

Doctor 021

PHARMACOLOGY



Sheet no.01



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-DEFINITIONS:

-Drug:

It is any chemical that affect living processes. It modifies an already existing function, and does not create a new function

-it's a chemical compound that can modify physiological or biochemical processes, facilitating, increasing or reducing them.

-Pharmacology (science of drugs):

It is the knowledge of history, source (normal, synthetic), physical and chemical properties, absorption (how it reaches the circulation and the site of action from intestine), distribution, excretion (how to get rid of drugs), biotransformation, actions and therapeutic uses of drugs. (or toxic effects on microbes and cancer cells).

-pharmacy: drug before interring the body (synthesis and Preparing).

-pharmacology: the effect of the drug after interring the body.

-Medical (when related to human) (or Clinical) Pharmacology:

Is the science that deals with the use of drugs for diagnosis, prevention and treatment of human disease.

-Toxicology:(A Branch of pharmacology deals with toxins and overdosed drugs).

Is that aspect of pharmacology which deals with toxic effects of drugs and the toxic effects produced by household, environmental and industrial chemicals. (poisons are also drugs, why?)

-Toxins are drugs since they affect physiological and Biochemical processes in the body.

-Clinical Toxicology:

Deals with the toxic or adverse effects of toxins on the human body, including the diagnosis and treatment of human poisoning.

-Pharmacotherapeutics:

Is the use of drugs in the prevention and treatment of disease (or the medical uses of drugs).

-Chemotherapeutics:

Is the use of drugs to stop the growth or kill microorganisms or cancer cells.

-The genomic effect of the action of the drug:

-Pharmacogenomics (multiple genes):

The relation between the individual's genetic makeup to his/her response to specific drugs (entire genome).

-Pharmacogenetics (single gene):

Interindividual variation in drug response that is due to genetic influences (specific gene).

-Tolerance:

Is a decrease in the responsiveness to the drug with continued drug administration.

-happens over time slowly.

-results from adaptation of the body.

-Tachyphylaxis:

-Similar to tolerance but more rapid.

-Prescription:

The written directions for the preparation, dispensing and administration of the drug.

-two types of effect:

The therapeutic effect (required action):

It is the primary effect that the drug is prescribed (such as morphine for pain).

Adverse effects (unrequired action):

Are the undesirable harmful effects of the drug during therapy (at therapeutic doses (during treatment)) if large doses it's now called toxic effect.

-every drug has adverse effect but differ in severity.

Drug toxicity:

Harmful effect of the drug on the body as a result of drug overdose.

Drug-Drug interaction:

When administration of one drug affect (increasing or decreasing) the action of another drug, or when co-administered drugs affect the action of each other.

Drug misuse:

Is the improper use of medications concerning dose, frequency, and duration of administration; or Invalid indication. All may lead to acute and chronic toxicity.

Drug abuse (related to addiction):

It is an inappropriate and habitual intake of drugs either continually or periodically for recreational but NOT medical reasons. It is related to addiction to drugs.

-AREAS OF PHARMACOLOGY:

-Pharmacodynamics:

Is what the drug does to the body, which includes the biochemical and physiological effects of the drug, including the mechanism of action, interaction with receptors as well as the adverse effects.

-Related to the effect of the drug:(toxic effect, adverse effect, mechanism of action, therapeutic effect).

Pharmacokinetics:

- **Is what the body does to the drug.**

- **Deals with absorption** (how does the drug moves), **distribution, biotransformation and excretion of drugs:**

- 1. Absorption: Is the movement of drug molecules from the site of administration into the circulation.**

- 2. Distribution** (to site of actions and organs of elimination): **Is the movement of drug molecules from the circulation to tissues and between different parts of the body.**

- 3. Biotransformation: Is conversion of the drug from one chemical structure into another by the action of metabolic enzymes (metabolism).**

- 4. Excretion: Is the movement of drug molecules out of the body.**

-PHARMACOKINETICS & PHARMACODYNAMICS

Dosage form (fluid, solid)



Disintegration

(Result from the active form from the drug)



