

PASSION ACADEMIC TEAM

YU - MEDICINE

MUSCULOSKELETAL SYSTEM

Sheet#7 - Pharmacology

Lec. Title : Anti-Microbial Agents & Acne
Preperations (Part 1)

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kindly report it to
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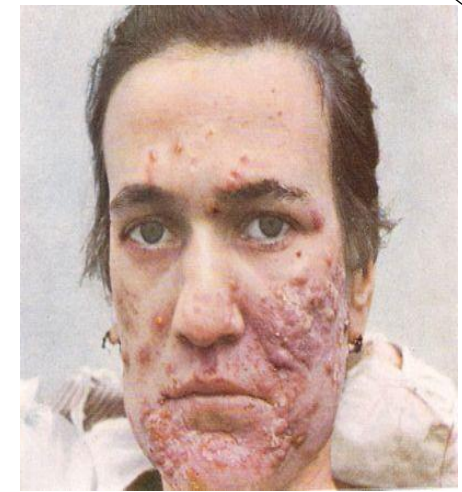




Anti-microbial Agents and acne preparations

Dr. Romany H Thabet, PhD

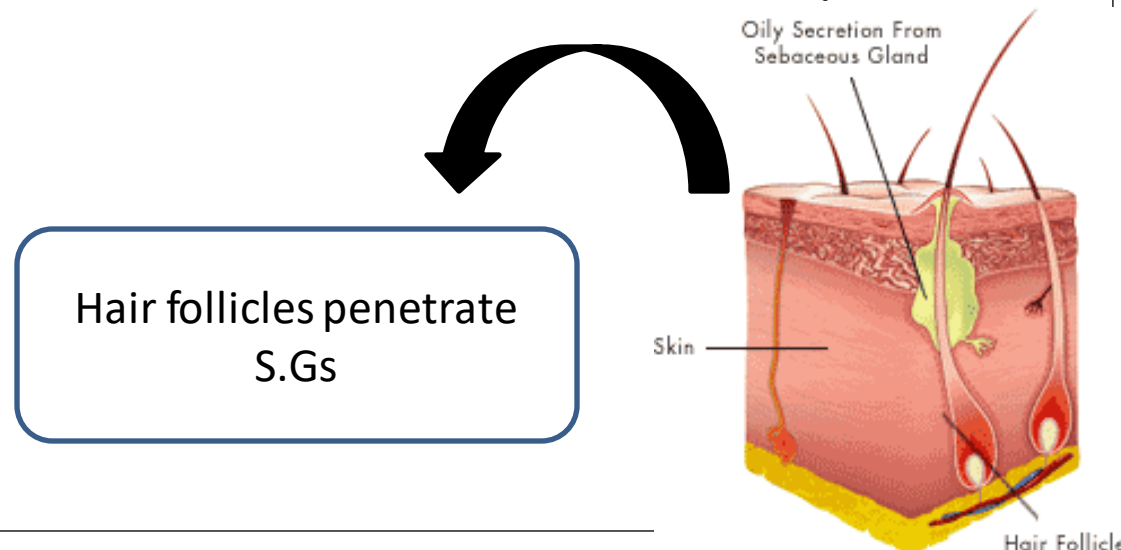
Treatment of Acne Vulgaris



□ How do they form:

1. **increased sebum production**, due to the increase in sebaceous glands {S.G} activity (in oily skin ربنا يبعدها عذًا و عنكم)
2. **sloughing of keratinocytes**, causes blockage of S.G drainage
3. **bacterial growth** (**Propionibacterium acnes**), due to anaerobic environment formation.
4. **inflammation.**

□ **Other factors include:** stress & hormonal imbalance (in females mainly)



A **comedo**:

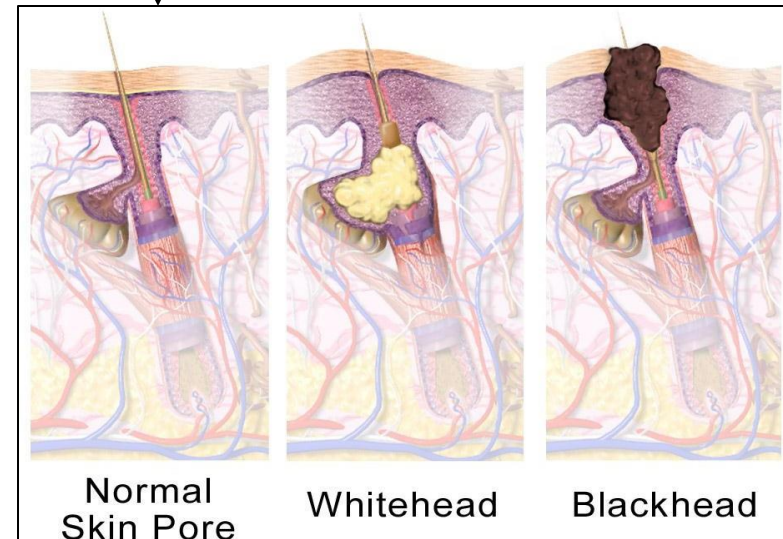
Is a clogged hair follicle (pore) in the skin. Keratin (skin debris/dead skin) combines with oil to block the follicle.

