

# Learning Objectives

- By the end of this session the learners will be able to:
  - Discuss history of toxicology & classification of poisons
  - Describe routes of administration & actions of poisons
  - Identify factors modifying actions of poisons
  - Explain the fate of poisons in the body & diagnosis of poisoning
  - Describe duties of A doctor in case of poisoning

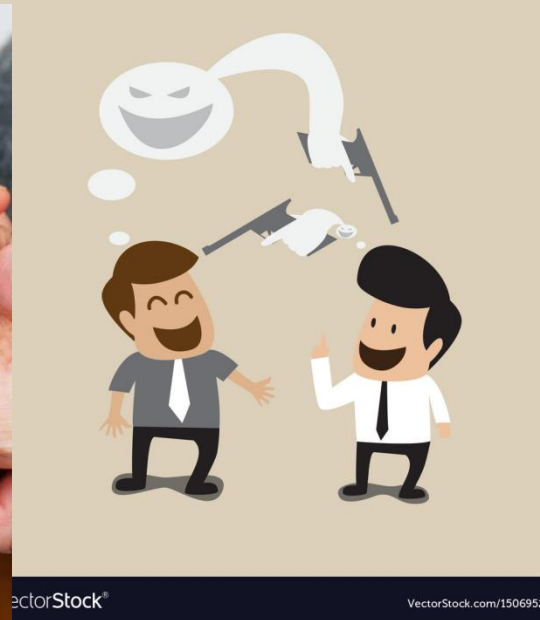


# Introduction to Toxicology



# Toxicology

- Forensic Toxicology
- Toxinology
- Poison (potus)
  - Medicine & poison
  - Intent



# History

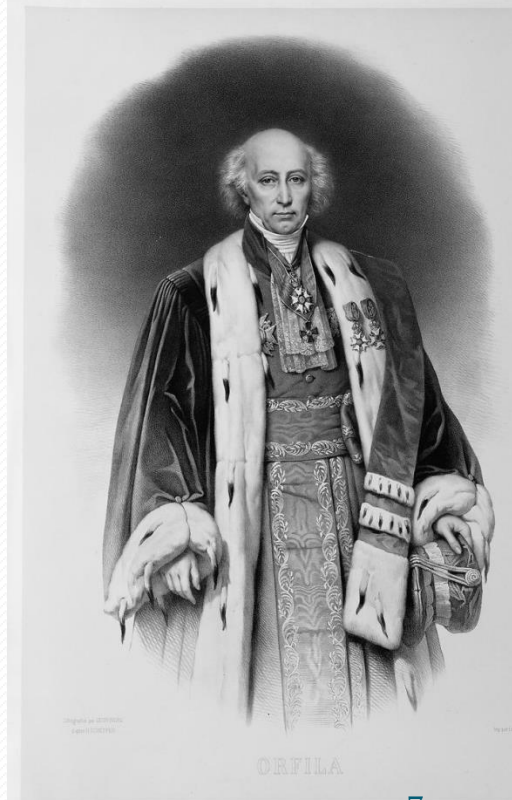
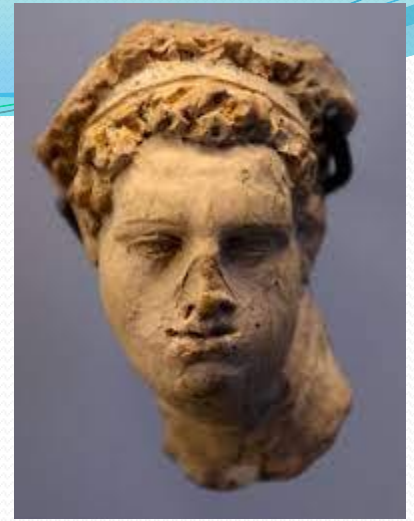
- Toxon, toxeuma, Toxicon.
- Menes (300BC)
- Egyptians discovered cyanide
- Dioscorides classified poisons
- Socrates (402BC )



