REPUBLIC OF YEMEN
Ministry of Higher Education and Scientific Research
21 SEPTEMBER UNIVERSITY



الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
جامعة ٢١ سبتمبر للعلوم الطبية والتطبيقية

General Pharmacology 1

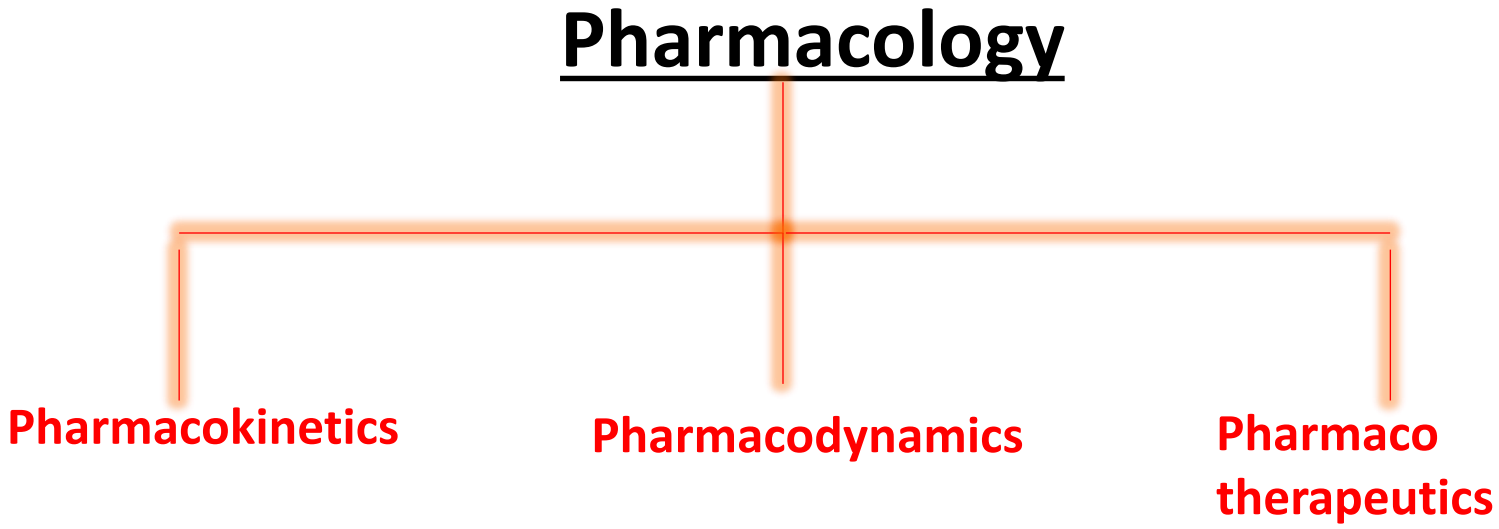
First lecture

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Pharmacology

- Pharmacology is the study of the effects of chemical substances on living systems, and the study of the effects of living systems on chemical substances





➢ Pharmacokinetics:

- The kinetic of drug or the effect of the tissues on the drug with time **including**

(absorption, distribution, metabolism and excretion)

➢ Pharmacodynamics:

- Study the biochemical and physiological effects for drug on the body tissues **(Mechanism of action)**

➢ Pharmacotherapeutics:

