

**Metallic poison**

copper

# Sources

- Electrical conductor
- Copper alloys used in jewelery,coins,paints,ceramics,furniture polish
- In agriculture used as fungicide ,algicide
- Contaminated food
- Used as pigment and catalyst

- ✘ Copper is an essential nutrient that is incorporated into various enzymes like hemoglobin formation, carbohydrate metabolism, catecholamine biosynthesis, cross linkages of collagen, elastin, and hair keratin  
Copper dependent enzymes such as cytochrome-c oxidase, super oxide dismutase and ascorbic acid.
- ✘ Copper binds to ceruloplasmin in liver .

# Mechanism of action

- Free copper form free radicles like superoxide,hydrogenperoxide .These free radicles damage lipids membrane, protein structures and DNA

# Acute and chronic toxicity

- Gastrointestinal effects
  - » Nausea, vomiting, diarrhea, anorexia, abdominal pain and acute pancreatitis
- Renal effects
  - » Acute renal failure
  - » Fanconi syndrome
  - » (tubular proteinuria, phosphaturia, hypercalciuria)
- Pulmonary effects
  - » Vine yard sprayer disease due to air borne copper sulfate, pneumonitis, pulmonary edema
- Hematologic effects
  - » Hemolysis, methemoglobin

## ✘ Dermatological effects

- ✘ Contact dermatitis, greenish blue discoloration of skin

## ✘ Wilson's disease

- ✘ Central nervous system degeneration
- ✘ Liver failure
- ✘ Hemolytic anemia
- ✘ Kayser-Fleischer rings are corneal deposits of copper
- ✘ Chalcosis is the lodging of metallic copper alloy foreign bodies in the eye

# Treatment

- Gastric emptying
- Catharsis
- Hydration
- Chelation
  - **BAL**(BRITISH anti lewisite)
  - 3-5 mg/kg every 4 hours for two days then 2.5 -3 mg/kg every 6 hours for next 2 days then 12 hours for 7 more days
  - **Oral**
    - » Penicillamine or Succimer

# Postmortem findings

- Skin may be yellow
- Greenish blue froth
- Bluish green discoloration of the gastric mucosa and stomach content is diagnostic
- Mucous membrane is congested ,inflamed, and eroded in patches
- Liver may be soft and fatty



# Medicolegal aspects

- Occurs in fungicide
- Antidote for phosphorus poisoning
- Used to commit suicide
- Accidental poisoning may occur
- It is not use for homicidal purpose
- Rarely used as cattle poison