

# **PRACTICAL PHARMACOLOGY**

**College of Medicine - Third Stage**



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## Pharmacological dosage forms

**1-Internal preparation :** (solid,liquid,powder,drop for infant ,aerosol ,implant, parenteral)

**2-External preparation :** (suppository,ointment,cream,drop,liniment....)

### 1-Internal preparations:

#### ⌘ Solid preparation(Tablet – Pill - Capsule):

##### 1- Tablet:

a) **Ordinary compressed tablet:** is producing by forcing the powdered form of drug which either contain the drug alone or with diluents(pharmacologically inert substance to make compression of the tablet easier )into solid mass using mechanical machine with optimal degree of compression, the tablet is converted into small masses in the stomach (disintegration)after that it will dissolve in gastric content(dissolution).**e.g** : paracetamol.

b) **Coated tablet:** this is ordinary compressed tablet coated with sugar for the following **purpose:**

- to avoid bitter taste of drug.
- to prevent oxidation of drug.
- to facilitate swallowing of drug.

**e.g** : profine,flu out,ferrosan.

c) **Enteric coated tablet:** this is ordinary compressed tablet coated by acid resistance material to allow the drug to pass the stomach unchanged but it dissolves in alkaline media of intestine, **e.g:** enteric coated Aspirin and Salazopyrin.

##### **Advantage:**

- To avoid irritation of stomach, **e.g:** Indomethacin.
- Prevent destruction of the drug by the acid, **e.g:** digestive enzymes.
- To get local action in the intestine, **e.g:** Duogastrone.

d) **Triturated tablet** : this type is prepared by mixing the drug with a suitable diluents the mixture moistened with alcohol and the mass is pressed and let to dry form a disc shaped. **e.g:** Vitamin E tablet.

e) **Sustained release tablet** : compressed tablet coated with many coat each with different disintegration and dissolving rate, this modified manufacture prolong the duration of action and decrease frequency of administration and also called retard, **e.g:** Glucophage, phyllocotin.

- f) **Sublingual tablet:** it is usually uncoated specially produced to be suitable for absorption from sublingual mucosa to get rapid action and avoid destruction by first pass metabolism, **e.g:** Angised.
- g) **Effervescent tablet:** this is relatively large tablet containing large dose of the drug, it is produced by mixing the drug with citric acid and sodium bicarbonate to form granules these granules are compressed to form the tablet, this type of tablet appear to have rapid action, disintegration and dissolution occur in water inside the glass, **e.g:** Vitamin C tablet.
- h) **Chewable tablet:** this is ordinary uncoated tablet specially manufactured to be sucked or chewed usually have a good taste, **e.g:** Antacid.
- i) **Lozenges tablet:** this is a sugar flavoured tablet with different shape and attractive color it is usually sucked to treat simple tonsillitis and relief cough, it usually contain volatile oil, antiseptic, antibiotics, **e.g:** Vicks.

## 2- Pill:

Is the spherical body containing the drug in a solid or liquid form given by mouth, a pill should not weight more than (0.3 gm), it is sometime coated when the drug has a bitter taste or liable to oxidation, **e.g:** Contraceptive pill.

## 3- Capsule (*ordinary capsule, spansule capsule, and capsule for inhalation*):

- a) **Ordinary capsule:** it is a small oval or rounded shape made of gelatine, it is either:
- ❖ Hard containing powdered drug, **e.g:** Tetracycline.
  - ❖ Soft contain liquid form of drug, **e.g:** Adalat.

The capsule shell will dissolve in stomach used for the following **purpose:**

- to mask the bad taste of drug.
  - prevent oxidation of drug.
  - to get accurate dose of drug.
- b) **Spansule capsule:** containing different granule each with different disintegration and dissolution rate, this will prolong duration of action and decrease frequency of administration, **e.g:** Stelazine.
- c) **Capsule for inhalation:** it is ordinary capsule which contain a drug which is usually unabsorbed from the bowel, it is intended to be inhaled to get local action in the lung using certain instrument manufactured for that purpose, **e.g:** Cromoglycate.

