Clinical Toxicology Lab
Basra University - College of Pharmacy
Evaluation of Drug Toxicity on Human

Lecturer

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Introduction

- Toxicology is a study of poisons on living organisms.

- poison is any chemical that has an ability of producing detrimental actions on living organisms

- The regulatory agencies have established a consistent framework for risk assessment due to exposure to a chemical poses to human beings and to the environment.

Risk assessment

- This framework includes the steps of hazard identification, dose–response assessment, exposure analysis, and characterization of risks.

- **The term hazard or risk** is defined as the probability of an adverse outcome

- **Risk assessment** is the systematic scientific characterization of potential adverse health effects because of human exposures to hazardous agents.
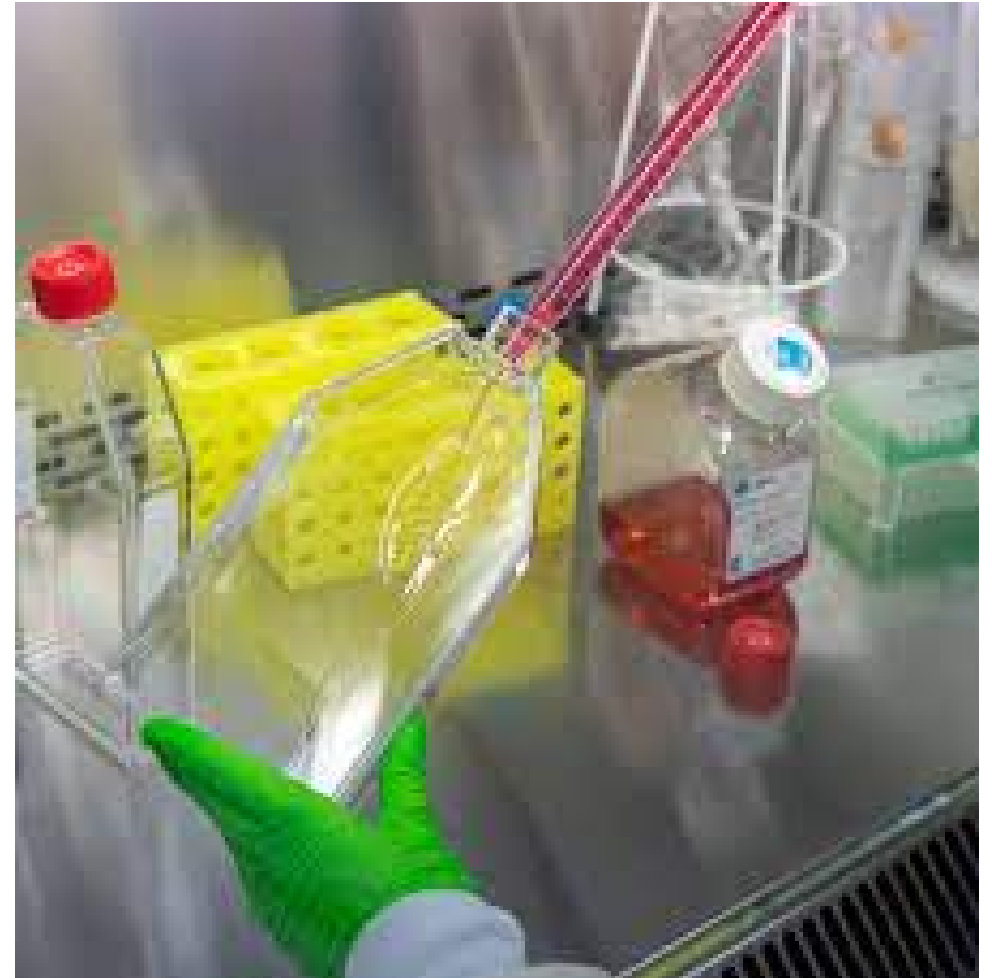
Hazard identification

- Hazard identification is gathering all available information on the toxic effects of a chemical and evaluating it to determine the possible risks associated with exposure.

- Therefore, it is necessary to conduct toxicity testing for these chemicals that are developed into drugs, inhaled or ingested.

Cell based testing (*in vitro*)

- Parts of an organism (tissues or cells) isolates and grows or maintains under controlled conditions.

- It is fast and inexpensive compared with lifetime animal-bioassay.

- Examining the efficiency of drug discovery, toxicity.

Animal –based testing (*in vivo*)

▪ It is conducted to evaluate drug safety.

▪ Animals are carefully monitored for side effects

▪ After the study period, pathologists examine their organs for signs of drug toxicity.

▪ Testing on mice is more expensive

Case study : Methylene Chloride Toxicity

- A 66-year-retired man was admitted to the emergency suffering from chest pain and discomfort, slurred speech .

- He has a basement workshop to preparing some furniture for repainting. He was worked three hours in his basement workshop and following leaving , he experienced the onset of his chest pain.

- The attending physician found that the victim had experienced an anterior wall myocardial infarction

Case study : Methylene Chloride Toxicity

- . The physician examined the paint container and noted the label cautioned that the product contained 80% methylene chloride to be used only with adequate ventilation.

- Two weeks later, the patient returned home and continued his work and shortly he felt severe chest pains and was readmitted.

- His hospital course during this second acute myocardial infarction was complicated by cardiogenic shock, dysrhythmia, and heart failure.

Case study : Methylene Chloride Toxicity

- The patient survived, and six months after discharge returned once again to his basement workshop to complete the paint stripping operation.

- Assisted by his wife, he worked slowly for two hours and following that he experienced chest pain, collapsed, and died before the arrival of the ambulance..

Clinical evaluation (in case of emergency arrival)

Medical history

- Exam the item that reflect methylene chloride exposure.

- Family history, particularly coronary artery disease.

- Hobbies or household projects.

Physical examination : evaluation

▪ Exam the major toxic syndromes of central nervous and cardio vascular systems .

▪ **Regarding to Laboratory tests**:

Methylene chloride levels in breath, blood, or urine (if exposure is recent).

Treatment and Management :

- There is no antidote or specific treatment for methylene chloride

  intoxication.

- To treat acute toxic exposures, immediately remove the person from the

  source of exposure and give oxygen or artificial respiration, if indicated.

- Proper use of paint products and other protective equipment should be

  followed and avoid all exposure to such products from patients with

  coronary artery disease .

References

➢ Casarett & Doull's Toxicology – The Basic Science of Poisons (6th edition)

➢ Principles of Clinical Toxicology (Third edition)