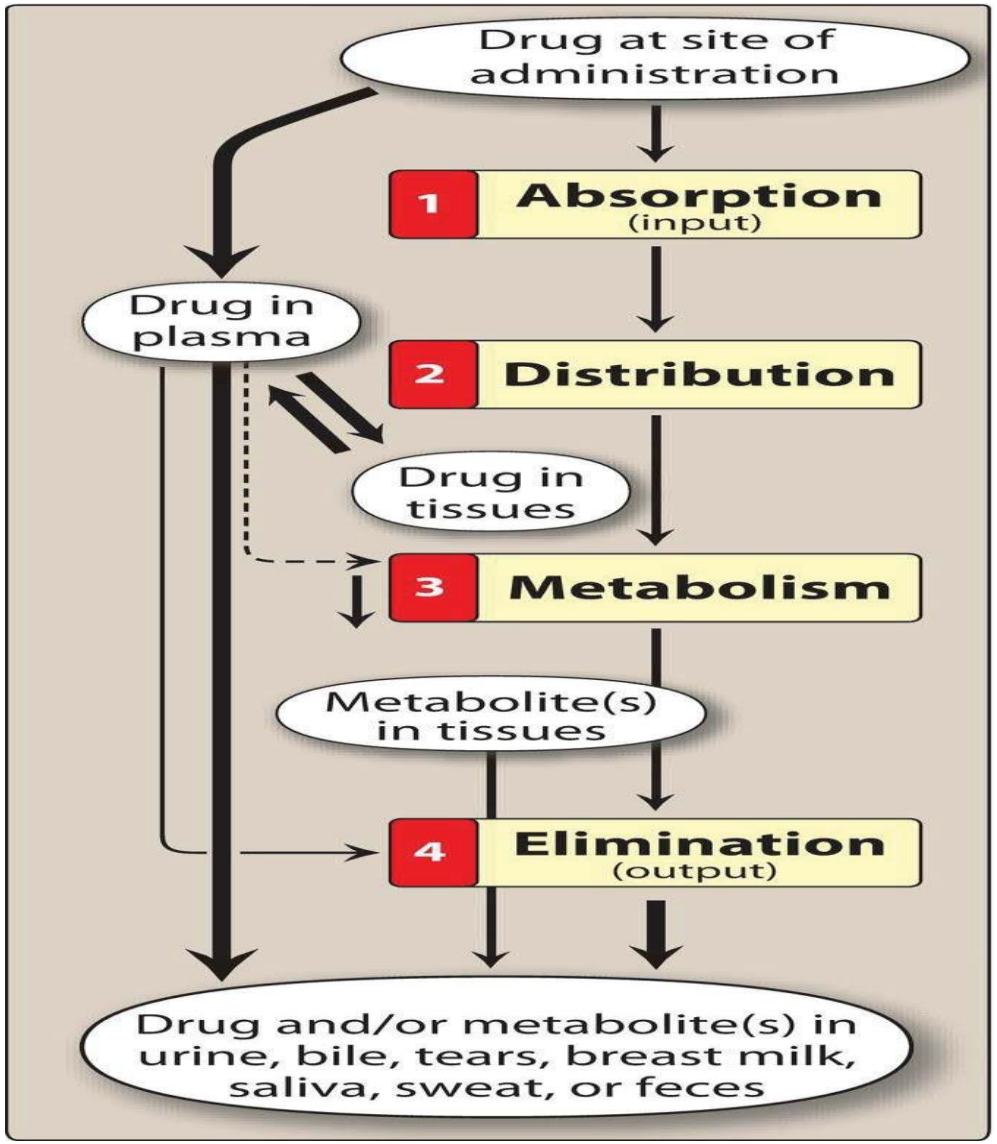
- The proper selection and use of drugs for prevention and treatment of diseases.

➢ Toxicology:

- It is a branch of pharmacology which deals with the undesirable effects of drugs on the body tissues.

➢ Pharmacokinetics:

Four pharmacokinetic properties determine the onset, intensity, and duration of drug action



Schematic representation of Drug absorption , Distribution,metabolism,elimination

Drug:

 A substance that affect living process and are used in the treatment, prevention or diagnosis of diseases and for prevention of pregnancy.

- **Classes of drugs:**

- **Prescription drugs:** for sale by prescription only.
- **Over the counter (OTC) drugs:** for sale without prescription.

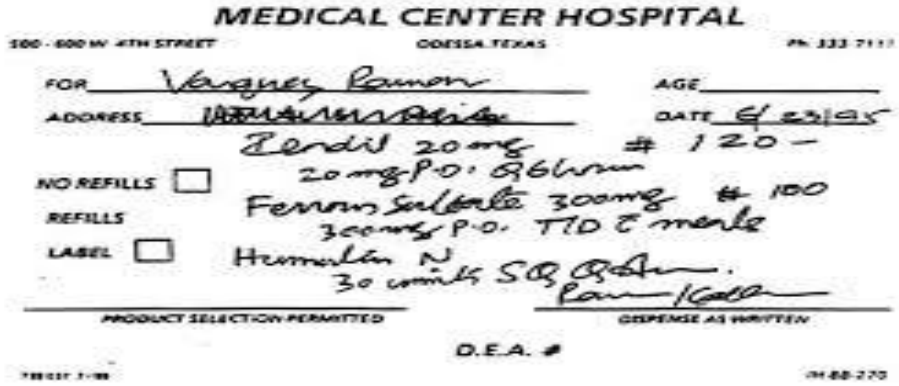
- **Nomenclature of drugs:**

- ✓ **Chemical name:** Describes the chemical composition. As acetylsalicylic acid.
- ✓ **Generic name:** Given by the official sources. As aspirin.
- ✓ **Trade name:** Given by manufacturing companies. As (Ecoprine)® or (Anaprin)®

The dosage of the drugs:

Dose: the amount of drug given to the patient at a definite time.
Therapeutic dose: the average dose required to produce a therapeutic effect.
Maximal tolerated dose: the largest dose can be taken safely.
Loading dose: the initial dose that give rapid therapeutic plasma concentration.
Toxic dose: the dose which cause toxic effects.
Lethal dose or fatal dose: the dose that produce death.

