

10- Granules:



- They are consisting of solid, dry aggregates of powder particles often supplied in single-dose sachets.
- Some granules are placed on the tongue and swallowed with water, others are intended to be dissolved in water before taking. Such as effervescent granules evolve carbon dioxide when added to water.

11- Powder (Oral):



- There are two kinds of powder intended for internal use.
- 1-Bulk Powders:
 - are multi-dose preparations consisting of solid, loose, dry particles of varying degrees of fineness.
 - They contain one or more active ingredients, with or without excipients and, if necessary, coloring matter and flavoring substances.
 - usually contain non-potent medicaments such as antacids since the patient measures a dose by volume using a 5ml medicine spoon. The powder is then usually dispersed in water or, in the case of effervescent powders, dissolved before taking.
- 2-Divided Powders:
 - are single-dose presentations of powder (for example, a small sachet) that are intended to be issued to the patient as such, to be taken in, or with water.

12- Powders for mixtures:

- - The mixed powders may be stored in dry form and mixture prepared by the pharmacist when required for dispensing , by suspending the powders in the appropriate vehicle.

13-Liquid preparations:

- a- Oral solution:
 - Oral solutions are clear Liquid preparations for oral use containing one or more active ingredients dissolved in a suitable vehicle.
- b- Oral emulsion:
 - Oral emulsions are stabilized oil-in-water dispersions, either or both phases of which may contain dissolved solids.
- c- Oral suspension:
 - Oral suspensions are Liquid preparations for oral use containing one or more active ingredients suspended in a suitable vehicle.
 - Oral suspensions may show a sediment which is readily dispersed on shaking to give a uniform suspension which remains sufficiently stable to enable the correct dose to be delivered.



13-Liquid preparations (Cont.):

- d- Syrup:
 - It is a concentrated aqueous solution of a sugar, usually sucrose.
 - Flavored syrups are a convenient form of masking disagreeable tastes.
- e- Elixir:
 - -It is pleasantly flavored clear liquid oral preparation of potent or nauseous drugs.
 - The vehicle may contain a high proportion of ethanol or sucrose together with antimicrobial preservatives which confers the stability of the preparation.



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13-Liquid preparations (Cont.):

- f- Linctuses:

- Linctuses are viscous, liquid oral preparations that are usually prescribed for the relief of cough.
 - They usually contain a high proportion of syrup and glycerol which have a demulcent effect on the membranes of the throat.

- **g- Oral drops:**

- Oral drops are Liquid preparations for oral use that are intended to be administered in small volumes with the aid of a suitable measuring device. They may be solutions, suspensions or emulsions.



13-Liquid preparations (Cont.):

- h- Gargles:
 - They are aqueous solutions used in the prevention or treatment of throat infections.
 - Usually they are prepared in a concentrated solution with directions for the patient to dilute with warm water before use.
- i- Mouthwashes:
 - These are similar to gargles but are used for oral hygiene and to treat infections of the mouth.



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Topical dosage forms (Cont.):

- 2- Creams:
- Creams are semi-solid emulsions, that is mixtures of oil and water.



Topical dosage forms (Cont.):

- 3- Gels (Jellies):
- Gels are semisolid system in which a liquid phase is constrained within a 3-D polymeric matrix (consisting of natural or synthetic gum) having a high degree of physical or chemical cross-linking.



Topical dosage forms (Cont.):

- 5- Pastes :
- Pastes are basically ointments into which a high percentage of insoluble solid has been added
- The extraordinary amount of particulate matter stiffens the system.
- Pastes are less penetrating and less macerating and less heating than ointment.

- Pastes make particularly good protective barrier when placed on the skin, the solid they contain can absorb and thereby neutralize certain noxious chemicals before they ever reach the skin.
- Like ointments, paste forms an unbroken relatively water – impermeable film unlike ointments the film is opaque and therefore can be used as an effective sun block accordingly.
- Pastes are less greasy because of the absorption of the fluid hydrocarbon fraction to the particulates.

Topical dosage forms (Cont.):



- 7- Transdermal patch:
 - A **transdermal patch** or **skin patch** is a medicated adhesive patch that is placed on the skin to deliver a specific dose of medication through the skin and into the bloodstream.
 - An advantage of a transdermal drug delivery route over other types such as oral, topical, etc is that :
 1. it provides a controlled release of the medicament into the patient.
 2. No first pass metabolism
 3. Avoid the harsh environment of gastrum
 4. The delivery of drug can be terminated at any time
- E.g. scopolamine for motion sickness.

Topical dosage forms (Cont.):

- 10-Lotions:
- - These are fluid preparations (aqueous) for external application without friction.
- - They are either dabbed on the skin or applied on a suitable dressing and covered with a waterproof dressing to reduce evaporation.

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Topical dosage forms (Cont.):



- 11- Collodion:
- **Collodion** is a solution of nitrocellulose in ether or acetone, sometimes with the addition of alcohols.
- E.g: Wart Remover consists of acetic acid and salicylic acid in an acetone collodion base used in Treatment of warts by keratolysis.



Parenteral dosage forms:

- Intravenous injections or infufusion → direct to the blood
- Intramuscular injection → absorption
- Subcutaneous → needs absorption.

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Inhaled dosage forms:



- 1- Inhaler :
- Inhalers are solutions, suspensions or emulsion of drugs in a mixture of inert propellants held under pressure in an aerosol dispenser.
- Release of a dose of the medicament in the form of droplets of 50 μm diameter or less from the container through a spring-loaded valve incorporating a metering device. The patient then inhales the released drug through a mouthpiece.
- In some types, the valve is actuated by finger pressure, in other types the valve is actuated by the patient breathing in through the mouthpiece.
- It is commonly used to treat asthma and other respiratory problems.

Inhaled dosage forms (Cont.):



- 2- Nebulizer or (atomizer):
- **A nebulizer** is a device used to administer medication to people in forms of a liquid mist to the airways.
- - It is commonly used in treating asthma, and other respiratory diseases.
- - It pumps air or oxygen through a liquid medicine to turn it into a vapor, which is then inhaled by the patient.
- Inhalers are better because:
- 1-These are cheaper
- 2- more portable
- 3- carry less risk of side effects.
- Nebulizers, for that reason, are usually reserved only for serious cases of respiratory disease, or severe attacks.

Ophthalmic dosage forms:

- 1- Eye drops:
- Eye drops : solutions or suspension
- Ointments
- In-situ gelling preparations



Otic dosage forms:

- Ear drops:
- Solution
- emulsion
- Suspension
- Give local effect



Nasal dosage forms:



- 1- Nasal Drops and Sprays:
- Drugs in solution may be instilled into the nose from a dropper or from a plastic squeeze bottle.
- *The drug may have a local effect, e.g. antihistamine, decongestant.*
- *Alternatively the drug may be absorbed through the nasal mucosa to exert a systemic effect.*
- The use of oily nasal drops should be avoided because of possible damage to the cilia of the nasal mucosa.