Dioscorides

# History

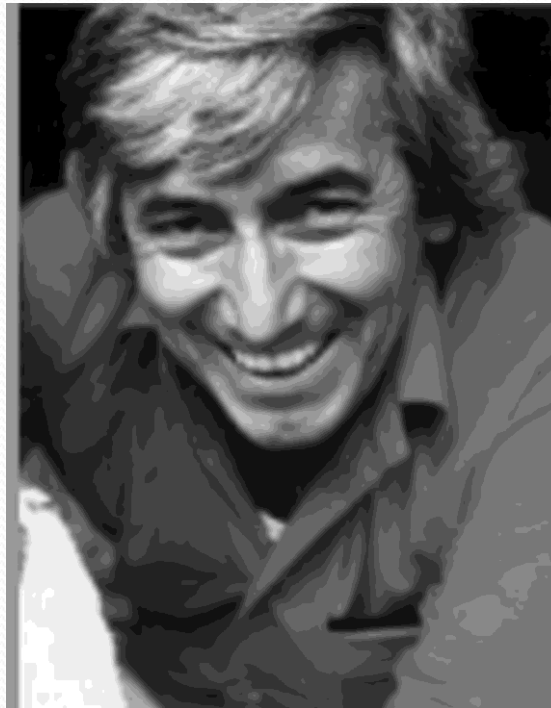
- Mithridates (114-63 BC)
- 14<sup>th</sup> to 18<sup>th</sup> century, Sir Theodosius Boughton
- Mathieu Orfila (1813) Trait des poisons, (Toxicologie generate)
- Marsh test in 1836 and the Riensch test in 1841
- Hazardous occupations
- Thalidomide





# History

- Ricin, the political poison of the 20th century
- Paracelsus, the 16th century





# Classification of Poisons

- **Based on**
  - Nature of Poison
  - Manner of Use
  - Source of Poison

# Classification of Poisons

- **Corrosives**
  - Mineral acids, organic acids, vegetable acids, conc. alkali
- **Irritants**
  - Inorganic, organic, mechanical
- **Neurotics**
  - Cerebral, spinal, peripheral
- **Cardiac**
- **Asphyxiants**
- **Miscellaneous**

# Human Poisoning

- **Suicidal**
  - Characteristics of ideal suicidal poison
- **Homicidal**
  - Characteristics of ideal homicidal poison
- **Accidental**
  - Storage
  - Animal bites
  - Chemicals in industry