Prescription


MEDICAL CENTER HOSPITAL

FOR Vargney Ramon AGE

ADDRESS DATE 4/23/95

Zerdil 20mg # 120 –
20mg P.O. Q6hrs prn

NO REFILLS ☐

REFILLS

Ferrous Sulfate 300mg # 100
300mg P.O. TID c meals

LABEL ☐

Humulin N
30 units SQ Q AM.

PRODUCT SELECTION PERMITTED

DISPENSE AS WRITTEN

D.E.A. #

is composed of 8 main parts

1. Date
2. Patient information
   Name ,address and age
3. R
   Take (Latin- recipe)
4. Drug information
   Name and strength of the drug .
5. Direction for the pharmacist ,if compound drug .
6. Direction for the patient
   take orally ,apply (ointment), insert (rectally)
7. Refill information
8. Doctor information
   Signature ,Name ,Address .



MEDICAL CENTER HOSPITAL

500 - 600 W 4TH STREET ODESSA, TEXAS Ph. 333 7111

FOR Vargas, Ramon AGE

ADDRESS [redacted] DATE 6/23/95

Zerdi 20 mg # 120 -
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30 units SQ Q AM.

PRODUCT SELECTION PERMITTED

DISPENSE AS WRITTEN

D.E.A. #

TB 637 1-98 IH-88-270

Abbreviation

Abbreviation	English meaning
collut.	a mouth wash
garg.	a gargle
o.d	once daily
b.i.d	twice a day
q.i.d	four times a day
s.o.s.	if needed

Abbreviation

Abbreviation	English meaning
prim. luc	early in the morning
o.m.	every morning
o.h.	every hour
n.	at night
o.n.	every night
h.s.	at bed time
a.c.	before meals
p.c.	after meals
i.c.	between meals/food

Abbreviation

Abbreviation	English meaning
pulv	powder
sol.	solution
tab.	teblet
caps.	capsule
tr.	tincture
ex.lact.	with milk
ex. aq.	with water
dol. urg.	when the pain is severe

➢ Sources of drugs:

- **Natural:**

Plant sources:

- Atropine from belladonna leaves.
- Digoxin from digitalis.
- Morphine from opium.

- **Animals:**

As insulin from pancreas of animals.

- **Microorganisms:**

✓ As antibiotics from fungi and bacteria.

- **Minerals:**

✓ As ferrous sulfate or I2

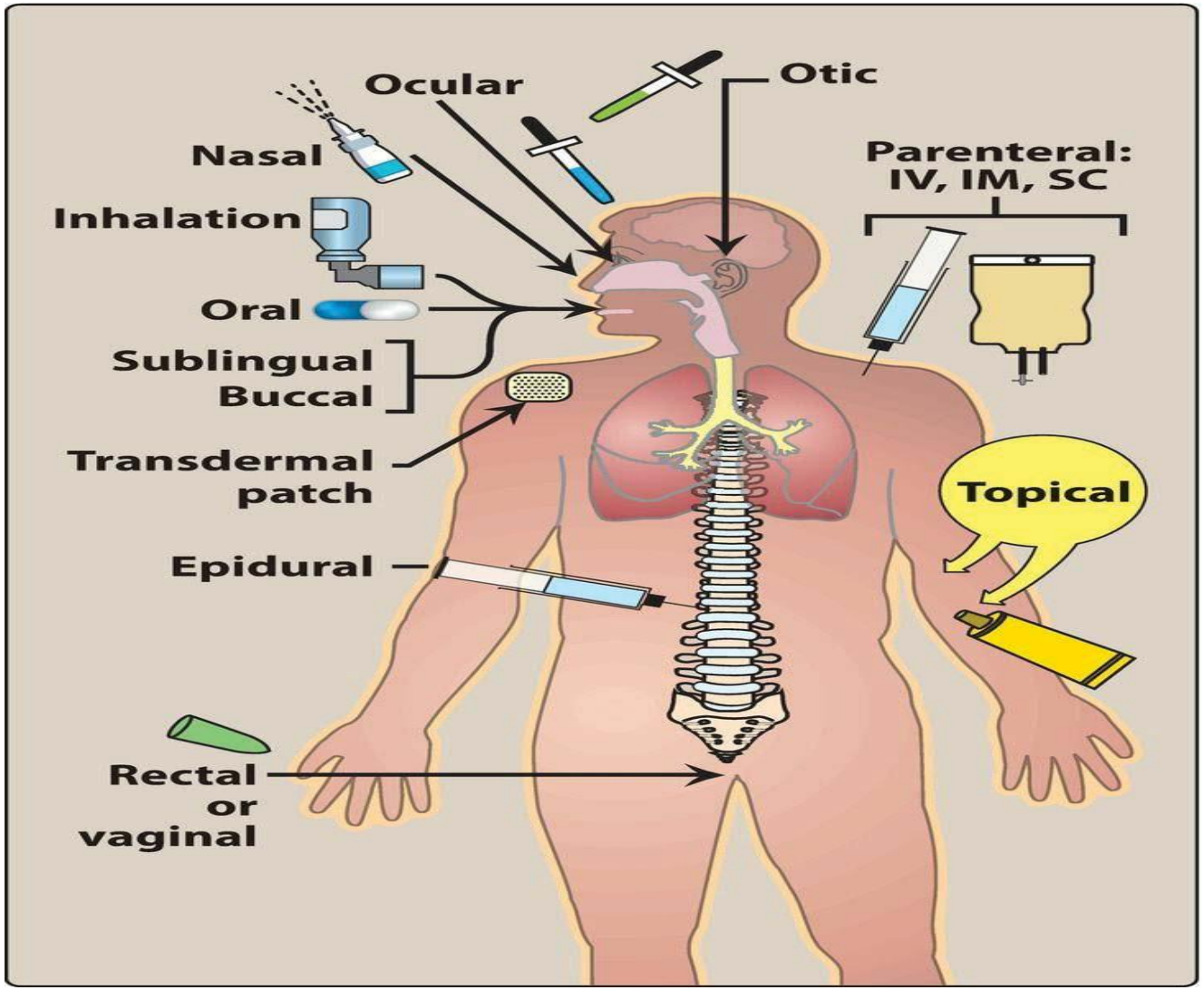
- **Synthetic:**
- **Chemically: (most drugs)**

