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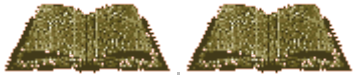 (N.B. Please increase your screen resolution to 1600 x 1200 dpi or more, for best viewing)

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AN EXCELLENT PRIMER ON TOXICOLOGY

Toxicology Secrets, 1st Edition *by* Louis J. Ling, Richard F. Clark, Timothy B. Erickson and John H. Trestrail III
Hanley & Belfus, Medical Publishers, 210 South 13th Street, Philadelphia, PA 19107; xvi + 303 pages: ISBN 1-56053-410-9. Publication Date December 2000: Price, $39.95 (US), $44.95 (Foreign).

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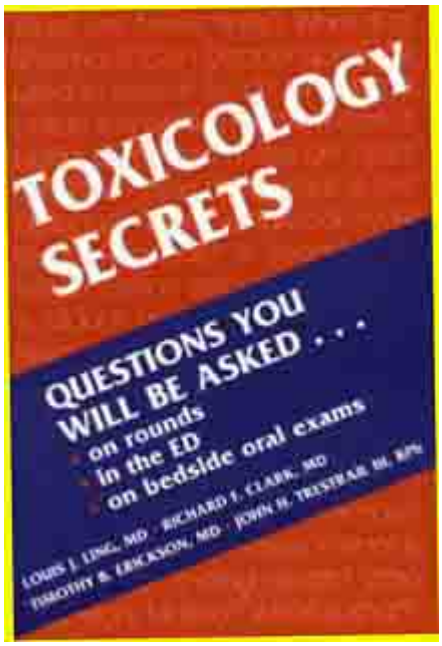

This is yet another great book from *Hanley and Belfus* in their now famous *Secrets* series. Like their previous book on Trauma, this one is also in a "question - answer" form, making it very easy for the students to answer their exam questions, or questions asked in their clinical rounds.

View this book on Amazon

Written by four toxicology experts, this book is divided into 64 chapters spread over fifteen sections. Almost all conceivable topics in toxicology have been covered. The sections are (i) General principles (ii) Over-the-counter drugs (iii) Prescription medications (iv) Antibiotics (v) Cardiac drugs (vi) Psychopharmacologic medications (vii) Drugs of abuse (viii) Metals (ix) Chemicals (x) Pesticides (xi) Gases (xii) Food poisoning (xiii) Botanicals (xiv) Envenomations, and (xv) Toxic Terrorist threats.

Take this Toxicology Quiz!
The book is packed with interesting questions on toxicology. Some of them are more difficult (and may be of a more trivial nature). These appear under a special category *Extra Credit*. Here are some questions (from various different sections) you should be able to answer after reading this book. You may want to try these questions right now. For answers see the box below and to the left.

General Questions

Qu 1. What drugs are "illusogens"? (From Chapter 33, entitled "*LSD and other hallucinogens*")
Qu 2. Will passive inhalation of marijuana (e.g., attending a rock music concert) result in a positive urine test? (From Chapter 34, entitled "*Marijuana*")
Qu 3. What are the most common drugs actually associated with acquaintance rape? (From Chapter 37, entitled "*Date Rape Drugs*")
Qu 4. What is the pathophysiology of arsenic toxicity? (From Chapter 38, entitled "*Arsenic*")
Qu 5. What is the tap test? (From Chapter 61, entitled "*Arthropod envenomation*")

Extra Credit

Qu 6. The year 1930 saw the introduction of a lithium-containing drink called Bib-Label

Lithiated Lemon-Lime Soda, which was touted to relieve the depression caused by hangovers. Still on the market, but without lithium, what is this popular drink now called? (From Chapter 25, entitled "*Lithium*")

Qu 7. This poison which was popular throughout Europe in the 1400s, was made by feeding arsenic to toads then distilling the juices from their dead bodies. By what name was this poison known to the people of the day? (From Chapter 38, entitled "*Arsenic*")

Qu 8. When tin and lead are mixed, a metal is formed that was widely used in colonial days to make dinnerware. What was this potentially toxic substance called? (From Chapter 39, entitled "*Lead*")

Qu 9. Who was Mary Mallon? (From Chapter 54, entitled "*Food poisoning*")

Qu 10. When the French were testing nuclear weapons in the Sahara Desert, what type of venomous animal was able to withstand the most radiation? (From Chapter 61, entitled "*Arthropod envenomation*")

A quick look at the questions tell us that they are quite interesting and useful. Sample these questions: (i) We all know about toxidromes, but what is a *packidrome*? (page 12, chapter 3 entitled "Toxidromes and vital signs"); (ii) What is "crack dancing"? (page 123, chapter 30 entitled "Cocaine"); and (iii) What are POPs? (page 242, chapter 56 entitled "Air and water pollution").

What I found extremely interesting in this book were questions which were marked as "Extra Credit" questions. These are basically interesting trivia, which very few people know of. Professors of toxicology and medicine would find these trivia very valuable to spice up their lectures. I certainly am going to use them in my own toxicology lectures. In almost every chapter these questions appear. Sample these, and try to answer if possible: (i) The untimely death from bulimia of what famous singer almost jeopardized the nonprescription sales of syrup of ipecac? (page 8, chapter 2 entitled "General Management of Poisonings"); (ii) In October 1982, there was a national panic when seven people died in Chicago from cyanide-laced acetaminophen capsules. Who was eventually found to be responsible for this tampering incident? (page 24, chapter 6 entitled "Acetaminophen"); (iii) The name *warfarin* is actually an acronym of the name of the patent holder plus the suffix from the word *coumarin*. Who is the patent holder of this anticoagulant? (page 54, chapter 13 entitled "Anticoagulants"); (iv) The condition known as "orange-picker's flu" is caused by low-level chronic exposure to what type of pesticides? (page 189, chapter 45 entitled "Insecticides: Organophosphates and carbamates"); and (v) In a famous hotel fire in 1980, 79 people died despite being far from the actual flames. Their deaths were due to inhalation of toxic smoke and fumes. What was the name of the hotel that burned? (page 213, chapter 51 entitled "Smoke inhalation");

Mnemonics are cleverly used at several places. What is the differential diagnosis of metabolic acidosis with an increased anion gap? The answer is given in the form of a mnemonic, A MUDPILES (page 31). It expands like this: Alcohol, Methanol, Uremia, Diabetic ketoacidosis, Paraldehyde, Isoniazid and Iron, Lactic acidosis, Ethylene glycol, Salicylic acid, and Starvation.

The book is well-endowed with a number of tables and bulleted lists wherever necessary. Three tables appear just in one chapter on caffeine. The question asked is,"How much caffeine is dangerous" (page 34)? The answer is fortified with the help of a table, which gives age, dose in grams and blood levels in micrograms per ml. Similarly as the answer to another question, the authors give a table (page 35) telling us how much caffeine is there in various commonly consumed drinks such as brewed coffee, instant coffee, Decaffeinated coffee, tea, chocolate milk and so on. I

found these table particularly helpful, as they tend to give a lot of useful information in a capsule form.

Answers

Here are the answers to the questions asked in the box above

Ans 1. Lysergic Acid Diethylamide (LSD), mescaline, psilocybin, morning glory, and nutmeg will produce illusions. Phencyclidine, jimson weed, and some of the synthetic designer amphetamines have illusogenic properties. (*Page 132*)

Ans 2. No. The detection limits are set high enough to avoid this false-positive. (*Page 135*. However on *page 17*, we are informed that a patient can get a positive cocaine test if his roommate smokes a lot of crack. There have even been reports of bank tellers who have handled a large number of one hundred dollar bills during normal working conditions, getting positive results!).

