



لجان الترفعات

DISPENSING



MORPHINE ACADEMY

MORPHINE
ACADEMY

Dermatological Formulations: Ointments Creams and Pastes

Dermatological Formulations

- Ointments, creams, pastes and gels are semisolid dosage forms intended for topical application.
- They are also termed "semisolids" because they appear to be solid but still have fluid properties بحبكلك انه هم ببينوا انهم صلبين بس لما نفردهم على الجلد بكونوا ناعمين
- They may be applied to the skin, placed on the surface of the eye, or used nasally, vaginally, or rectally. يمكن نستخدمهم في عدة اماكن
- Topical applications can be designed for either local effects or systemic absorption تأثير محلي على منطقة خارجية مثلا اكزيما
امتصاص الي الداخل ويفوت على الدم
- A topical dermatological product is designed to deliver drug into the skin in treating dermal disorders, with the skin as the target organ. في الجلد وهو العضو المستهدف
اضطرابات جلدية
- A transdermal product is designed to deliver drugs through the skin (percutaneous absorption) to the general circulation for systemic effects من خلال الجلد الى الدورة الدموية
الامتصاص من خلال الجلد الى الدورة الدموية

- Pharmaceutical *creams* are semisolid preparations containing one or more medicinal agents ^{مذاب} dissolved or ^{معلق} dispersed in either a w/o emulsion or an o/w emulsion.
- Many patients and physicians prefer creams to ointments ^{على المراهم} because they are easier to spread and remove. ^{بتفضل الكريمات} ^{عشان اسهل بالفرد على الجلد وازالتها}
- Pharmaceutical manufacturers frequently manufacture topical preparations of a drug in both cream and ointment bases to satisfy the preference of the patient and physician.

يعني بنلاقي في الصيدلية نفس الدواء عل شكل كريم ومرهم عشان انلبي طلبات كل الناس

ما هي الاغراض يعني ليش بنستخدمهم؟؟

Purposes of dermatological formulations:

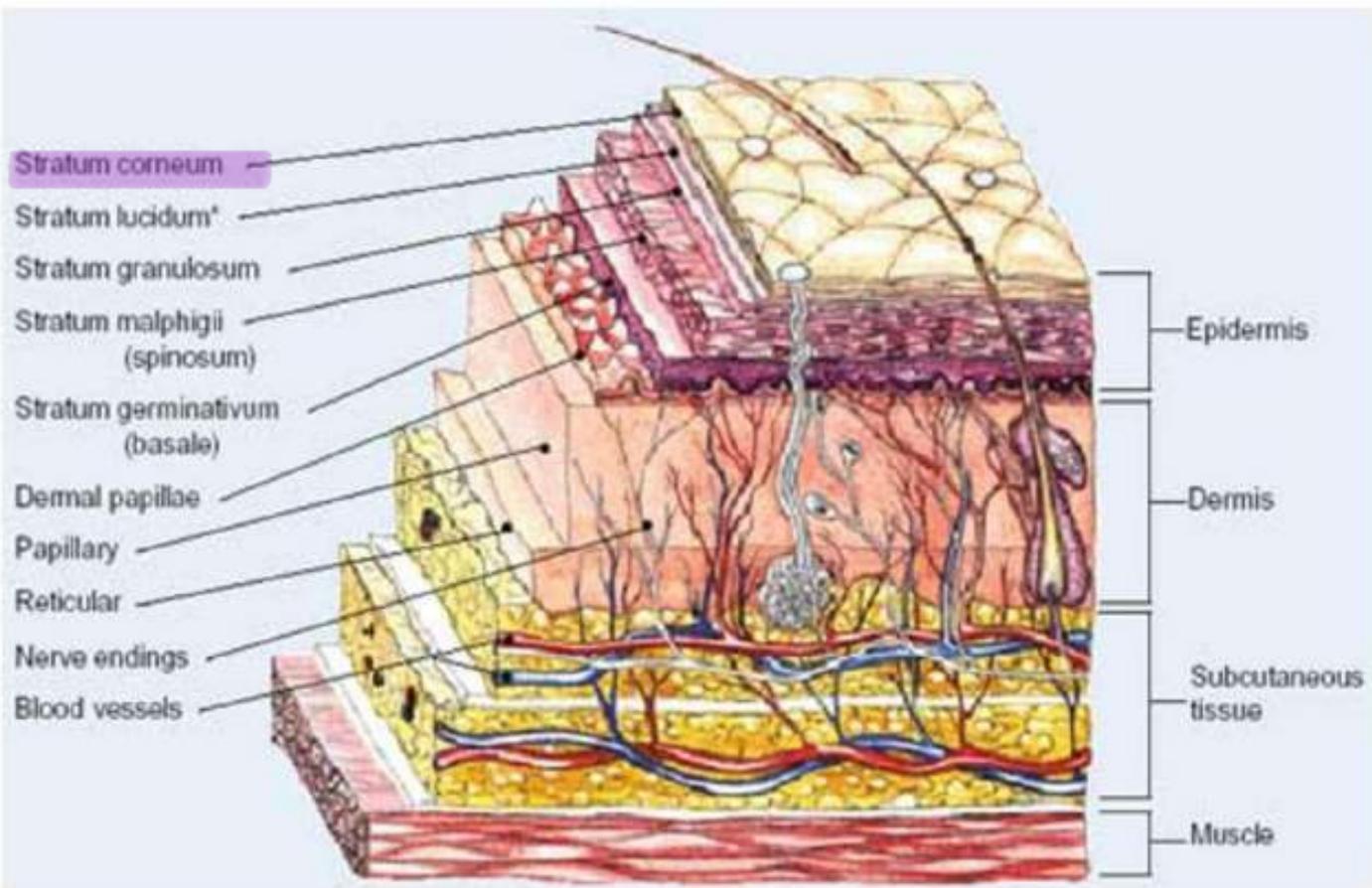
1. To protect the skin or mucous membranes from chemical or physical irritants in the environment thus permit the skin to rejuvenate and heal
2. To provide emollient (skin softening) and occlusive effect
3. To provide a topical vehicle for medications for local (anti-infective, anti-pruritic, astringent, keratolytic) or transdermal/systemic effect (e.g. nitroglycerin)