✓ As sulphonamides, diclofenac, barbiturates, ….. etc.

- **Biotechnology:**

✓ As human insulin & growth hormone (by recombinant DNA technology)

Routes of drug-administration:



Commonly used routes of drug administration

Liponncott illustrated review

Routes of drug-administration:

a- Enteral route: (through GIT)

1- Oral route:

- **Advantages:**
  - The most common for systemic and local action.
  - Ease of administration.
  - More safe.
  - Don`t need sterile technique.
  - Economic.

- **Disadvantages:**
  - Slow onset of action. (not suitable in emergency)
  - Unsuitable for unconscious patients.
  - Some drugs are irritant for mucosal membrane.
  - Affected by pH and digestive enzymes.

2- Sublingual route:

- Placement the drug under the tongue.
- Rapid absorption for systemic action.
- As nitroglycerine and isoprenaline.

3- Buccal route:

- Placement of drugs between gums and inner lining of the cheek.
- Rapid onset for systemic action.
- May irritate the mucous membrane.
- As midazolam and some opioids.

4- Rectal route:

- As suppositories or enemas for systemic and local action.
- Suitable for irritant drugs and during vomiting.
- Suitable for children and geriatrics.
- As non-steroidal anti-inflammatory drugs.

b- Parenteral route:

➢ Intravenous (IV) injection:

○ Advantages:

- 100% bioavailability.
- Rapid response.
- No first pass effect.
- Valuable in emergency situations.
- Suitable for irritant drugs and complex mixtures.
- Large volumes can be administrated. (compared to other parenteral route)
- The dose can be titrated.

○ Disadvantages:

- Low safety. (allergy & anaphylactic shock)
- Needs sterile technique and professional person.
- Not suitable for oily drugs.
- Irritation or phlebitis at the site of injection.

➢ Intramuscular (IM) injection:

- Suitable for solution, suspension and oily drugs.
- Slower absorption than IV.
- Painful and false IM injection may cause nerve damage.

➢ Subcutaneous (SC) injection:

- Slower absorption than IV or IM.
- Suitable for slow-release non-irritant drugs.
- May cause pain and necrosis.
- As insulin and some vaccines.

➢ Intradermal (ID):

- As local anesthetics and for sensitivity tests.

➢ Intrathecal. (in CSF)

- As drugs for spinal anesthesia.

- **Intra-articular.**

 For local action in joints as some corticosteroids.

- **Intra-arterial.**

 As in cancer chemotherapy.

- **Intra-cardiac.**

 As adrenaline in cardiac resuscitation.

- **Intraperitonial.**

 In hemodialysis or experimentally

c- Oral inhalation:

 Highly absorbed from mucous membrane of pulmonary epithelium.

 Local effect on the lungs as in asthma and COPD.

 Some drugs given for systemic action as inhalation anesthesia.

 Many drugs cause lung irritation.

d- Nasal inhalation:

- As nasal corticosteroids and desmopressin as nasal spray.



e- Topical administration:

- Usually for local effect but high lipid soluble drugs can be absorbed.

- **On skin:**

As antiseptics, ointments & creams.

- **On mucous membrane:**

As intravaginal forms, eye or ear drops.







f- Transdermal route:

- Application of drugs on the skin for systemic action (Transdermal drug delivery system)
- Convenient and painless.
- Used for sustained delivery of drugs as nitroglycerin or nicotine patches.

g- Pellet implantation.

- Optimal therapy for long periods.
- As estrogen or testosterone implants.