane gaps are shown). This causes all ions to get distributed equally across the cell membrane, bringing about cell death. The toxin induces the production of reactive oxygen species

(ROS). This increases the permeability of the mitochondria and a chain reaction of peroxidation within the cell membrane.

Chapter four is packed with information. And once again the author imparts the information in easy-to-understand short sentences. Several subheadings appear under each poison. Some of these are (i) General (ii) source (iii) species affected (iv) clinical signs (v) toxicity (vi) mechanism of action (vii) diagnosis (viii) treatment (ix) prognosis (x) prevention. A long list of references appears after each single poison. Mechanism of action of poisons, which is not always the easiest thing to understand, has been explained in a very simple and easy style. I was most impressed to read the mechanism of action of poisons, which has been explained in a very simple manner.

I would heartily recommend this book to all veterinary doctors and students as a ready reference book. I am basically a forensic pathologist taking the work load of clinical and forensic toxicology too, and I thoroughly enjoyed this book. I would imagine people like me must be able to enjoy the book too.

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