Dissolution

absorption



Drug in the systemic circulation

Drug in the systemic circulation

Distribution



Drug in tissues of distribution



Drug in elimination organs



Excretion

Metabolism

Kidney

Liver



Drug at site of action



Pharmacological effect

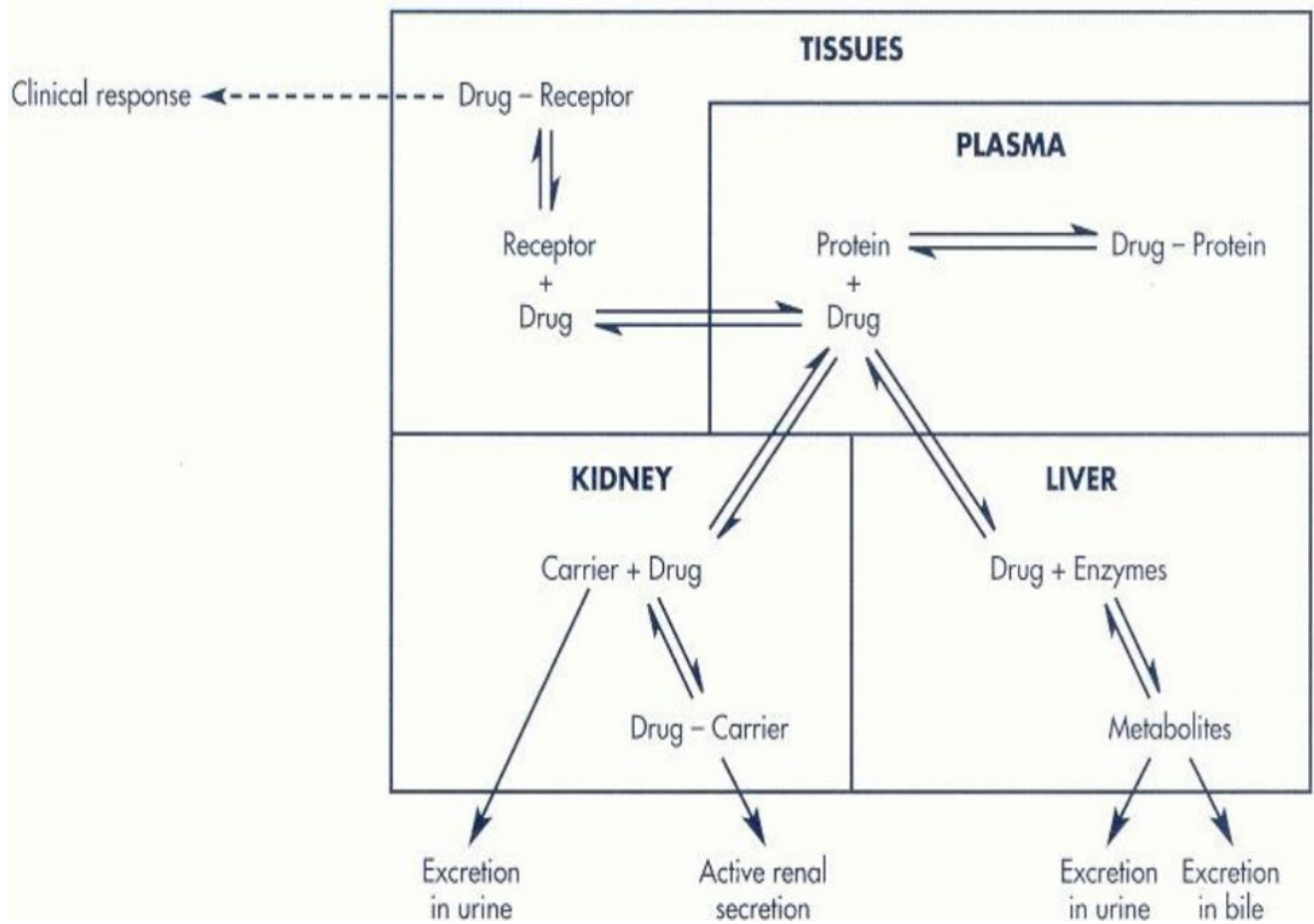


Clinical response



Efficacy Toxicity

-DRUG DISPOSITION:



-(Drug-Protein): bound drug (mainly albumin), it's not active in this form and it's not eliminated from the body.

-DRUG SOURCES:

1. Natural Sources:

- **Plants: include alkaloids** (contain nitrogen), **which are substances containing nitrogen groups and give an alkaline reaction in aqueous solution. Including morphine, cocaine, atropine, and quinine.**
- **Microbes** (specially from fungi): **include antibiotics + anticancer drugs which are isolated from microorganisms, such as Penicillium and Streptomyces species.**
- **Animal tissues (hormones): The most important are hormones used for replacement therapy (Insulin, growth hormone, thyroid hormones). These days, peptide hormones may be synthesized by recombinant DNA technology.**

2. Synthetic Drugs:

- **Synthesized new compounds** (exist in small amount): **include aspirin, barbiturates, and local anesthetics which were among the first drugs to be synthesized in the laboratory.**
- **Modified naturally occurring drugs** (by altering the structure of drugs): **include Semisynthetic derivatives of naturally occurring compounds, such as the morphine derivative oxycodone.**