Therapeutic Drug Monitoring

- There are inter-individual differences in drug response, and even intra-individual differences at different times or circumstances.
- This variability results from two main domains:

1. Variation in absorption, distribution, metabolism or excretion (pharmacokinetics).
2. Variation at/or beyond tissue receptors or other macromolecular drug targets (pharmacodynamics).

- Inter-individual and intra-individual differences in drug response necessitate individualization of drug therapy.
- This means giving the right dose for the individual, in contrast to the population dose.
- Therefore, monitoring of drug therapy (for therapeutic and adverse effects) becomes essential.
- How?
- There must be a continuous variable (biological response) that is readily measured and is closely linked to the desired therapeutic outcome of a drug, as a measure of monitoring of the therapeutic effect.
- Monitoring is also needed to reduce the risk of a clinical event (stroke, heart attack, pulmonary embolism, etc.).
- For example, antihypertensive drugs are monitored by their effect on blood pressure, statins by their effect on serum cholesterol, warfarin by its effect on the international normalized ratio (INR).
- Some times, there is NO good continuous variable to monitor, especially for diseases with an unpredictable or fluctuating course.
- Measuring drug concentrations in plasma or serum identifies only pharmacokinetic variability, and may usefully guide dose adjustment. (e.g: anticonvulsants).
- Measuring drug concentrations for use in this way is often referred to as 'therapeutic drug monitoring'.

Role of therapeutic drug monitoring: