Introduction to Excretion

Elimination from the body is very important in determining the potential toxicity of a xenobiotic. When the body rapidly eliminates a toxic xenobiotic (or its metabolites), it is less likely that they will be able to concentrate in and damage critical cells. The terms excretion and elimination are frequently used to describe the same process in which a substance leaves the body. **Elimination** is sometimes used in a broader sense and includes the removal of the absorbed xenobiotic through metabolic pathways as well as through excretion. **Excretion**, as used here, pertains to the elimination of the xenobiotic and its metabolites by specific excretory organs.

Except for the lung, polar (hydrophilic) substances are more likely than lipid-soluble toxicants to be eliminated from the body. Chemicals must again pass through membranes in order to leave the body, and the same chemical and physical properties that governed passage across other membranes apply to excretory organs as well.

Figure 13.1.1. Processes of toxicokinetics
(Image Source: Adapted from iStock Photos, ©)

Primary Routes of Excretion

The body uses several routes to eliminate toxicants or their metabolites. The main routes of excretion are via urine, feces, and exhaled air. Thus, the primary organ systems involved in excretion are the:

- Urinary system
- Gastrointestinal system
- Respiratory system

A few other avenues for elimination exist but they are relatively unimportant, except in exceptional circumstances.

> 📌 Knowledge Check
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> **1) The three major routes of excretion are:**
> a) Gastrointestinal tract, sweat, and saliva
> b) Mother's milk, tears, and semen
> c) Urinary excretion, fecal excretion, and exhaled air
>
> **Answer**
>
> Urinary excretion, fecal excretion, and exhaled air - **This is the correct answer.**
> The main routes of excretion are via urine, feces, and exhaled air.