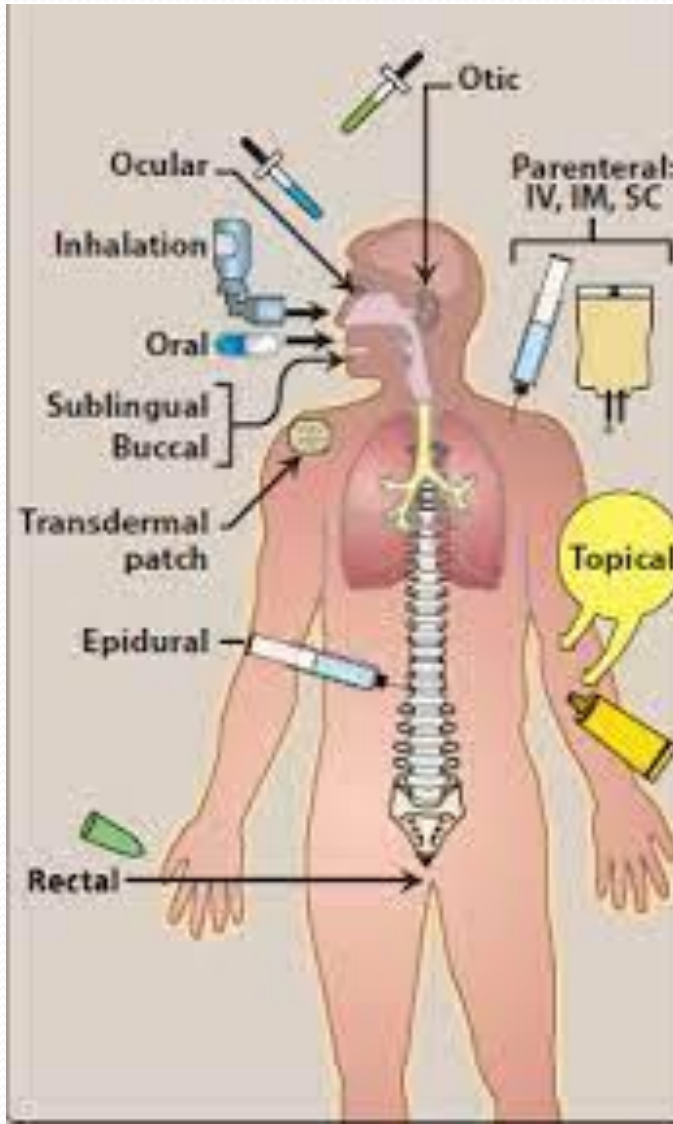
# Poisoning

- Acute poisoning
- Chronic poisoning
- Subacute poisoning
- Fulminant poisoning
- **Toxicity rating**



# Routes of Administration of Poisons

- Enteral:
  - Oral
  - Sublingual
  - Buccal
- Par - enteral:
  - By injection
    - Intravenous (IV)
    - Intramuscular (IM)
    - Subcutaneous (SC)
  - By inhalation
  - By external application
    - Topical
    - Transdermal patch
    - Epidural
  - Natural orifices
    - Rectal
    - Otic
    - Ocular



# Actions of the poisons

- Local action:
- Remote action:
  - Specific, non-specific & localized
- Local & remote combined action:
- General action

# Factors Modifying Actions Of Poisons



- **Dose:**
  - Idiosyncrasy, allergy, habit, synergism, additive effect, cumulative poisons.
- **Form of poison:**
  - Physical state, chemical combination, mechanical combination. ( $\text{AgNO}_3$  and  $\text{HCl}$ , acids & alkalis, alkaloids)

# Factors Modifying Actions Of Poisons

- **Method of administration:**
  - According to route
  - e.g. Snake venom, cocaine
- **Condition of the body:**
  - Age
  - State of health (opium, mercury)
  - Sleep



# Fate of Poisons in the Body

- Unabsorbed poison:
- **Absorbed poison:**
  - Excreted
  - Metabolized
  - Biotransformation.
  - Stored in bones

# Diagnosis of Poisoning

- **Poisoning in the living**
  - **Acute poisoning**
    - Appearance of symptoms
    - Severity
    - Detection
    - Symptoms Suggestive of Poisoning
  - **Chronic poisoning**
    - Appearance of symptoms
    - Severity
    - Detection
    - Symptoms



