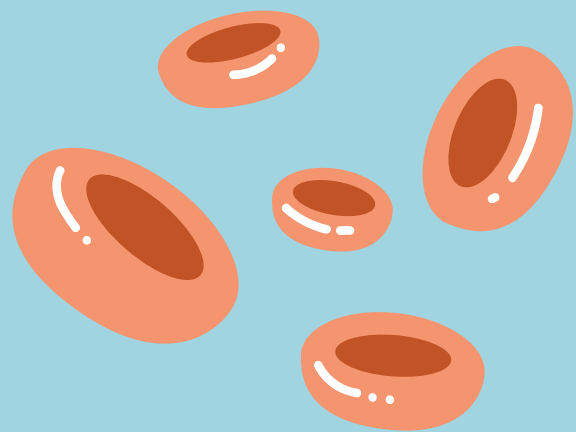
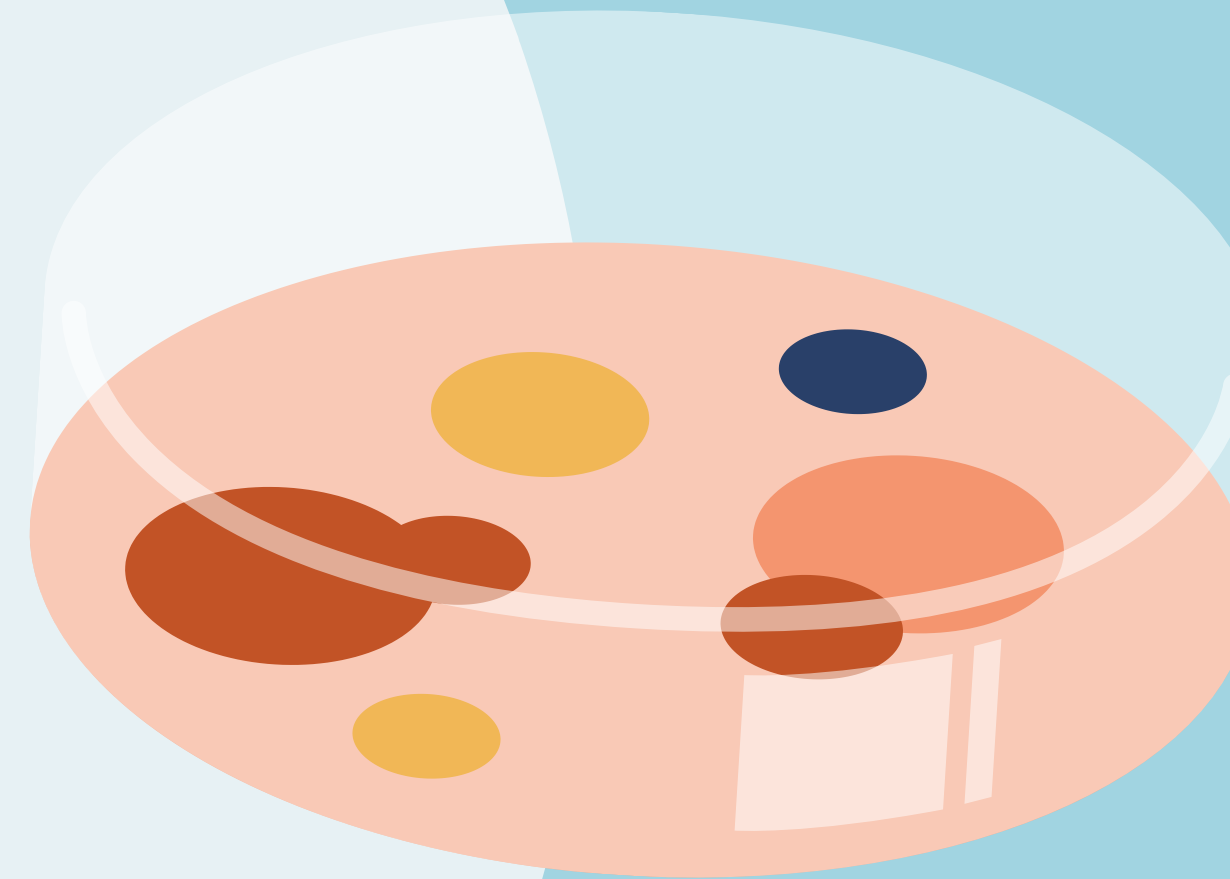


