

Important Pharmacological Terms

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Definitions:

Pharmacokinetics

It is the study the effects of body on drugs . It includes the study of absorption, distribution, biotransformation and excretion of drugs

Absorption

The movement of a drug from its point of entry into the body into systemic circulation

Active transport

Transport against concentration gradient

Bioavailability means

Fraction of an uncharged drug reaching the systemic circulation following any route of administration

Drug distribution

The transport of a drug in the body by the bloodstream to its site of action

Volume of Distribution (Vd)

Volume of distribution (Vd) is the ratio between the amount of drug in body (dose given) and the concentration of the drug (C) measured in blood or plasma.

Elimination Half-life

Elimination Half-life: ($t_{1/2}$) is the time required to decrease the amount of drug in body by 1/2 during elimination

First Pass Effect

Drug metabolism may occur in the intestinal wall or liver enzymes, before reaching systemic circulation

Biotransformation

The process by which drugs are inactivated and transformed into a form that can be eliminated from the body

Metabolic transformation (phase 1) is:

Transformation of substances due to oxidation, reduction or hydrolysis

Excretion

Primarily accomplished through the kidneys but may also involve the liver, the lungs, intestines, sweat and mammary glands

Receptors:

Specialize target molecules on the cell surface or intracellularly that the drug binds to and exerts its effect through. \ Or

Active macromolecular components of a cell or an organism which a drug molecule has to combine with in order to elicit its specific effect

-Pharmacodynamics:

It is the study the effects of drugs on body

It involves the study of following

1. Biological and therapeutic effects of drugs
2. Mechanisms of drug action
3. Drug interactions

Affinity:

It is the tendency of a drug to associate with its receptor. It is a measure of how tightly a drug binds to a receptor(Fast/strong binding = higher affinity)

Agonist:

It is a drug that binds to the receptor and produces a biological response



Full agonist

It is an agonist that can produce maximal effects and has high efficacy

Partial agonist

It is an agonist that can produce submaximal effects and has moderate efficacy

A competitive antagonist

It is a substance that binds to the same receptor site and progressively inhibits the agonist response

Agonist-antagonist is the substance binding to one receptor subtype as an agonist and to another as an antagonist

Antagonist:

It is a drug that binds to the receptor but no biological response is produced

ED₅₀ “effective dose 50”:

The dose of the drug that produces a response equal to 50 % of the maximum response.

Efficacy

It is the maximal response produced by the drug. It depends on the number of drug-receptor complexes formed.

Potency

It is a measure of how much of a drug is required to elicit a given response. The lower the dose required for a given response, the more potent the drug

Therapeutic index

It is the ratio of LD₅₀ (the dose which is lethal to 50% of experimental animals) to ED₅₀ (the dose that gives the desired response in 50% of experimental animals).

$$= \text{LD}_{50} / \text{ED}_{50}$$

Therapeutic index is a measure of drug safety, thus the higher the index the safer is the drug.

Idiosyncrasy:

It is an abnormal response to the therapeutic dose of the drug because of genetic difference in metabolism.

It is reaction to a drug that is significantly different from what is expected



Hypersensitivity:

Abnormal response to the therapeutic dose of the drug because of antigen- antibody reaction

Tolerance:

Effect of drug gradually decreases when given continuously or repeatedly

Potentiation

The enhancement of a drug's effect by another drug

Refractory

The failure of a patient to respond as expected to a certain medication

Synergism

The combined action of 2 or more drugs that is greater than the sum of the 2 drugs acting independently

Cumulative action

An increased effect caused by multiple doses of the same drug

Additive effect

If two drugs with the same effect, taken together, produce an effect that is equal in magnitude to the sum of the effects of the drugs given individually

Therapeutic dose

It is the amount of a substance to produce the required effect in most patients

Toxic dose

It is the amount of a substance to produce effects hazardous for an organism

Teratogenic action

It is a negative action on the fetus causing fetal malformation

Nephrotoxicity

It is toxic action on kidney

Pharmacological actions:

These are the effects of the drug on the body.

Contraindication

Specific sign, symptom, or circumstance in which it would be inappropriate or harmful to administer a drug

Indication

Specific sign, symptom, or circumstance that makes it appropriate to administer a drug

Dose

The dose refers to the amount of drug to be administered. Adult and pediatrics patients may have two different doses of the same drug.

A landscape photograph of a sunset. The sky is filled with vibrant orange and yellow light, with some clouds catching the low sun. In the foreground, a dark silhouette of a tree stands on a grassy field. The text "Thank you" is overlaid in the center in a white, serif font.

Thank you