**⌘ Liquid preparations :**

1. **Syrup:** the drug is water soluble usually dissolved in already prepared simple syrup with good taste particularly for children, **e.g:** Samilin ,Ampicillin. The antibiotic syrup usually supplied by pharmaceutical company as a powder mixed with sugar and prepared by adding sufficient quantity of water before use because antibiotics hydrolysis in the aqueous solution to other compound which has no antibacterial activity or causing allergic reaction.
2. **Aqua:** it is a watery solution contain volatile substance used as flavoured (flavored) vehicle,**e.g:** Chloroform water.
3. **Elixir:** it is syrup containing 25% alcohol, **e.g:** hypnoral.
4. **Suspension:** a solution contain indiffusible solid which does not distributed evenly to get a uniform mixture so, it should be shaken before use, **e.g:** Methoprim.
5. **Extract:** the solid or semisolid preparation of active principle obtained from plant by mixing with a suitable solvent, after evaporation we get the extract. different solvent are used such as ( water, alcohol, ether and chloroform ).it is named according to the solvent, **e.g:** watery extract of Cascara, Alcoholic extract of Belladonna. The evaporation done under low pressure otherwise it will destroy the active drug.
6. **Liquor:** it is a solution containing chemical substance dissolved in water if it is for internal use and alcohol if it is for external use.
7. **Emulsion:** is a mixture of two immiscible liquid such as water and oil in which one of the liquid is broken up and surrounded by a film emulsifying agent to be dispersed through the other liquid.
8. **Mixture:** is a combination of drug in liquid form , **e.g:** white mixture of Magnesium sulphate (which is used as purgative).
9. **Decoction:** solution of drug obtained from plant by boiling for 10 min, and then strained.
10. **Infusion:** a dilute solution of active principle obtained from plant by adding hot or cold water shaken from time to time and then strained.

**⌘ Powder preparation:**

1. **Ordinary powder:** contain the drug as a fine powder in which specific quantity of the powder is mixed with sufficient water before use, **e.g:** Gastrogel (used for heart burning)
2. **Effervescent powder:** it is an ordinary powder mixed with sodium bicarbonate and citric acid to be prepared by mixing with sufficient water before use, **e.g:** Citrogran powder.

**⌘ Drop for internal use:**

This type of preparation is most convenient for infant, in which the drug is concentrated into a few drops to facilitate swallowing and minimize the loss of drug, **e.g:** paracetamol, Digoxin.

**⌘ Aerosol:**

A pressurized liquid form of the drug intended to be inhaled by puff each puff contain a specific dose, **e.g:** Ventolin (sulbutamol).

**⌘ Implant:**

A minute disc preparation inserted under the skin which is usually contain hormone, it is slowly metabolized or absorbed to give a prolonged duration of action, **e.g:** Stilbestrol.

**⌘ Parenteral:**

- a. **Ampoule:** is a thin glass container for single injection, it is usually sterile to be injected (IV, IM, SC) **e.g:** Buscopan. The ampoule which contains hormone usually mixed with oil and should not be used IV because of fat embolism sometime put in separate ampoule (the solvent and the drug) ,**e.g;** Pregnyl.
- b. **Vial:** a thick container with a rubber cap contains powder or solution for single or multiple injection , **e.g:** Procaine Penicillin (for 1 injection ) , Xylocaine (for multiple injection ) .

## External preparations

### 1) *Suppository:*

a. **Rectal:** is conical or turbido shaped preparation inserted into the rectum for local (**e.g** : Antihemorrhoid) or systemic action (**e.g**: Aminophylline). The active drug is mixed with a fatty base which is melt at body temperature and should not exceed (4 gm) to facilitate the entry and prevent proctitis, the **reason** of manufacturing of this preparation :

- to avoid irritation of stomach , **e.g**: Indomethacin.
- to get local action in the intestine, **e.g**: Laxative (Bisacodyl).
- in uncooperable patient (children, unconscious 'coma case patient' ). **e.g**: Revanin.
- in patient with repeated vomiting (pregnant women), **e.g**: Plasil.
- to get full dose during night, **e.g**: Aminophylline.

b. **Vaginal:** it is called ovule or pessary due to its shape, the active drug is mixed with a fatty base melt at vaginal temperature and its miscible in vaginal secretion, inserted into the vagina by a certain applicator. **e.g**: Mycostatine (antifungal drug), Flagyl.

### 2) *Ointment:*

The semisolid preparation consist of a fatty base, **e.g**: Paraffin, Oville, Wax, and Vaseline. Containing the active drug and the base is immiscible with water therefore it is suitable to be applied on dry surface.

### 3) *Cream:*

It is a semisolid preparation containing the drug mixed with the fatty base which is miscible with water applied to wet surface, **e.g**: Nystacort, Clotrymazole ( vaginal cream), Estrogen.

### 4) *Liniment:*

It is a semisolid or liquid preparation containing irritant substance applied to the skin by friction . **e.g**: Rheumalgin.

