Introduction to Pharmacology

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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.

Definitions

Pharmacology (science of drugs):

It is the knowledge of history, source, physical and chemical properties, absorption, distribution, excretion, biotransformation, actions and therapeutic uses of drugs. (or toxic effects on microbes and cancer cells).

Definitions

Medical (or Clinical) Pharmacology:

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

Definitions

Toxicology:

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?)

Definitions

Clinical Toxicology:

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

Definitions

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.

Definitions

Pharmacogenomics:

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

Pharmacogenetics:

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

Definitions

Tolerance:

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

Tachyphylaxis:

Similar to tolerance but more rapid.

Definitions

Prescription:

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

The therapeutic effect:

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

Adverse effects:

Are the undesirable harmful effects of the drug during therapy (at therapeutic doses).

Definitions

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 the action of another drug, or when co-adminstered drugs affect the action of each other.

Definitions

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:

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.

Areas of Pharmacology

Pharmacokinetics:

- **Is what the body does to the drug.**
- **Deals with absorption, distribution, biotransformation and excretion of drugs:**

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

Areas of Pharmacology

2. **Distribution: 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

↓

Disintegration

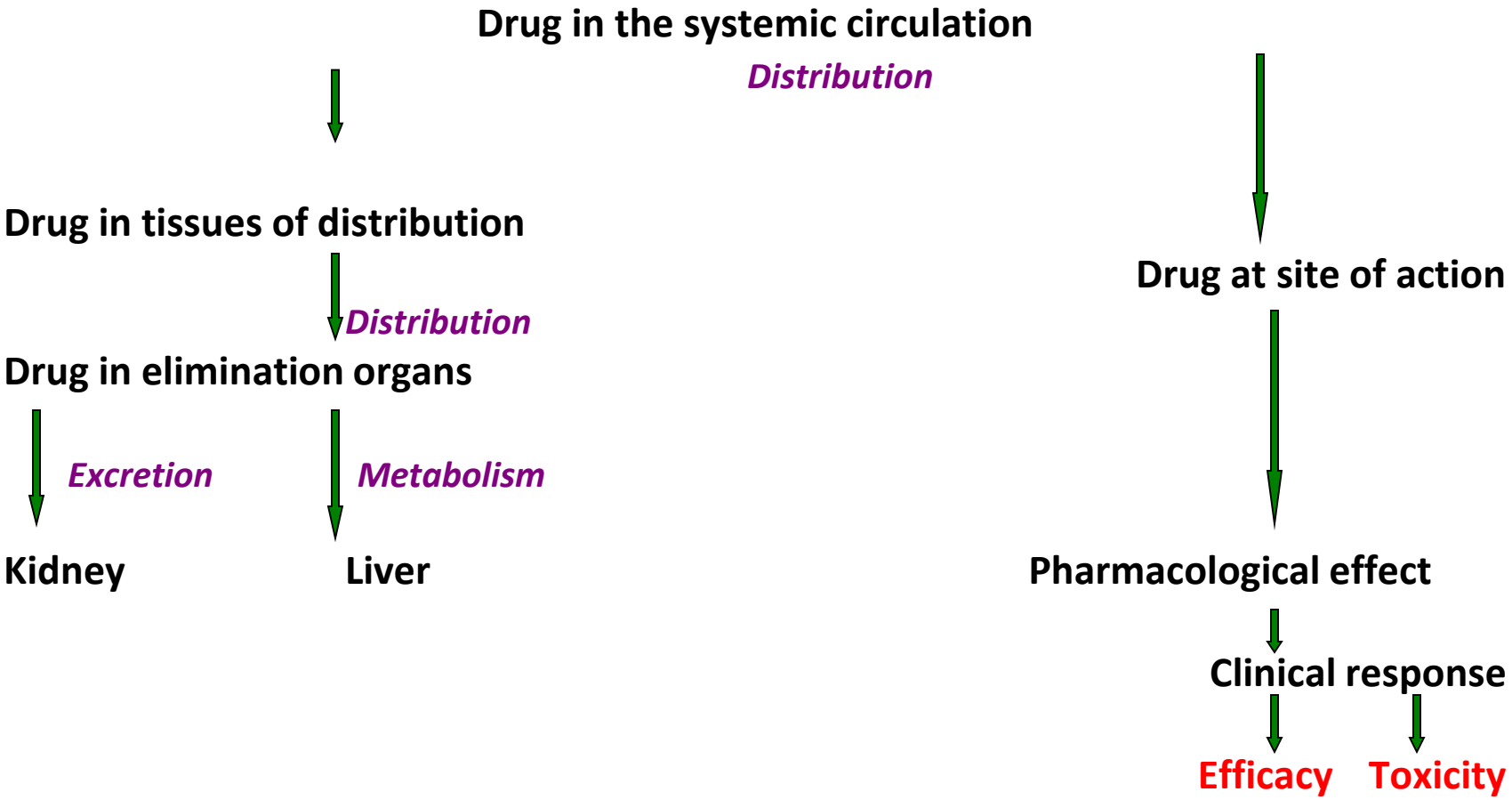
↓

Dissolution

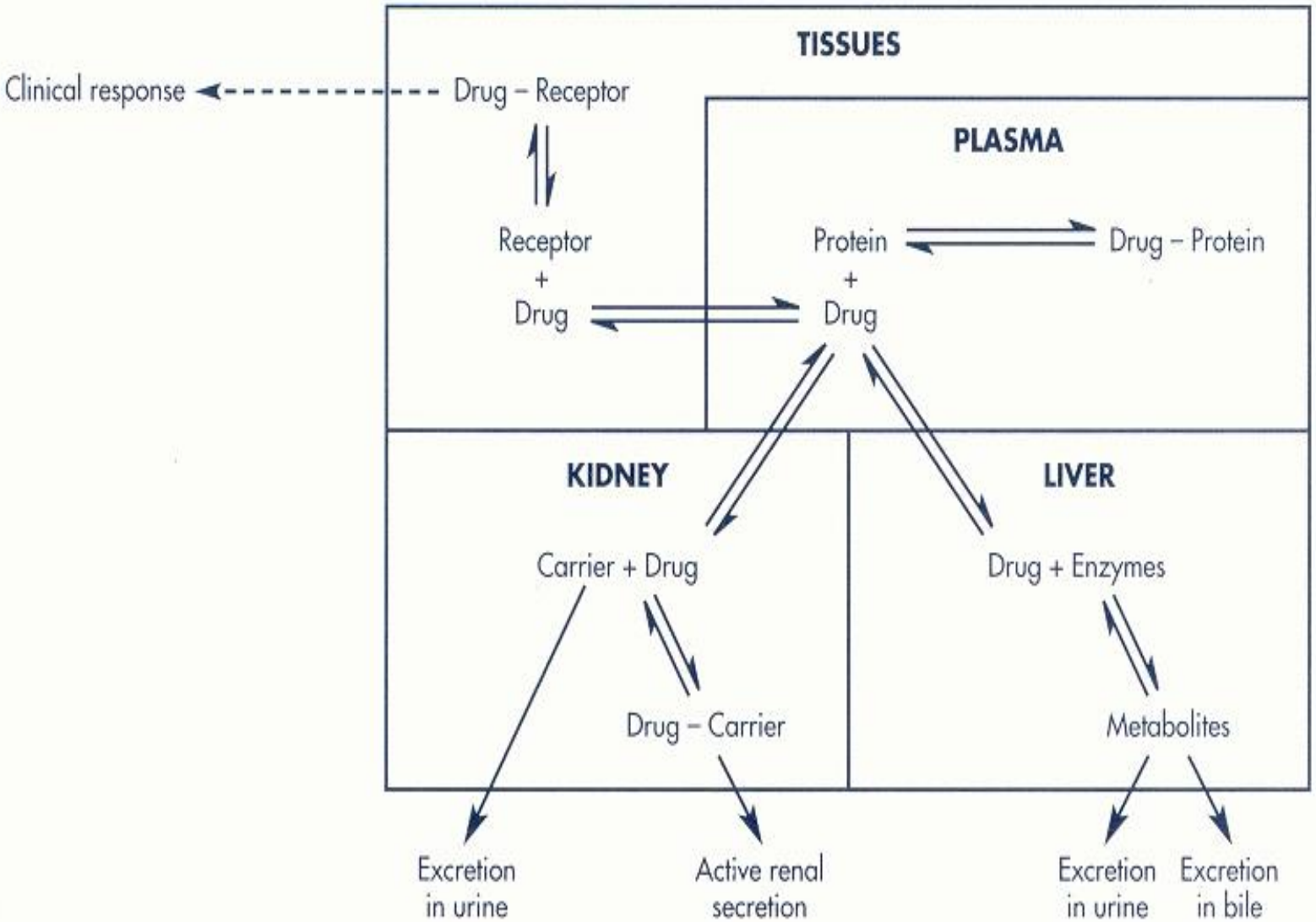
↓ ***absorption***

Drug in the systemic circulation

Pharmacokinetics & Pharmacodynamics



Drug Disposition



Drug Sources

1. **Natural Sources:**

- **Plants:** include alkaloids , which are substances containing nitrogen groups and give an alkaline reaction in aqueous solution. Including morphine, cocaine, atropine, and quinine.
- **Microbes:** include antibiotics which are isolated from microorganisms, such as *Penicillium* and *Streptomyces* species.

Drug Sources

- **Animal tissues:** **The most important are hormones used for replacement therapy (Insulin, growth hormone, thyroid hormones). These days, peptide hormones may by synthesized by recombinent DNA technology.**

Drug Sources

2. Synthetic Drugs:

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