عبارة عن الوسط او
المادة الحاملة التي تُمزج
مع الدواء

Structure of the skin

يعني اكبر عضو في جسمك هو الجلد ويمثل 17% من وزنك

- The skin is the largest and heaviest organ in the body and accounts for about 17% of a person's weight.
- Its major function is to **protect** the underlying organ systems from **trauma**, **temperature**, **humidity**, **harmful penetrations**, **moisture**, **radiation**, and **microorganisms**.
الاصعاع الصدمات الحرارة الكائنات الدقيقة الاختراقات الضارة الرطوبة
- It is composed of three layers of stratified tissue: **epidermis**, **dermis**, and **subcutaneous tissue**.
يتكون الجلد من ثلاث انسجة طبقية
- The thickness of the skin is 3 - 5 millimeters. The thickness of the skin varies with the different parts of the body. The thickest parts of the skin are the palms and soles and the thinnest parts are the eyelids and genitals.
باطن القدم راحة اليد الاعضاء التناسلية الجفون
- Within the structure of the skin are several skin appendages: **hair** **follicles**, **sebaceous glands**, **sweat glands**, and **nails**.
بصيلات شعر شوية زوائد على الجلد زي : الاظافر الغدد العرقية الغدد الدهنية



Local and systemic effects of Dermatological Formulations:

- It is the stratum corneum that is the barrier to drug penetration through the skin. هذه الطبقة عبارة عن حاجز يمنع نفاذ الدواء خلال الجلد
سمكها
- The stratum corneum is approximately 10 microns thick. It can swell to approximately three times its original thickness and absorb about five times its weight in water. تنتفخ ثلاث مرات اكثر وتمتص ماء
خمس مرات اكثر
لما نرطبها
- When the stratum corneum hydrates, it becomes more permeable. Therefore, occlusive dressings are often used to hydrate the stratum corneum and increase the penetration of certain drugs. اكثر نفاذية
الضمادات
نفاذية
يعني بحكي انه لما نحط الدواء على منطقة معينة ونغطيها بضمادات فأحنا هيك بنزيد النفاذية
وانه يدخل الدواء للجلد
الامراض الجلدية
الاكزيما
الصدفية
- Dermatoses such as eczema and psoriasis (have disrupted SC) can also increase the absorption of some drugs. الناس الي عندهم خلل في هذه الطبقة

بكون عندهم نسبة الامتصاص عالية عشان هذه الطبقة هي الي بتمنع النفاذية

Local and systemic effects of Dermatological Formulations:

- Dermatological formulations produce a local drug effect either on or in the skin.
المستحضرات الجلدية
- Besides the specific therapeutic action of incorporated active drugs, the formulations also serve as protectants, lubricants, emollients, or drying agents.
صحيح لها تأثير علاجي
و يمكن لها تأثير حمائي
او عوامل تحفيف
او مرطبات
شو بتعالج
- Examples of treatments using dermatological formulations include minor skin infections, itching, burns, diaper rash, insect stings and bites, athlete's foot, corns, calluses, warts, dandruff, acne, psoriasis, and eczema.
الطفح الجلدي بسبب الحفاضات
حرق
حكة
الثآليل
مسامير القدم
القدم الرياضي
لسعات ولدغات الحشرات
التهابات جلدية
اكزيما
صدفية
حب الشباب
قشرة الرأس

Local and systemic effects of Dermatological Formulations:

- Some dermatological formulations are intended to systemically deliver a drug.
يعني للداخل
 - The formulation is placed on the skin, and the drug penetrates the epidermis into the dermis and subcutaneous tissues, where it is absorbed into the systemic circulation.
بخترق طبقات الجلد بعدين تمتصه الدورة الدموية
 - Some dermatological formulations provide continual percutaneous absorption (i.e. transdermal patch)
 - Percutaneous (through the skin) absorption is the result of three competing processes:
معناها عبر الجلد
 - the potential of the drug to cross the stratum corneum
 - the potential of the drug to leave the formulation
 - the influence of the formulation on the stratum corneum.
تأثير
- اذا بدنا يصير امتصاص لازم يصير هدول الشغل
- بخترق

Percutaneous absorption

امتصاص من خلال الجلد

- More drug is absorbed when the formulation is applied to a **larger surface area** كلما وزعنا الدواء على منطقة اكبر زاد الامتصاص
- Formulations or **dressing that increase hydration of the skin** generally **enhance percutaneous absorption** وحكيما اذا غطينا المنطقة بضمادات بيزيد الامتصاص
- The greater the amount of **rubbing the formulation**, the **greater is the absorption** وكمان اذا عملنا فرك على المنطقة بيزيد للامتصاص
- The **longer the formulation remains in contact with the skin**, the **greater is the absorption** وكلما كمان خليناها على البشرة لفترة اطول بيزيد الامتصاص

Percutaneous absorption:

- The amount of drug that can be absorbed is about 2mg/day

- Thus:

1. percutaneous enhancers are used:

- Improve the solubility of active drug انحسن من الذوبان in the stratum corneum
- Facilitate the drug's diffusion into او من الانتشار the systemic circulation
- **DMSO, Urea, Triethanolamide, Dimethyl formamide** هدول الي ممكن نضيفهم عشان يساعدا على الامتصاص

2. Mechanical methods:

- Phonophoresis uses **ultrasonic vibrations** to increase the absorption of drugs such as **lidocaine, tetracycline** into and through the skin
- Iontophoresis uses **electrical field** to aid in the transportation of local anesthetic and **analgesic, peptides and proteins**

