

## TOXICOKINETICS/TOXICODYNAMICS

Toxicokinetics is the quantitation of the time course of toxicants in the body during the processes of absorption, distribution, biotransformation and excretion or clearance of toxicants. This is a reflection of how the body handles toxicants as indicated by the plasma concentration of that xenobiotic at various time points. The end result of these toxicokinetic processes is a biologically effective dose of the toxicant.

The toxic action of a chemical is a consequence of the physical/chemical interaction of the active form of that chemical with a molecular target within the living organism. Toxicokinetic data is best derived using radio labeled dose of the drug. It allows for following the fate of the drug, metabolic products, distribution in the tissue, storage sites, as well as its elimination. It is concerned with what the body does to the toxicant. The toxicokinetics of a chemical are determined by measuring the concentrations of the chemical in blood at various times following a single dose. The fundamental parameters that define the rates and extents of distribution and elimination are derived from data following an intravenous or oral dose.

**Important principles of Toxicokinetics:** The effect which a drug produces is dependent on: i. The dose - The kinetics of a drug may differ from therapeutic dose

- excreted as urine. Proteins and blood cells are too large to pass through the pores.
2. Tubular secretion: Some substances are actively transported from the blood into the renal tubule and are thus also excreted in the urine.
  3. Tubular reabsorption: Active----- From tubules into blood capillaries.

### **Other routes of excretion**

- Breast milk
- Sweat, saliva, tears and semen.

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### **TOXICODYNAMICS**

Toxicodynamics involves the interactions of a toxicant with a biological target and the functional or structural alterations in a cell that can eventually lead to a toxic effect. Depending on the toxicant's chemical reactivity and vicinity, the toxicant may be able to interact with the biological target. Interactions between a toxicant and the biological target may also be more specific, where high-affinity binding sites increase the selectivity of interactions. For this reason, toxicity may be