❖ **Basic terms in pharmacology**

- **Pharmacology**: - The term pharmacology is derived from two Greek words: pharmakon, the Greek word for drugs, and logos, the Greek word for science. **Is the study of chemicals—drugs—on living tissues and how those chemicals help diagnose, treat, cure, and prevent disease.**

- **Pharmacokinetics:** The term pharmacokinetics is derived from the root words *pharmaco*, which means "medicine," and *kinetics*, which means "movement or motion." **Pharmacokinetics is thus the study of drug movement throughout the body. Therefore, it describes how the body deals with medications.**

- **Pharmacodynamics:** is the branch of pharmacology concerned with the mechanisms of drug action and the relationships between drug concentration and responses in the body.

- **Pharmacognosy** : is the study of plant and animal natural products and their use in the treatment of disease .

- **Drug:** - a chemical substance of known structure, other than a nutrient or an essential dietary ingredient,1 which, when administered to a living organism, produces a biological effect.

- **Therapeutics**: - is the branch of medicine concerned with the prevention of disease and treatment of suffering.

- **Pharmacotherapeutics: -** is the application of drugs for the purpose of disease prevention and the treatment of suffering.

- **Pharmacy (Pharmaceutics):** is the study of preparation, compounding and dispensing of the medicines.

- **Chemotherapy:** deals with the use of drugs capable of inhibiting or destroying invading bacteria, viruses, parasites, or cancer cells, while having minimal effect on healthy living organism.

- **Toxicology:** is the science that study poisons according to their source, chemical composition, actions, tests for detection, and antidotes. It forms a major part of forensic medicine.

- **Pharmaco-epidemiology:** is the study of the effect of drugs on populations.

Sources of drugs: -

1. **Plant sources:** There are several drugs come from plant sources, as the plants contains active substances (alkaloids, digitalis, oil, resins, saponin) in their root, seeds, leaves and flowers. These active substances can be extracted, purified and used as drugs to treat different diseases.

Common drugs from plants include

- Digitalis (Purple Foxglove).
- Morphine (Opium Poppy).
- Vincristine (Periwinkle).

2. **Animals sources:**

drugs from animal sources include agents such as insulin (can be extracted from pork and beef pancreas. pituitary hormones, some vitamins, antibiotics, and biologic agents (such as vaccines and immune serums).

3. **Synthetic Chemicals:**

Most drugs used today are either **partially synthetic** (contains a derivative of a natural substance combined with a pure chemical ex: penicillinV, the penicillin molecule, which is unstable in gastric acid is modified so that it can be given orally

or **wholly synthetic chemical** compounds that have been produced in a laboratory. advantage of synthetic drugs is being more standardized in their chemical characteristics, more consistent in their effects and less expensive to produce than drugs from a natural source.

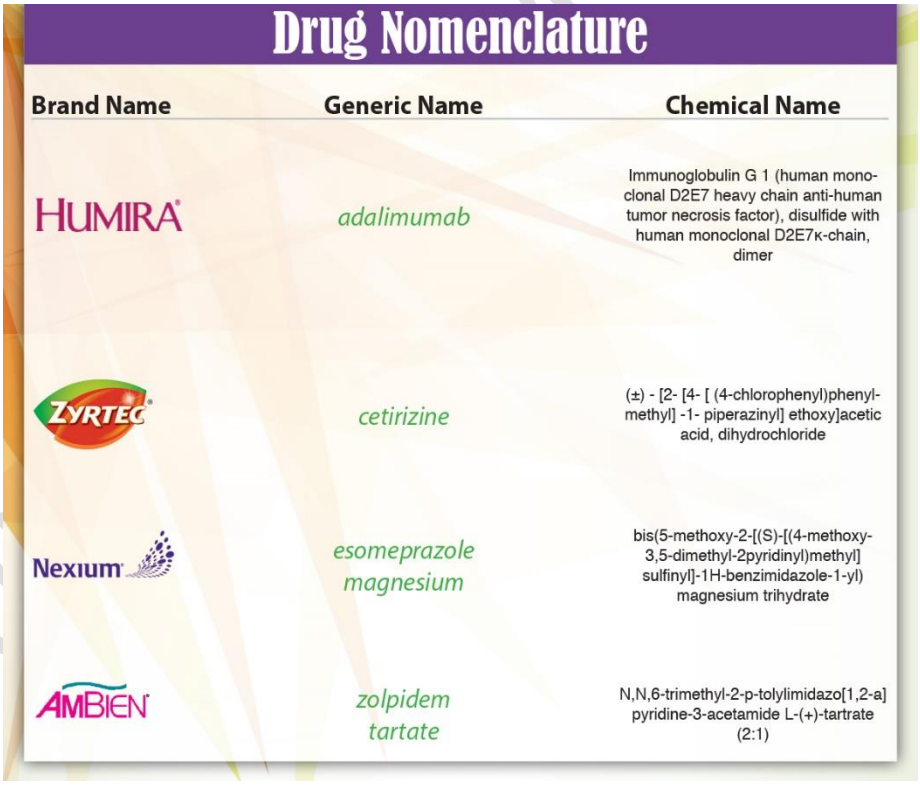
4. **Genetically Engineered Chemicals:**

Genetically engineered drugs are drugs developed with DNA technologies. For example manipulating with DNA by inserting these gene into harmless *E.coli* bacteria and repeatedly reproduced to produce drug.

❖ **DRUG NAMES:**

All drugs are known by at least three names: **a chemical name**, a **generic name** (sometimes called the official name), and a **trade name:**

- **chemical name** of a drug describes the drug's atomic and molecular structure, using exact chemical nomenclature. Ex: **N-acetyl-p-aminophenol**.
- **Generic name** The generic name of a drug is the universally accepted name and considered the official name for the drug. The generic name appears on all drug labels and is the official name listed in official sources such as the Physicians' Desk Reference (PDR). **Ex: paracetamol**
- **Brand (trade) name**, or proprietary name, is given to a drug by its manufacturer. The symbol™ or ® after the trade name indicates that the drug molecule and name are registered by the drug manufacturer, and the use of the drug and its name are restricted to the drug's manufacturer. **Ex: Tylenol or panadol**



Example of nomenclatural of drugs

❖ Prescription and Over-the-Counter Drugs

Drugs are obtained either by a **prescription** or **over the counter (OTC):**

- **Prescription Drugs:** They are drugs that are considered unsafe for use except under medical supervision, they're dispensed only by physician's description Drugs that fall under this classification are:

✓ Those given by injection.
✓ Hypnotic drugs (drugs that depress the nervous system).
✓ Narcotics (drugs that relieve pain, dull the senses and induce sleep).
✓ Habit-forming drugs.
✓ Drugs with low therapeutic index

- **Non-prescription drugs** (**over-the-counter** (OTC) drugs): drugs that are considered safe for use without medical supervision and are available to the public without prescription . OTC drugs include those given for symptoms of the common cold, headaches, constipation, diarrhea, and upset stomach.

❖ Factors Affecting the Dose and Action of Drugs

Dose indicates the amount to be given at one time and dosage refers to the frequency, size, and number of doses.
Many factors affect the drug action and the required dose, these factors are:

1) **Age:** In general, children require smaller doses than adults either based on age or based on weight.

2) **Sex:** Female response to certain drugs differ from male due to hormonal fluctuations in women during the menstrual cycle.

3) **Body weight:** The usual doses for drugs are mentioned generally for 70 kg adult. The dose calculations for abnormally thin or obese patients are required to calculate on the basis of body weight.

4) **Rout of administration:** By influencing absorption and distribution.

- I.V rout: the most rapidly action and response of drug due to directly injected to the blood stream.
- I.M rout also rapid but slower than I.V rout.

- The oral route usually produces slower drug action than parenteral routes.

5) Pathologic Conditions

The absorption of oral drugs is decreased with various GI disorders. Distribution is altered in liver or kidney disease and other conditions. Furthermore, Metabolism is decreased in malnutrition (eg, inadequate protein to synthesize drug-metabolizing enzymes). Excretion is decreased in Kidney disease.

6) Health and nutrition

Anemic patients are, in general, more sensitive to the toxic effects of drugs and hence they are given smaller doses.

7) its interaction with another drug in the body (increased or decreased)

*** Interactions that can increase the therapeutic or adverse effects of drugs are as follows:*

A. *Additive effects* occur when two drugs with similar pharmacologic actions are taken. *Example:* ethanol + sedative drug →increased sedation.

B. *Synergism* or *potentiation* occurs when two drugs with different sites or mechanisms of action produce greater effect.

Ex: acetaminophen (non-opioid analgesic) + codeine (opioid analgesic) →increased analgesia

***C.* In some situations,** a drug that is a specific antidote is given to antagonize the toxic effects of another drug. *Example:* naloxone (a narcotic antagonist) + morphine (a narcotic or opioid analgesic) → relief of opioid-induced respiratory depression.

❖ **Properties of ideal drug: -**

- ✓ **Effectiveness:** a drug that elicits the response. It is the most important property.
- ✓ **Safety (**safe drug even at high concentrations and long period of administration.
- ✓ **Selectivity:** Selectivity is the degree to which a drug acts on a given site relative to other sites
- ✓ **Reversible action** (mean the action of drug subsided within specific time).
- ✓ Easy for administration.
- ✓ No interaction with other drugs or food.
- ✓ Low cost**.**