PRACTICAL TOXICOLOGY

LAB: 1

REVIEW

- **Toxicology: is the study of the adverse effects of chemicals on living organism.**
- **It is study of symptoms, mechanisms , treatments and detection of poisoning.**
- **Toxicologist is trained person to examine the nature of those effects (including their cellular, biochemical, and molecular mechanism of action) and assess the probability of their occurrence.**

INTRODUCTIONS

- **Toxicity: is the degree to which a substance can harm humans or animals can be acute, subacute, chronic, and subchronic.**
- **Poison: It is any substance which when introduce to or absorbed by living organism destroys or injures health. It can cause death even in vary small amounts.**
- **Toxin:- generally refers to toxic substances that are produced by biological systems such as plants, animals, fungi or bacteria.**
- **Venom:- It is biological toxin that is injected by bite or sting to cause its effect.**

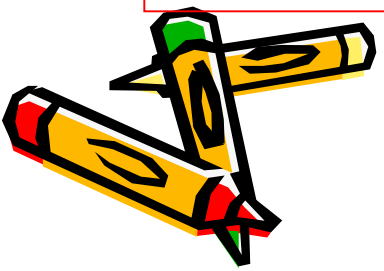
The types of exposures are

1-**Acute**, which is exposure to a chemical for **24 hours or less**.

2-**Chronic**, which is exposure to a chemical for **more than 3 months**.

3-**Sub-acute**, which is exposure to a chemical for **1 month or less**.

4-**Sub-chronic**, which is exposure to a chemical **between 1 to 3 months**.



FACTORS AFFECTING TOXICITY

1. pathway of administrations (toxin is applied to skin, ingested, inhaled or injected).
2. The time of exposure
3. The number of exposure (single or multiple).
4. The physical form of toxin (solid, liquid, gas).
5. The genetic makeup of individual.
6. An individual's overall health

CLASSIFICATION OF TOXICANTS

1. Target organ (hepatotoxin, neurotoxin).
2. Intended use (pesticide, solvent).
3. Source (natural, synthetic).
4. Special effect (carcinogen, endocrine disrupter).
5. Physical state (gas, solid, liquid).
6. Toxicity (extremely, slightly).
7. Chemical composition (heavy metal, organophosphate).

TYPES OF TOXIC RESPONSES

1. **Immediate:- minute to hours after single exposure.**

2. **Delayed: days to years after exposure.**

3. **Effect at site of contact, GIT, Lung and Skin.**

4. **Effect distant from exposure site, CNS, and Kidney**

REVERSIBLE VS IRREVERSIBLE

Largely determine by:

1. Tissue involved

2. Length of exposure

3. Magnitude of tissue insult

Reversible: rapidly regenerating tissue like liver, intestinal mucosa and blood cells.

Irreversible: CNS damage, carcinogenesis and mutagenesis

ROUTE AND SITE OF EXPOURE

1. **Exposure phase: the major routes of exposure are**

a. Gastrointestinal tract (ingestion)

b. Lungs (inhalation)

c. Skin (topical, percutaneous or dermal)

d. parenteral (I.V , I.M)

2.TOXICOKINETICS PHASE

1. Absorption
2. Distribution
3. metabolism and
4. excretion.

3.TOXICODYNAMIC PHASE

The science of toxicology is based on the principle that there is a relationship between a toxic reaction (response) and the amount of poison received (dose).

MECHANICAL APPROACHES AND TREATING UNWANTED TOXICITY:

The first line of defenses is to remove the:

a. Ingested poison are frequently treated by:-

1. oral administering of activated charcoal which adsorbs the poison.

2. Ipecac syrup which causes vomiting in order to empty the stomach.

3. Cathartics which remove the poison from gut.

4. Gastric lavage where the stomach is washed out and drained using tube.

TREATING UNWANTED TOXICITY

B. poison which are injected into the body (from bites and strings from venomous animals) are usually treated by the use of constriction band which limits the flow of lymph or blood to the area.

The second line of defense involves the removal of poison (drugs) from blood stream by:

1. changing the urine pH.

2. Forced diuresis.

3. Hemodialysis.

4. Exchange transfusion.

The third line is administered of antidote which either remove the harmful substance from the blood or counteract its effect.