- A comedo can be open (blackhead) or closed by skin (whitehead), and occur with or without acne.

The chronic inflammatory condition that usually includes both comedones and inflamed papules and pustules is called

Acne

- It's important to determine if this's a case of facial acne or spreaded ...with scars or not...chronic(fibrous) or acute ?
To choose the right medication



Treatment of Acne Vulgaris

1. Benzoyl Peroxide(topical)

- For treatment of superficial inflammatory acne.
- It is bacteriostatic against *P.acnes*.
- It increases the sloughing rate of epithelial cells and loosens the follicular plug structure, resulting in some degree of comedolytic activity
- Side effects include:
dryness, irritation, and allergic contact dermatitis.
- It may bleach or discolor some fabrics (e.g., clothing, bed linen, towels).

في البداية لازم تكون عارف الدواء كيف بفيديك ... هون مثلاً، هاد الدواء شغال كمضاد حيوي و كمقشر .. وهلمّ جرّاً على نفس المبدأ بالأدوية اللي جاية .. خاصة اللي شغالة Ab الشئ الثاني بنستخدم الأدوية الموضعية في حالات متوسطة أو خفيفة، يعني هم هالأكمّ حبة بفترة ضغط امتحانات و عالوجه بس و مو تاركين آثار عظيمة ..

2. Azelaic Acid

- Azelaic acid has **antibacterial**, **antiinflammatory**, and **comedolytic activity**.
- Azelaic acid is useful for mild to moderate acne in patients **who do not tolerate benzoylperoxide**.
- It is also useful for **postinflammatory hyperpigmentation**(with scars)???? **because it has skin-lightening properties.**(تميل و شكشكة مكانه)
- S/E: uncommon, mild transient burning, pruritus, stinging, and tingling (تميل و شكشكة مكانه) may occur

3. Tretinoin

- Tretinoin (a retinoid; topical vitamin A acid) is a comedolytic agent
- MOA: increases cell turnover in the follicular wall and decreases cohesiveness of cells, leading to extrusion of comedones and inhibition of new comedo formation.
- Topical vit A is nooooooot ,is not, الثالثة نابطة is not an AbConcomitant use of an antibacterial agent with tretinoin can decrease keratinization, inhibit P.acnes, and decrease inflammation.
- كمان مرّة لحتى يوصلكم صوت الدكتور: توبييكاال فيتامين A ما بيشتغلش Ab بس السيستاميك (systemic) آآه ...
- كمان شغلة، بتقدر تستخدم أي شكل من فيتامين A بس هدول اللي مذكورين بهاي المحاضرة مفضلين أكثر
- A regimen of benzoyl peroxide each morning and tretinoin at bedtime may enhance efficacy and be less irritating than either agent used alone.

4. Adapalene

- Adapalene is a third-generation **retinoid** with **comedolytic, keratolytic, and antiinflammatory** activity.
- Adapalene is indicated for mild to moderate acne vulgaris.
- The 0.1% gel can be used as an **alternative to tretinoin**
- Coadministration with a topical or oral antibiotic is reasonable for moderate forms of acne.

□ أي شيء بعلاج ال acne إذا مال إليه Ab activity جييله مضادّ
معه

5. Erythromycin

- Erythromycin in concentrations of 1% to 4% with or without zinc is effective against inflammatory acne.
- ~~asasasasas~~... Zinc combination products may enhance penetration of erythromycin into the pilosebaceous unit.
- Development of *P. acnes* resistance to erythromycin may be reduced by combination therapy with benzoyl peroxide. (synergism)
- Ab ≠ anti-inflammatory

6. Clindamycin

- Clindamycin inhibits *P. acnes* and provides comedolytic and anti-inflammatory activity.
- Combination with benzoyl peroxide increases efficacy.

7. Salicylic Acid, Sulfur, and Resorcinol

- Salicylic acid, sulfur, and resorcinol are **second-line topical therapies**.
- They are keratolytic and mildly antibacterial agents. **Salicylic acid** has comedolytic and antiinflammatory action.
- Keratolytics may be less irritating than benzoyl peroxide and tretinoin, but they are not as effective comedolytic agents.
- Disadvantages: include the odor created by hydrogen sulfide on reaction of sulfur with skin

Systemic Pharmacotherapy

In aggressive cases with scars , stress

1. Isotretinoin(systemic Vit A)

- MOA: decreases sebum production, inhibits P. acnes growth within follicles, inhibits inflammation, and alters patterns of keratinization within follicles.
- It can be used in patients who have failed conventional treatment as well as those who have scarring acne or acne associated with severe psychological distress.
- A5-month course is sufficient for most patients.

Isotretinoin

□ **Adverse effects** are often **dose related**.

