TOXICOLOGY PHL 472 (2 + 1)

Prerequisite: PHL 451

Course Description:

A detailed course that describes the incidence, mechanism of action and toxicological manifestations in humans poisoned with chemicals, drugs of abuse. The course also covers the characteristic effects of the toxicants that can help in the diagnosis as well as the methods of treatment.

Course Contents: **Hours**

I. Mechanisms of cell injury: 3

a) Membrane toxicants:

- Permeability
- Integrity

b) Cytosolic toxicants:

- Lysosomal
- Mitochondrial
- Enzyme inhibitors
- Reactive Metabolites

c) Nuclear toxicants:

- Alteration in protein synthesis
- Nucleic acid degeneration
- Chromosomal alterations

II. Chemical Carcinogens: 4

- Definitions
- Mode of action of the chemical carcinogens
- Classes of the chemical carcinogens
- Modifying factors in chemical carcinogenesis
- Detailed effects of selected representative members.

III. Teratogenic agents: 5

- Teratogenic potential (dose-response)
- Mechanisms of teratogenesis:
  - Mutations
  - Chromosomal aberations
  - Mitotic interferences
  - Nucleic acid integrity
  - Lack of precursors or substrates
  - Enzyme inhibition
  - Osmolar imbalance

IV. Industrial Hazards: 4

- Nitrogen compounds: Analine, nitrobenzene, & TNT.
- Halogenated "hydrocarbons": carbon tetrachloride, phosgene, fluorocarbons, riot control agents & personal protection devices.
- Alcohols and glycols: methanol, ethanol, ethylene & diethylene glycol.
- Aldehydes: formaldehyde, acetaldehyde and paraldehyde.
- Hydrocarbons: petroleum distillates, aromatic hydrocarbons naphthalene.

V. Immunotoxicity: 3

- Introduction
- Chemicals and metals inducing hypersensitivity and allergy
- Chemicals and metals inducing autoimmunity
- Immunosuppressants.

VI. Toxicity of Narcotics: 4

- Introduction
- Acute versus chronic intoxication
- Laboratory findings and clinical presentation
- Treatment.

VII. Chemical and Biological Warfare Agents: 3

- Definitions
- Introduction
- Classification
- Mechanisms of Toxicity
- Management.

EXAMINATIONS: 2

Total Hours: 28

RC-21,22
JAN/97

PHL (472) practical (1 credit hour)

Lab 1 Determination of the acute LD_{50} and estimation of the margin of safety.

Lab 2 General antidotes for acute intoxication.

Lab 3 Physiological and Pharmacological Antidotes:
- Morphine and Nalorphine.
- Barbiturates and Megimide.
- Digitalis and Potassium.
- Magnesium and Calcium.

Lab 4 Experiments with irritants and corrosives.

Lab 5 Behavioural Toxicology Experiments:
- Morphine, amphetamine and cocaine; effects of acute intoxication.
- The Withdrawal Syndrome (spontaneous, induced).

Lab 6 Experiments with insecticides and pesticides.
Estimation of cholinesterase activity.

Lab 7 Snake venom toxicity and its management.

Lab 8 Inhalation toxicity with emphasis on warfare agents.

Lab 9 Hypersensitivity and allergy (Ovalbumin challenge in guinea pigs).

Lab 10 Chronic Toxicity testing:
- Mutagenicity.
- Teratogenicity.

Lab 11 Toxic Drug Interactions:
- Sulphonamide and Tolbutamide (Glucose).
- Pargyline and Pethidine (Hyperpyrexia).
- B-blokers and Digoxin (Bradycardia).
- Halothane and Catecholamines (Arrhythmias).

Lab 12 Effect of modification of pH on the excretion of toxicants.

Lab 13 Poisons affecting cardiac function (ECG).

Lab 14 EXAMINATIONS.