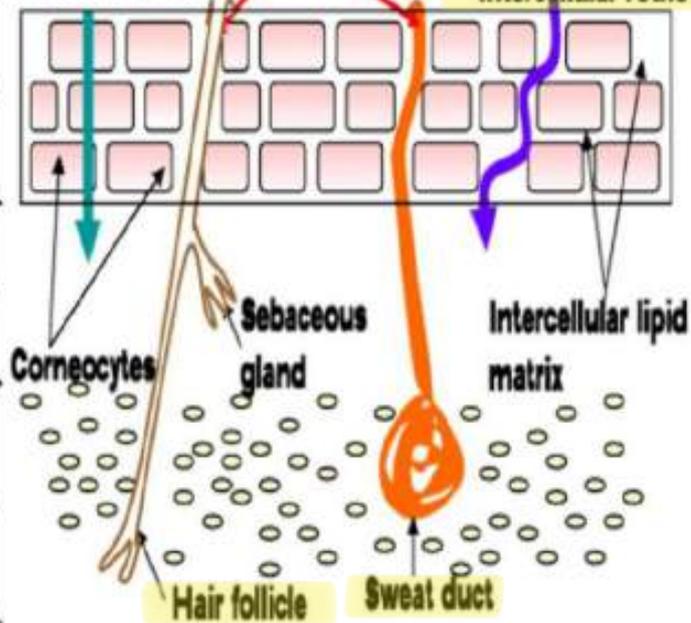
من خلال الخلايا

Transappendageal route

من بين الخلايا

Intracellular route

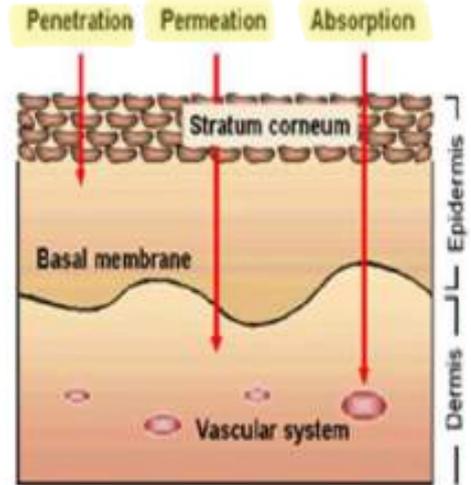
Intercellular route



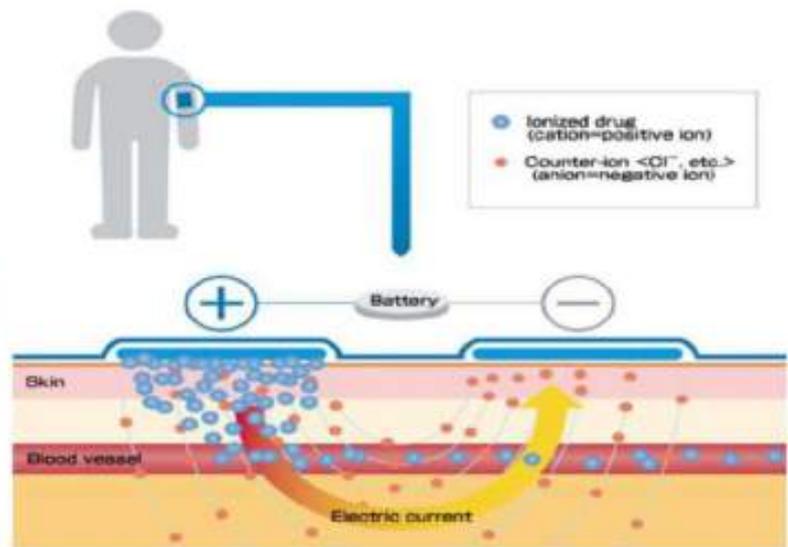
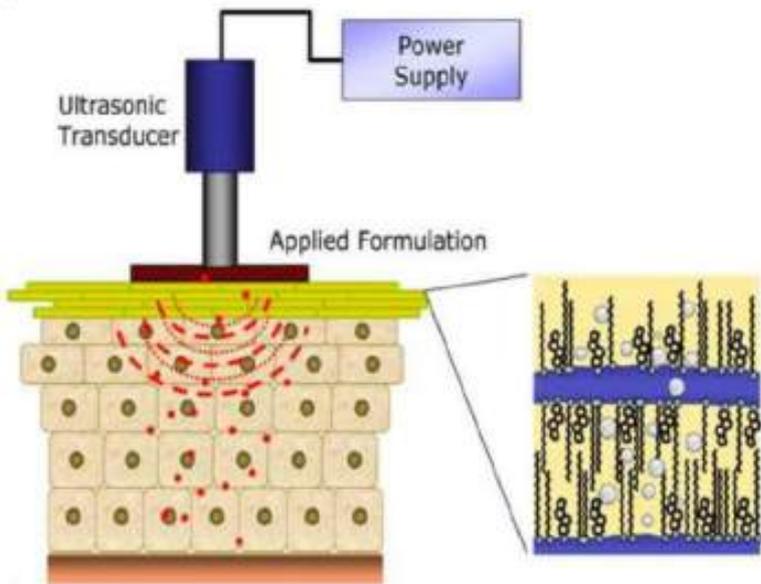
A) Epidermis (S. corneum), B) Dermis, C) subcutaneous layer

Skin penetration phases

حفظ



scifiba and



Ointments

- Traditionally the term *ointment* has been used for (i) the general class name for all **external-use semisolids** and (ii) the subclass, **oleaginous semisolids**.
المواد شبه الصلبة للاستخدام الخارجي
المواد شبه الصلبة الزيتية
- USP 31 Chapter <1151> defines ointments very generally as “semisolid preparations intended for external application to the skin or mucous membranes”.
- However, pharmaceutical manufacturers use the word *ointment* more specifically to indicate that a drug is incorporated into an **oleaginous ointment base**; for example, the name **Hydrocortisone Ointment** means that hydrocortisone is incorporated into an **oil-type semisolid base**.
- Thus, the term *semisolid* would be used for naming the general class, and the term *ointment* would be redefined more narrowly as “a viscous oleaginous or polymeric semisolid dosage form”, which is consistent with current usage by the pharmaceutical industry

Ointments

- Ointments are semisolid preparations intended for external application to the skin or mucous membranes.
- Ointments may be medicated or Unmedicated ointments
يعني فيها دواء او ممكن ما فيها دواء زي الفازلين مثلاً
- Unmedicated ointments are used for the physical effects they provide as protectants, emollients, or lubricants.
- *Ointment bases*, as described, may be used for their physical effects or as vehicles for medicated ointments.

	Oleaginous Ointment Bases	Absorption Ointment Bases	Water/Oil Emulsion Ointment Bases This is correctly classified as cream	Oil/Water Emulsion Ointment Bases This is correctly classified as cream	Water-miscible Ointment Bases More correctly called gels
Composition	oleaginous compounds	oleaginous base + w/o surfactant	oleaginous base + water (< 45% w/w) + w/o surfactant (HLB ≤8)	oleaginous base + water (> 45% w/w) + o/w surfactant (HLB ≥9)	Polyethylene Glycols (PEGs)
Water Content	anhydrous	anhydrous	hydrous	hydrous	anhydrous, hydrous
Affinity for Water	hydrophobic	hydrophilic	hydrophilic	hydrophilic	hydrophilic
Spreadability	difficult	difficult	moderate to easy	easy	moderate to easy
Washability	nonwashable	nonwashable	non- or poorly washable	washable	washable
Stability	oils poor; hydrocarbons better	oils poor; hydrocarbons better	unstable, especially alkali soaps and natural colloids	unstable, especially alkali soaps and natural colloids; nonionics better	stable
Drug Incorporation Potential	solids or oils (oil solubles only)	solids, oils, and aqueous solutions (small amounts)	solids, oils, and aqueous solutions (small amounts)	solid and aqueous solutions (small amounts)	solid and aqueous solutions
Drug Release Potential*	poor	poor, but > oleaginous	fair to good	fair to good	good
Occlusiveness	yes	yes	sometimes	no	no
Uses	protectants, emollients (+/-), vehicles for hydrolyzable drugs	protectants, emollients (+/-), vehicles for aqueous solutions, solids, and non-hydrolyzable drugs	emollients, cleansing creams, vehicles for solid, liquid, or non-hydrolyzable drugs	emollients, vehicles for solid, liquid, or non-hydrolyzable drugs	drug vehicles
Examples	White Petrolatum, White Ointment	Hydrophilic Petrolatum, Anhydrous Lanolin, Aquabase™, Aquaphor®, Polysorb®	Cold Cream type, Hydrous Lanolin, Rose Water Ointment, Hydrocream™, Eucerin®, Nivea®	Hydrophilic Ointment, Dermabase™, Velvachol®, Unibase®	PEG Ointment, Polybase™