1. **Drying** of the mouth, nose, and eyes is most common.

2. **Peeling and skin desquamation**

3. **Systemic effects** include :

1. **transient increases in serum cholesterol and triglycerides,**
2. **increased creatine kinase, hepatomegaly with abnormal liver injury tests**
3. **hyperglycemia,**
4. **photosensitivity,**
5. **bone abnormalities, arthralgias, muscle stiffness,**
6. **teratogenicity.**

2. Oral Antibacterial Agents

a) Tetracyclines:

- **MOA:** inhibit P. acnes, reduce the amount of keratin in sebaceous follicles, and have antiinflammatory properties
- **Side effects:** hepatotoxicity , GI disturbances, photosensitivity
- Tetracyclines must not be combined with systemic retinoids ????????because of an increased risk of **intracranial hypertension**.
- Tetracycline administration must be separated from food and dairy products

Doxycycline & Minocycline is commonly used for moderate to severe acne vulgaris.

Oral Antibacterial Agents

b) Trimethoprim-sulfamethoxazole (or trimethoprim alone) is a second-line

□ oral agent that may be used for patients who do not tolerate tetracyclines.

Topical Antibiotics

Not for acne, noooooo for acne... .
For topical bacterial infections
Only for topical uses, not systemic

ادوية ال acne كلها انذكرت في الجزء الأول من
المحاضرة وهدول مش تابعين الهم

1. Mupirocin (G++++)

- Mupirocin works against Gram-positive bacteria only
- Mupirocin inhibits bacterial tRNA synthetase
- Can be used to treat **MRSA** in skin (**although resistance is rising**)
- **Only for topical uses**

2. Polymyxin (G----)

- polymyxins are only active against gram negative bacteria
- The polymyxins are highly nephrotoxic and are thus **only used topically**
- MOA: Bind the lipopolysaccharide in the outer membrane, and causes poring of it

3. Bacitracin

- Primarily used against gram positive bacteria *S. aureus* and *Streptococci* spp.
- Most gram negative organisms are resistant
- **MOA:** Bacitracin interferes with bacterial cell wall synthesis.



4. Gramicidins

- The Gramicidins are small peptides
- Gramicidin is a **powerful antibacterial agent**, with broad range against a **number of Gram positive and Gram negative microorganisms.**
- Unfortunately, Gramicidin is **hemolytic**, and thus is **limited to topical use.**
- Mechanism of action is believed to be at the cytoplasmic membrane.



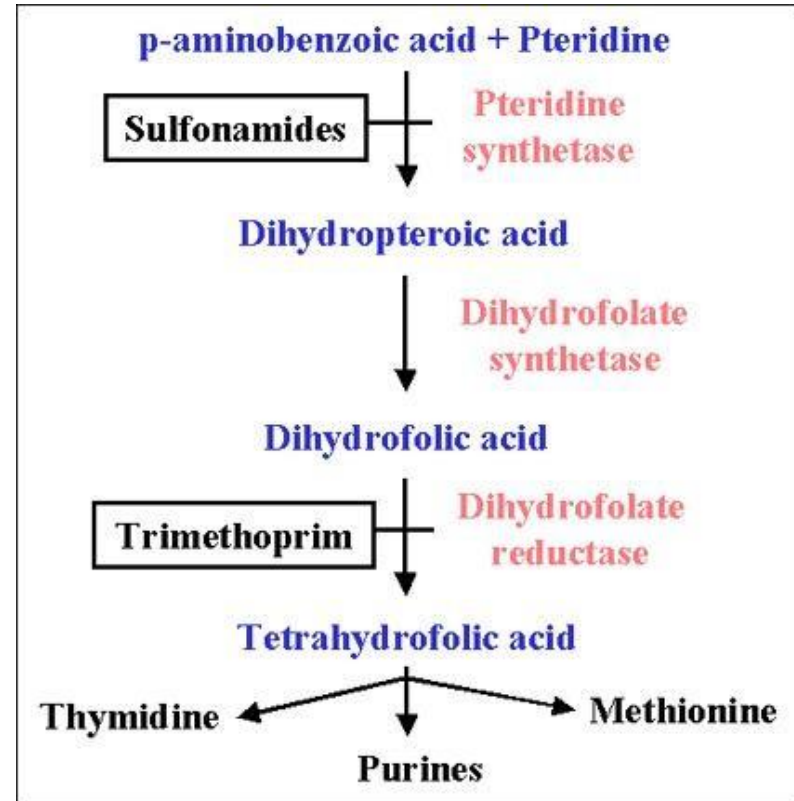
5. Neomycin

- It aminoglycosides antibiotics
- Neomycin is extremely nephrotoxic, thus limiting **its use to a topical antibiotic**
- Neomycin has excellent activity against **gram negative bacteria** and **partial activity against gram positive strains**
- Some people have allergies to neomycin
- **MOA:** neomycin works by binding to the bacterial 30S ribosomal subunit, thus inhibiting protein synthesis.

6. