

TOXICOLOGY AND THERAPY OF INTOXICATION

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Introduction to Toxicology and Therapy of Intoxication

A medical pharmacology course should be primarily concerned with three aspects of toxicology: adverse effects of therapeutic agents, acute intoxications, and chronic poisoning/environmental toxicology. The adverse effects of drugs should be taught along with the pharmacology of individual drugs or groups of drugs.

The discussion of acute intoxications should constitute a short, but important, part of the pharmacology course and should deal with the techniques and procedures used in dealing with the effects of exposure to acutely toxic materials. Lectures dealing with chronic intoxications should emphasize environmental toxicology and risk assessment.

Principles of Toxicology

Recommended Curriculum Equivalent: 1 hr

Learning Objectives

Describe how toxicants are influenced by the basic pharmacokinetic and pharmacodynamic processes such as absorption, distribution, biotransformation, excretion and cellular targets.

Explain the principles of bioactivation of chemicals to toxic species.

Describe cellular defense mechanisms.

Explain the concepts of threshold levels for toxicity.

Describe measures for determining the safety of a drug or non-therapeutic chemical (e.g. therapeutic ratio).

Priority Toxic Chemicals	
Recommended Curriculum Equivalent: 2 hr	
Drugs and Chemical Toxicants	Antidotes
ACETAMINOPHEN AIR POLLUTANTS ALCOHOLS (ETHANOL, METHANOL, ETHYLENE GLYCOL) CARBON MONOXIDE Cyanide HEROIN IRON LEAD MERCURY PESTICIDES (ORGANOPHOSPHATES AND CARBAMATES) SALICYLATES	N-ACETYL-L-CYSTEINE ACTIVATED CHARCOAL ATROPINE/2-PAM METHYLENE BLUE METAL CHELATORS (EDETATE, 2,3- DIMERCAPTOSUCCINIC ACID, DIMERCAPROL, DEFEROXAMINE) NALOXONE SODIUM BICARBONATE Sodium nitrite/sodium thiosulfate
Learning Objectives	
Explain how exposure to the primary and secondary toxicants can occur. Describe the signs and symptoms of a toxic exposure induced by each of the toxicants. Describe the mechanism of toxicity of the primary and secondary toxicants. Compare and contrast the toxicity induced by various metals. Compare and contrast the toxicity induced by the neurotoxic pesticides. Describe the antidote and/or treatment for each toxicant.	

Management of Acute Intoxications
Recommended Curriculum Equivalent: 1 hr
Learning Objectives
<p>This section can be case-based to follow up on the identification of priority toxicant poisoning and the therapeutic aspects of treating intoxications. Alternatively, lectures can be provided to teach the “decision-tree” approach to the treatment of acute intoxications using examples such as acetaminophen overdose.</p> <p>Explain the basic principles of managing an acute intoxication from a drug or non-drug.</p> <p>Describe how decisions are made to determine how an acute intoxication should be handled.</p> <p>Describe common intoxications and their management.</p>

Environmental Toxicology/Risk Assessment
Recommended Curriculum Equivalent: 1 hr
Learning Objectives
<p>Explain the concept of risk versus dose and methods for risk assessment.</p> <p>Describe the concept of pre-carcinogens, proximate carcinogens and ultimate carcinogens.</p> <p>Describe bioactivation pathways for carcinogens.</p> <p>Describe mechanisms of chemical carcinogenesis.</p> <p>Differentiate between mutagenicity and carcinogenicity.</p> <p>Describe chemical preventive mechanisms from carcinogenicity.</p>