Oleaginous ointment Bases

- *Petrolatum, USP, is a purified mixture of semisolid hydrocarbons obtained from petroleum.*
- vary in color from yellowish to light amber.
- It melts at 38°C to 60°C and may be used alone or in combination with other agents as an ointment base.
- Petrolatum is also known as yellow petrolatum and petroleum jelly.
- A commercial product is Vaseline. الفازلين

Oleaginous ointment Bases

- *White Petrolatum, USP, is a purified mixture* of semisolid hydrocarbons from petroleum that has been wholly or nearly decolorized. ازالة لونها
- It is used for the same purpose as petrolatum, but because of its lighter color, it is considered more esthetically pleasing by some pharmacists and patients. اكثر ارضاء من الناحية الجمالية
- White petrolatum is also known as white petroleum jelly.
- A commercial product is White Vaseline

Oleaginous ointment Bases

- *Yellow Ointment, USP: This ointment has the following formula for the preparation of 1000 g:*

- Yellow wax 50 g

- Petrolatum 950 g

- Yellow wax is the purified wax obtained from the honeycomb of the bee *Apis mellifera*.

من خلية النحل

Oleaginous ointment Bases

- *White Ointment, USP.* This ointment differs from yellow ointment by substitution of white wax (bleached and purified yellow wax) and white petrolatum in the formula.

Oleaginous ointment Bases

- Hydrocarbon bases, known also as “oleaginous ointment bases”
- Only small amounts of an aqueous component can be incorporated into these bases
- Hydrocarbon bases serve to keep medicaments in prolonged contact with the skin and act as occlusive dressings.

Absorption Ointment Bases

- *Hydrophilic Petrolatum, USP, has the following* formula for the preparation of 1000 g:
 - Cholesterol 30 g
 - Stearyl alcohol 30 g
 - White wax 80 g
 - White petrolatum 860 g
- هون ضفنا
w/o surfactant

Absorption ointment Bases

- *Lanolin, USP (Anhydrous lanolin) obtained from the wool of sheep (Ovis aries), is a purified wax-like substance that has been cleaned, deodorized, and decolorized.*
بعملوا له تنظيف وازالة الرائحة وازالة اللون
- It contains not more than 0.25% water.
- *Modified Lanolin, USP, is lanolin processed to reduce the contents of free lanolin alcohols and any detergent and pesticide residues.*
المنظفات المبيدات الحشوية

Absorption ointment Bases

- Permit the incorporation of aqueous solutions with the formation of a water-in-oil emulsion (e.g., Hydrophilic Petrolatum and Anhydrous Lanolin, both USP),
- Cholesterol and Stearyl alcohol are added as emulsifiers

Water/Oil Emulsion Bases

- Aare more correctly called “creams”.
- Consists of water-in-oil emulsions that permit the incorporation of additional quantities of aqueous solutions (Cold cream type, Hydrous Lanolin, USP).
- <http://www.cosmeticsandskin.com/aba/cold-cream.php>: refer to this article for the history of cold cream
- Why is it called cold cream?
- What is the role of borax in this formula?

Oil/Water Emulsion Bases

- oil-in-water emulsions (e.g., Hydrophilic Ointment, USP), and **are more correctly called “creams”**.
- They also are described as “water-washable” because they may be readily washed from the skin or clothing with water an attribute that makes them more acceptable for cosmetic purposes.
- Some medicaments may be more effective in these bases than in hydrocarbon bases. Other advantages of the water removable bases are that they may be diluted with water and that they favor the absorption of serous discharges in dermatological conditions.