THERAPEUTIC DRUG MONITORING (TDM)



Salma A
Roll No:97
2023 batch

Definition : It is defined as a clinical laboratory measurement of a drug or a chemical in the plasma to ascertain the therapeutic effect & to prevent toxicity of drugs with narrow therapeutic index.



Key Concepts in Therapeutic Drug Monitoring :

1. Therapeutic Range

- Understanding the therapeutic range is crucial for effective TDM, as it defines the concentration of a drug in the bloodstream that achieves desired therapeutic effects without causing toxicity.
- Monitoring drug levels within this range helps clinicians adjust dosages appropriately.

2. Pharmacokinetic Parameters

- Measurement of plasma drug concentration can give an estimate of the pharmacokinetic variables in that patient (Parameters such as Volume of Distribution (Vd), Clearance (Cl), and plasma half-life ($t_{1/2}$))
- Also the magnitude of deviation from the 'average patient', so that appropriate adjustments in the dosage regimen can be made

Revised dosed rate = Previous dose rate x Target CPSS

Measured CPSS

Key Concepts in Therapeutic Drug Monitoring :

3. Patient Variability

- Individual patient factors such as age, weight, organ function, and genetic makeup can significantly influence drug metabolism and response.
- Recognizing this variability is essential to achieve optimal therapeutic outcomes for each patient.

Indications of TDM : It is useful in ;

1

Drugs with low safety margin

Eg : digoxin, anticonvulsants, antiarrhythmics, theophylline, aminoglycoside antibiotics, lithium, tricyclic antidepressants.

2

If individual variations are large

Eg: antidepressants, lithium.

3

Potentially toxic drugs used in the presence of renal failure

Eg: - aminoglycoside antibiotics, vancomycin.

Indications of TDM : It is useful in ;

4

In case of poisoning

Eg : paracetamol poisoning

5

In case of failure of response without any apparent reason

Eg: antimicrobials.

6

To check patient compliance

Eg – antiepileptic drugs, psychopharmacological agents.

Timing of blood sampling :

A. When the purpose is dose adjustment:

- In case of relatively long-acting drugs it is prudent to measure the trough steady-state blood levels, i.e. just prior to the next dose, because this is governed by both V_d and CL .
- For short-acting drugs which achieve therapeutic levels only intermittently (e.g. ampicillin, gentamicin), sampling is done in the immediate post-absorptive phase to reflect the peak levels.



Timing of blood sampling :

b. In case of poisoning:

- Blood for drug level estimation should be taken at the earliest to confirm the poisoning and to assess its seriousness.
- It should then be repeated at intervals to estimate the drug clearance in the affected patient, and the need to hasten elimination (**e.g. by hemodialysis**).



Timing of blood sampling :

C. For checking compliance to medication:

- Even random blood sampling can be informative.





LIMITATIONS OF TDM :

Monitoring of plasma concentration is of no value for :

- * Drugs whose response is **easily measurable**, e.g. antihypertensives, hypoglycemics, diuretics, oral anticoagulants, inhalational general anesthetics.
- * **Drugs activated** in the body, e.g. levodopa
- * **Hit and run drugs** (whose effect lasts much longer than the drug itself), e.g. reserpine, MAO inhibitors, omeprazole.
- * Drugs with **irreversible** action, e.g. organophosphate anticholinesterases, phenoxybenzamine.

Summary



Optimizing Drug Efficacy

Individualized Patient Care

Enhancing Treatment Compliance