### 5) *Lotion:*

Is a liquid preparation applied to the skin without friction , it usually containing cooling substance , **e.g**: Calamine. sometime contain drug like steroid or antiseptic.

### 6) *Enema:*

It is a solution intended to be injected into the rectum for local (**e.g**: watery solution of soap' as a laxative') or systemic (**e.g**: Prednisolone ' Predsol Retention Enema' for the treatment of ulcerative colitis).

**7) Drop:**

- ✓ **Eye:** watery sterile isotonic solution instilled into the eye by a dropper, it **contains** one of the following:
  1. Antiseptic, **e.g:** Boric acid.
  2. Antibiotic, **e.g:** Chloramphenicol.
  3. Decongestant, **e.g:** phenylephrine.
  4. Antihistamine, **e.g;** Mepyramine.
  5. Steroid, **e.g:** Betamethasone.
  6. Mydriatic, **e.g:** Atropine. Miotic, **e.g:** Pilocarpine.
- ✓ **Ear:** is a watery solution instill into the ear contain antihistamine, steroid, substance that solubilise the wax.
- ✓ **Nasal:** is a watery solution instill into the nose contains decongestant, antihistamine, steroid.

## Prescription writing

It is a term applied to the formula written by the physician to the pharmacist for preparing medication and to the patient for the use of the drug, it consists of :

1) **Superscription:** consists of:

- Name, address, and telephone No. of the physician. written at the upper right hand corner.
- Name, age, and sex (gender) of the patient. written at the left hand corner.
- Date of prescription and registration.
- Diagnosis.
- Symbol (**R**).

2) **Inscription:** consists of :

- Name of the drug.
- Strength of the drug.
- Amount of the drug.
- Pharmaceutical form.

3) **Subscription:** it comprises the direction to the pharmacist for preparation of the drug. It is usually applied when there is compound prescription.

4) **Transcription:** include direction to the patient for the use of the drug, consist of frequency of administration and time around meal and amount to be used.

**Compound prescription:** it is a type of prescription, include preparation of drug by the pharmacist at the time of dispensing by mixing tow or more drugs in a various dosage form.

### The reason of compound prescription:

- To mask a well known drug from the patient.
- In case of unavailability of small doses,  
e.g:Phenobarbital.
- When the combination of drug are not available as whole drug.
- In case of unavailability of certain ingredient.

① JOHN B. DOE, MD 1234 SOUTH NORTHEAST DR ③ WEST CITY, CA 94999 (234) 555-6789 ④	
FOR: ⑥	DATE: ⑤
ADDRESS: ⑦	
<b>R<sub>x</sub></b> ⑧ (DRUG NAME AND STRENGTH) (QUANTITY) ⑩	
SIG: ⑪	
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## Prescription Abbreviations

ABBREVIATION	EXPLANATION
ā	before
ac	before meals
agit	shake, stir
Aq	water
Aq dest	distilled water
bid	twice a day
ċ	with
cap	capsule
D5W, D <sub>5</sub> W	dextrose 5% in water
dil	dissolve, dilute
disp, dis	dispense
elix	elixir
ext	extract
g	gram
gr	grain
gtt	drops
h	hour
hs	at bedtime
IA	intra-arterial
IM	intramuscular
IV	intravenous
IVPB	IV piggyback
kg	kilogram
mEq, meq	milliequivalent
mg	milligram
mcg, μg (do not use)	microgram (always write out)
no	number
non rep	do not repeat
OD	right eye
OS, OL	left eye
OTC	over-the-counter
OU	both eyes
ḡ	after
pc	after meals
PO	by mouth
PR	per rectum
prn	when needed

q	every
qam, om	every morning
qd	every day
qh, q1h	every hour
q2h, q3h, etc	every 2 hours, every 3 hours,
qhs	every night at bedtime
qid	four times a day
qod	every other day
qs	sufficient quantity
rept, repet	may be repeated
Rx	take
ḡ	without
SC, SQ	subcutaneous
Sig, S	label
sos	if needed
ḡḡ, ss	one-half
stat	at once
sup, supp	suppository
susp	suspension
tab	tablet
tbsp, T (do not use)	tablespoon (always write out "15 mL")
tid	three times a day
tr, tinct	tincture
tsp (do not use)	teaspoon (always write out "5 mL")
U (do not use)	units (always write out "units")
vag	vaginal
i, ii, iii, iv, etc	one, two, three, four, etc
℥ (do not use)	dram (in fluid measure, 3.7 mL)
℥ (do not use)	ounce (in fluid measure, 29.6 mL)