

Food Poisoning

Introduction to Food Poisoning

Definition of Food Poisoning (Foodborne Illness)

- Food poisoning is a toxicological condition caused by consuming contaminated food or water. It may involve biological toxins, microbial pathogens, or chemical agents.
- From a clinical toxicology perspective, food poisoning is studied based on the mechanism of toxicity, clinical manifestations, and management protocols.

Classification of Food Poisoning based on Causative Agents:

1. Biological Toxins (Natural toxins)

- These are non-infectious toxic agents produced by organisms (bacteria, plants, algae, animals) and can cause toxic syndromes without infection.
- **Examples:**
 - **Botulinum toxin** (from *Clostridium botulinum*)
 - **Ciguatoxin** (marine fish)
 - **Scombrototoxin** (improperly stored fish)
 - **Aflatoxins** (produced by *Aspergillus* species)
 - **Mushroom toxins** (e.g., amatoxins from *Amanita phalloides*)

2. Microbial (Infectious agents)

- Involve pathogens that multiply or produce toxins in the GI tract.
 - **Bacteria:** *Salmonella*, *E. coli*, *Shigella*, *Listeria*
 - **Viruses:** Norovirus, Hepatitis A
 - **Parasites:** *Giardia*, *Entamoeba histolytica*
 - **Note:** In clinical toxicology, microbial causes are more the domain of infectious disease, but their **toxins** (like *Shiga toxin*) are studied for their toxicodynamics.

3. Chemical Toxins

- These include pesticides, heavy metals, or other industrial/agricultural chemicals.
- **Examples:**
 - Organophosphates (insecticides)
 - Arsenic
 - Mercury
 - Polychlorinated biphenyls (PCBs)
 - Nitrites and nitrates

Mechanisms of Toxicity

Preformed Toxins

- Toxins are ingested already formed in the food. Clinical manifestations occur rapidly (within hours).
- **Example:** Botulinum toxin → blocks acetylcholine release → causes **flaccid paralysis**.

In Vivo Toxin Production

- Pathogen colonizes the GI tract and produces toxin after ingestion.
- **Example:** *Clostridium perfringens* releases enterotoxins in the gut.

Direct Infection with Secondary Toxin Effects

- Microorganisms infect tissue and release toxins causing systemic effects.
- **Example:** *E. coli* O157:H7 → produces **Shiga toxin** → can lead to **hemolytic uremic syndrome (HUS)**.

Chemical Toxicity

- Chemicals in food act on organs such as the liver, kidneys, or nervous system.
- **Example:** Aflatoxins → hepatotoxic → risk of **hepatocellular carcinoma**.

Clinical Features (Toxicological Syndromes)

Toxin/Agent	Onset	Key Symptoms	Toxicologic Concern
Botulinum toxin	12–36 hrs	Diplopia, ptosis, dysphagia, flaccid paralysis	Neurotoxin – potentially fatal
Scombrototoxin	Minutes – hrs	Flushing, rash, headache, vomiting	Histamine-like reaction
Aflatoxins	Days – weeks	Liver injury, nausea, jaundice	Hepatotoxic; carcinogenic
Ciguatoxin	6–12 hrs	GI upset, paresthesia, temperature reversal	Neurotoxin
Shellfish toxins	< 1 hour	Paralysis, nausea, dizziness	Neurotoxic – saxitoxin (PSP), brevetoxin
Arsenic	Hours – days	GI distress, hypotension, QT prolongation	Multisystem toxicity
Organophosphates	Minutes – hrs	SLUDGE symptoms, respiratory distress	Cholinergic crisis

Diagnosis in Clinical Toxicology

Diagnosis of food poisoning from a toxicology standpoint involves:

History Taking

- Onset of symptoms after food intake
- Type and source of food (e.g., canned foods, seafood)
- Multiple cases (outbreak pattern)
- Time to onset is critical to narrow down toxin type

Laboratory Tests

- Blood tests: Electrolytes, liver enzymes, renal function
- Toxin assays: Botulinum toxin in serum/stool
- Microbiological cultures (limited in toxin-related cases)
- Urinary toxin analysis (e.g., arsenic, mycotoxins)

Specialized Testing

- EEG or EMG (in neurotoxic syndromes)
- Imaging for complications (e.g., cerebral edema in severe cases)
- Biopsy (rare, for chronic exposures)

Treatment and Management

General Management

- Supportive care (hydration, electrolyte balance)
- Antiemetics, antidiarrheals (use with caution)
- Hospitalization in severe cases

Specific Antidotes and Treatments

Toxin	Treatment
Botulinum toxin	Equine antitoxin (heptavalent)
Organophosphates	Atropine + Pralidoxime (2-PAM)
Aflatoxins	No specific antidote; supportive care
Arsenic/Mercury	Chelation with dimercaprol (BAL), DMSA
Scombrototoxin	Antihistamines
Ciguatoxin	Mannitol (investigational), supportive

Decontamination

- Activated charcoal (only in early ingestion, if applicable)
- Gastric lavage (rare; only if within 1 hour and life-threatening toxin)



FREE PREVIEW

[Click here to visit our website](#)

PHARMACY PREMIUM NOTES

Complete subject and semesters are available on FirstHope app only.



[Scan or click here](#)

Click here to get the app



Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram



[Scan or click here](#)

@FirstHopeNotes

Instagram

@firsthope.official

[Click here to follow >](#)

YouTube channel

FirstHope-Pharmacy / Live streams

[Click here to watch >](#)

WhatsApp channel

Follow FirstHope on WhatsApp

[Click here to join >](#)

FirstHope website

firsthopenotes.com

[Click here to visit >](#)

B.Pharm / D.Pharm / M.Pharm / Pharm.D

Preview notes. Complete subjects and semesters in the FirstHope app.