# Diagnosis of Poisoning

- **Poisoning in the dead**

- Autopsy

- Smell, orifices, froth, lividity

- Cyanide, Phosphorus, Opiates, aniline

- Internal examination

- Color of mucous membrane of stomach d

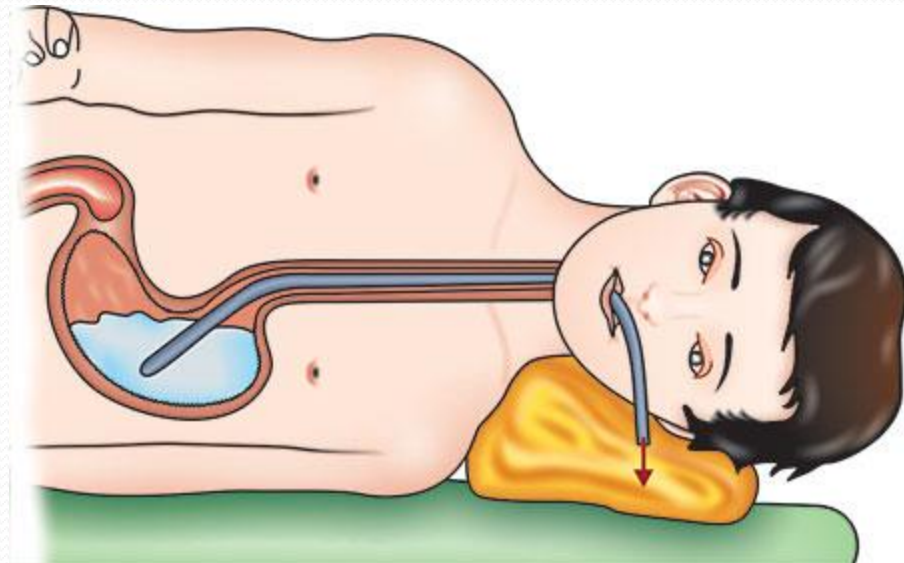
- Chemical analysis

- Evidence



# Duties of Doctor In Case of Poisoning

- Preliminary particulars
- Treat the patient
- In private practice
  - Suicidal, homicidal poisoning
  - Record keeping
  - Sample collection
  - Dying declaration
  - In event of death
- In public hospital





# Law Sections Related to Poisons

- **284 PPC**
  - Negligent conduct with respect to poisonous substance:
- **336A PPC**
  - Hurt caused by corrosive substance
- **336B PPC**
  - Punishment for hurt by corrosive substance
- **337-J PPC**
  - Causing hurt by mean of a poison:

# Introduction to Toxicology

## History

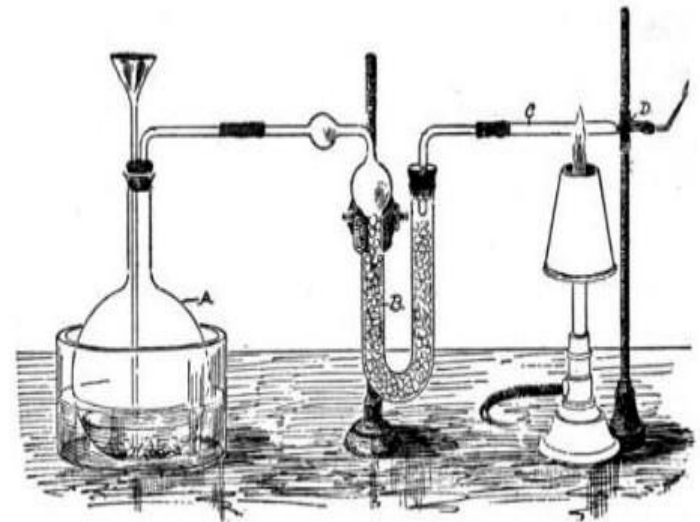
- Egyptians & Greeks
- Menes 300 B.C.
- Distillation, cyanide
- Hemlock, Socrates
- 200 B.C.
- Italian alchemists



# Introduction to Toxicology

## History

- 17<sup>th</sup> century
- Mathieu Joseph Bonaventure Orfila 1814 (Traité des poisons, also called Toxicologie générale)
- 1840 court evidence
- Robert Christison, Alexander G...
- Marsh test, Riensch test
- Hazardous occupations



# Introduction to Toxicology

## History

- Pharmacological disasters
- Ricin, 20<sup>th</sup> century
- Thallium poison
- Accidental poisoning
- Aluminium phosphide





# Introduction to Toxicology

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- Toxicon
- Trivial & grave and fatal effects
- Drug, insecticide
- **Branches**
  - Clinical Toxicology
  - Pharmacological Toxicology
  - Forensic Toxicology



# Introduction to Toxicology

- **Branches**
  - Occupational Toxicology
  - Environmental Toxicology
  - Aquatic Toxicology
  - Toxinology
  - Chemical Injury





# Introduction to Toxicology

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- Poison
- Paracelsus
- Venom
- Sources of poisons in nature
- Types of poisoning



# Summary

1.

2.

3.