Water-Removable Bases (o/w emulsion bases)

- following formula for the preparation of about 1000 g:

Ingredient Amount (grams)

- Methylparaben 0.25
- Propylparaben 0.15
- Sodium lauryl sulfate 10.00
- Propylene glycol 120.00
- Stearyl alcohol 250.00
- White petrolatum 250.00
- Purified water 370.00

Water Miscible Ointment Bases

- Water-miscible Bases—This group of so-called “greaseless ointment bases” comprises **water-soluble constituents**.
- **Polyethylene Glycol** Ointment NF is the only pharmacopeial preparation in this group.
Gelling agent
- Bases of this type offer many of the advantages of the **water-removable bases** and in addition, **contain no water-insoluble substances** such as **petrolatum**, **anhydrous lanolin**, or **waxes**.
They are more correctly called Gels.

Water-Miscible Ointment Bases

- *Polyethylene Glycol Ointment, NF*
- *PEG is a polymer of ethylene oxide and water represented by the formula $H(OCH_2CH_2)_nOH$, in which n represents the average number of oxyethylene groups.*
- The numeric designations associated with PEGs refer to the average molecular weight of the polymer.
- PEGs having average molecular weight below 600 are clear, colorless liquids
- those with molecular weight above 1,000 are waxlike white materials; and those with molecular weight in between are semisolids
- The greater the molecular weight, the greater the viscosity

SELECTION OF THE APPROPRIATE BASE

اختيار القاعدة المناسبة

معدل انطلاق الدواء من القاعدة

- Desired **release rate** of the drug substance from the ointment base

نختار قاعدة مناسبة سواء كان بدنا تأثير سطحي او امتصاص داخلي

- **Desirability of topical or percutaneous drug absorption**

قاعدة مناسبة لمنع فقدان الرطوبة

- **Desirability of occlusion of moisture from the skin**

- **Stability of the drug in the ointment base** قاعدة مناسبة تحافظ على ثبات الدواء

قاعدة مناسبة قابلة للغسل والازالة بالماء

- **Desire for a base easily removed by washing with water**

وينقسم حسب طبيعة سطح الجلد

- Characteristics of the surface to which it is applied: an

اذا كان جاف ومتشقق ومتقشر

ointment is generally applied to dry, scaly skin; a cream is

applied to weeping or oozing surfaces

اذا كان في افرازات او رطوبة او تسريب

SELECTION OF THE APPROPRIATE BASE

- تطلق الدواء بشكل كثير بطيء وغير منتظم عشان الماء لا يستطيع اختراق القاعدة جيدًا ليذوب الدواء القواعد الدهنية (الكارهة للماء)
- **Oleaginous (hydrophobic) bases** release drugs slowly and unpredictably because water cannot penetrate the base sufficiently to dissolve the drug وبالطالي يكون تأثير الدواء في الجسم ممتد على فترات طويلة زي petrolatum
 - **Water miscible and hydrophilic bases** tend to release drugs more rapidly and more predictably because water can penetrate into the base مناسب لما يكون بدنا نتحكم بشكل افضل في الجرعة ويوصل الدواء بسرعة وهذه القواعد اساسها الجليسيرين او (PEG)
 - Once the drug has been released from the base the penetration through skin is influenced by the area to which the ointment is applied, the condition of the skin, the location, and method of application

متى ما طلع الدواء من القاعدة ممكن يتأثر في عوامل أخرى

PREPARATION OF OINTMENTS

- Ointments are prepared by two general methods,
- (a) incorporation and (b) fusion طريقتين لتحضير المراهم

Incorporation

- The components are mixed until a uniform preparation is attained.
- On a small scale, as in extemporaneous compounding, the pharmacist may mix the components using a mortar and pestle, or a spatula may be used to rub the ingredients together on an ointment slab (a large glass or porcelain plate or pill tile).
- Others will use an ointment mill



Incorporating a drug into an ointment base:

- Insoluble powders that are added into ointment base should be in the finest possible state of subdivision:
اصغر ما يمكن
- Powder form used instead of crystalline form
- Triturate the powder in a mortar & pestle
- Levigating agents (miscible with the ointment base)
- Some powders are incorporated into ointment base by dissolving the solid in a low vapor pressure solvent or oil that can be taken up by the ointment base

Incorporating a drug into an ointment base:

- levigating, or mixing the solid material in a vehicle in which it is insoluble to make a smooth dispersion.
- The levigating agent (e.g., mineral oil for bases in which oils are the external phase, or glycerin for bases in which water is the external phase).
- The levigating agent should be about equal in volume to the solid material.
- A mortar and pestle are used for levigation. This allows both reduction of particle size and dispersion of the substance in the vehicle.
- After levigation, the dispersion is incorporated into the ointment base by spatulation or with the mortar and pestle until the product is uniform.