Ans 3. A recent study analyzed more than 1000 urine samples from individuals claiming sexual assault where drug use was involved. Of the samples, 40% were negative and 60% were positive. Substances found included alcohol (40%), Marijuana (20%), Benzodiazepines (6-flunitrazepam; 10%), cocaine (10%), Amphetamines (5%) and GHB (5%). Ketamine was not specifically analyzed becase these cases were referred randomly by health care workers. These data suggest that a variety of drugs are involved in acquaintance rape. (*Page 148*)

Ans 4. Arsenic distributes rapidly to erythrocytes and binds to the globin portion of hemoglobin. Redistribution occurs within 24 hours to the liver, spleen, kidneys, and gastrointestinal tract. Arsenic impairs cellular respiration by inhibiting mitochondrial enzymes and uncoupling oxidative phosphorylation. Arsenic also acts on the Kreb's cycle by blocking pyruvate dehydrogenase. (*Page 154*)

Ans 5. Often, the site of scorpion sting cannot be seen because there is no swelling, ecchymosis or erythema. Tapping the area around the suspected envenomation site with a finger determines the site of a scorpion envenomation. The tap test is positive when pain increases over or around the envenomation site with percussion. (*Page 273*)

Ans 6. "7-Up".(*Page 102*)

Ans 7. *Venin de crapaud*.(*Page 153*)

Ans 8. Pewter.(*Page 156*)

Ans 9. She was popularly known as Typhoid Mary. She was a carrier of typhoid, who worked as a cook at Sloan Maternity Hospital in New York. She passed on the disease to at least 51 people, 3 of whom died. She was tracked down in 1915, and placed under permanent quarantine on North Brother Island, where she spent the rest of her life. she died on November 11, 1938, after more than 23 years of isolation.(*Page 228. N.B. This is an abridged answer. The actual answer which appears in the book is much more detailed.*)

Ans 10. Scorpions.(*Page 274*)

Bulleted lists appear at several places. In the chapter on Arsenic, the question asked is,"What is arsenic and where is it found? (page 153)". The answer appears in the form of a bulleted list. In the chapter on "Marine envenomations", the question asked is, "What are the do's and don'ts of jellyfish sting management (page 277)"? The answer to this question too appears as a bulleted list. The students are especially going to like this approach, as it tends to summarize the information in a way they can easily remember and recall at the time of written or oral exams.

Several questions are in "True-False" format. For instance on page 158, the authors ask this question, "True or false: The reduction in blood lead levels seen in the United States is the result of extensive screening". The answer is "False". Reduction in blood lead levels have actually occurred as a result of removal of the most important sources of environmental lead such as leaded gasoline and lead abatement of contaminated homes.

Answers to the questions above? (i)Well, *packidrome* is an unofficial term that describes the mixed toxidromes apparent in patients with multi-ingredient drug ingestions. This is seen commonly with cold and flu preparations that contain antihistamines, analgesics, antipyretics, and decongestants in one package. (ii)"Crack dancing" is the name given to choreoathetoid movements associated with cocaine use. The patient exhibits movements like lip-smacking, repetitive eye blinking, choreoathetoid movements of the extremities etc. The symptoms start minutes to hours after cocaine use and may last for several days. It is thought that these movements could be due to super sensitivity to dopamine. Symptoms are not life-threatening, and resolve on their own. Another name for this syndrome is *boca torcida* or "twisted mouth", and (iii) POPs are Persistent Organic Pollutants.

Answers to Extra Credit questions? (i) For the syrup of ipecac question, the answer is Karen Carpenter. (ii) the perpetrator was never found. (iii) The acronym *warfarin* comes from Wisconsin Alumni Research Foundation. (iv) Organophosphates. (v) The name of the hotel was "The MGM Grand Hotel".

I believe clinical toxicologists, forensic toxicologists, and clinicians would find this book very useful. Forensic professionals like me are also going to admire this book, because in our day-to-day practice, we deal with a number of poisoned patients having medico legal implications. But I think students of medicine - both at undergraduate and postgraduate level - are going to love this book most. It is after all for them, this series is intended. I would fully recommend this book to all of these and any one else who is interested in the science of poisons in general.

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