Fusion

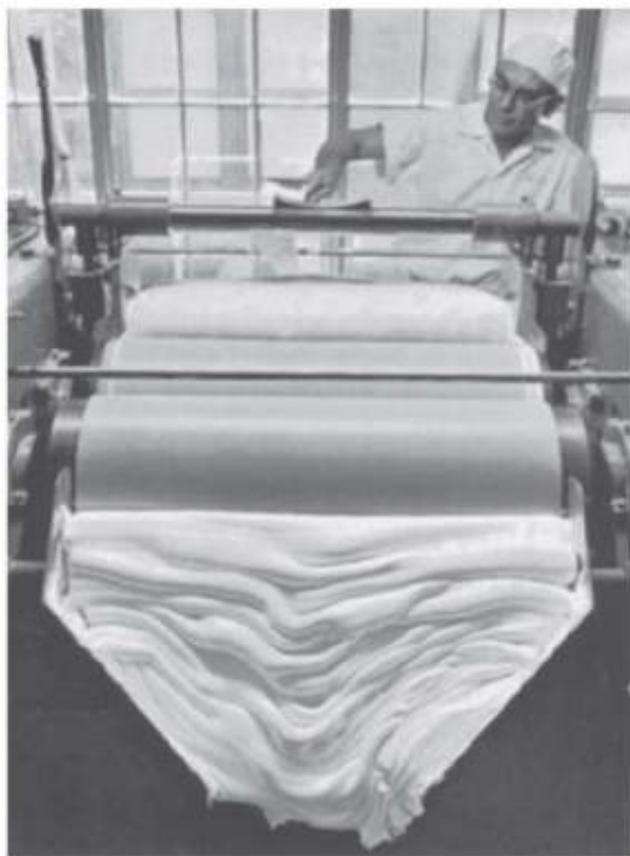
بستخدم حرارة

- By the fusion method, all or some of the components of an ointment are combined by being melted together and cooled with constant stirring until congealed.
- Components not melted are added to the congealing mixture as it is being cooled and stirred.
- On a small scale, fusion may be conducted in a porcelain dish or glass beaker.
- On a large scale, it is carried out in large steamjacketed kettles.

في المصانع يستخدم

Fusion

- Once congealed, the ointment may be passed through an ointment mill (in large-scale manufacture) or rubbed with a spatula or in a mortar to ensure a uniform texture.
- The materials with the highest melting points are heated to the lowest required temperature to produce a melt. The additional materials are added with constant stirring during cooling of the melt until the mixture is congealed. In this way, not all of the components are subjected to the highest temperature.



PASTES

- Pastes are semisolid preparations intended for application to the skin. They generally contain a larger proportion of solid material (such as 25%) than ointments and therefore are stiffer.
- Stiffer than ointments
- The stiffness reduce the percutaneous absorption potential of any drug incorporated in the paste
- They are used for their :
 - protective action
 - and ability to absorb serous discharge from skin lesions ^{التقرحات}
 - and ability to remain in place longer than ointments
 - E.g. Zinc Oxide paste USP, Carboxymethylcellulose Sodium Paste USP, Triamcinolone Acetonide Dental Paste USP.

تبع حشوات الاسنان

COMPENDIAL REQUIREMENTS FOR OINTMENTS

- Ointments and other semisolid dosage forms must meet USP tests for *microbial content, minimum fill, packaging, storage, and labeling*.
- ophthalmic ointments must also meet tests for *sterility and metal particles content*.

MICROBIAL CONTENT

بحكيك انه مستحضرات العين بالذات هي الي لازم تكون معقمة اما الباقي مش ضروري

- With the exception of ophthalmic preparations, topical applications are not required to be sterile.
- They must, however, meet acceptable standards for microbial content, and preparations prone to microbial growth must contain antimicrobial preservatives.
- Dermatologic products should be examined for *P. aeruginosa* and *S. aureus*, and those intended for rectal, urethral, or vaginal use should be tested for yeasts and molds

MINIMUM FILL

- The USP's *minimum fill test* is determination of the net weight or volume of the contents of filled containers to ensure proper contents compared with the labeled amount.

اختبار الحد الأدنى للملء وفقاً لمعايير USP هو تحديد الوزن الصافي أو حجم محتويات الحاويات المملوءة لضمان المحتويات المناسبة مقارنة بالكمية الموضحة على الملصق.

PACKAGING SEMISOLID PREPARATIONS

- Topical dermatologic products are packaged in either jars, tubes, or syringes whereas ophthalmic, nasal, vaginal, and rectal semisolid products are almost always packaged in tubes or syringes.
- The so-called ointment jars are made of clear or opaque glass or plastic
- Ointment tubes are made of aluminum or plastic

PACKAGING, STORAGE, AND LABELING

- Semisolid preparations must be stored in well-closed containers to protect against contamination and in a cool place to protect against product separation in heat.
- light-sensitive preparations are packaged in opaque or light-resistant containers.
- In addition to the usual labeling requirements for pharmaceutical products, the USP directs the labeling for certain ointments and creams include the type of base used (e.g., water soluble or water insoluble).

PACKAGING, STORAGE, AND LABELING

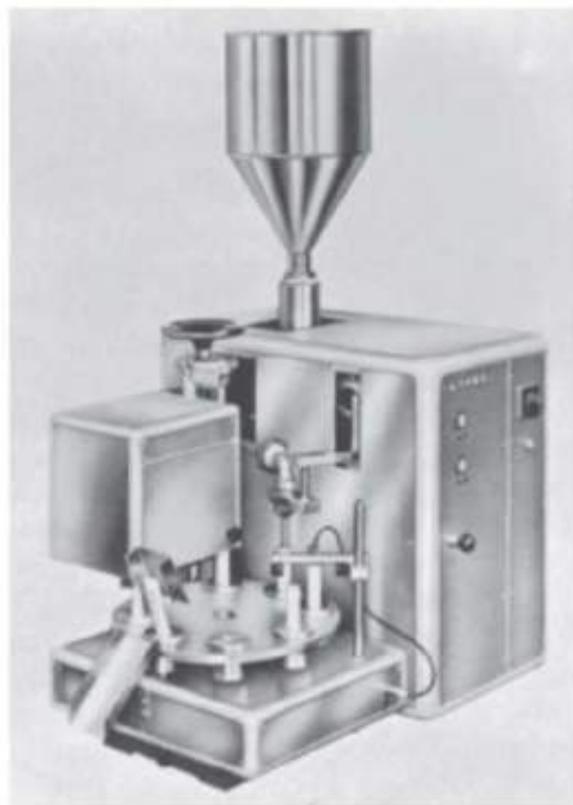
- Tubes of aluminum generally are coated with an epoxy resin, vinyl, or lacquer to eliminate any interactions between the contents and the tube.
- Plastic tubes are made of high- or low-density polyethylene (HDPE or LDPE) or a blend of each, polypropylene (PP), polyethylene terephthalate (PET)
- LDPE is soft and resilient, and it provides a good moisture barrier. HDPE provides a superior moisture barrier but is less resilient. PP has a high level of heat resistance, and PET offers transparency and a high degree of product chemical compatibility.

PACKAGING, STORAGE, AND LABELING

- Packaging should keep the formulation clean during repeated use and as free from air exposure and microbial contamination as feasible
- Tubes, jars, applicators, syringes, patches, pump dispensers
- Jars does not meet the above requirements, thus a tongue depressor can be used to remove the required quantity of formulation and keep the formulation free from hand contamination
- Pastes are generally packed in ointments jars

Filling Ointment Tubes

- Tubes are filled from the open back end of the tube, opposite from the cap end.
- Ointments prepared by fusion may be poured while still soft but viscous directly into the tubes with caution to prevent stratification of the components.
- On a small scale, as in the extemporaneous filling of an ointment in the pharmacy, the tube may be filled manually or with a small-scale filling machine



Observing formulations for evidence of instability

- Instability of various dermatological formulations can be identified by :
 - A separation of components
 - Discoloration
 - Development of rancid odor
 - Dryness
 - Crystal growth
 - Shrinkage
 - Microbial contamination
- Additional instability signs for ointments:
 - Excessive bleeding (i.e. separation of excessive amounts of liquids)
 - Formation of granules or grittiness

Observing formulations for evidence of instability

- Anhydrous formulations tend to be more stable than hydrous products
- Anhydrous formulation can have a 6 month beyond use date if incorporated drug is stable for that period
- For formulations containing water it is recommended that no more than a 2 week supply be dispensed if no preservative is used

Ophthalmic ointments

- Ophthalmic ointments are semisolids for application to the eye.
- Special precautions must be taken in the preparation of ophthalmic ointments. They are manufactured from sterilized ingredients under rigidly aseptic conditions, must meet the requirements under Sterility Tests and must be free of large particles.
- The medicinal agent is added to the ointment base either as a solution or as a micronized powder.

Ophthalmic ointments

- The USP directs that ophthalmic ointments must be packaged in collapsible ointment tubes.
- These tubes have an elongated narrow tip to facilitate application of a narrow band of ointment to the eye.
- The patient should be advised that blurred vision will occur as the ointment spreads over the eye and not to be alarmed.
- If the ointment is to be administered only once daily, it is often preferable to do so at bedtime, when vision impairment will be inconsequential.

Ophthalmic ointments

- It is important to emphasize to the patient that ocular products if handled improperly can become contaminated by bacteria that cause ocular infections, which may lead to serious consequences.
- Thus every effort must be made to avoid touching the tip of the tube to the eye, eyelid, fingertip, or any other surface, and the ointment should be used by only one person.

Summary

- Differences in emollient and occlusive effects and ease of application and removal between products is a factor of the base used and product type.
- As noted earlier, oleaginous bases provide greater occlusion and emollient effects than do hydrophilic or water-washable bases.
- Pastes offer even greater occlusion and are more effective than ointments at absorbing serous discharge.
- Creams, usually oil-in-water emulsions, spread more easily than ointments and are easier to remove.
- Water-soluble bases are nongreasy and are easily removed.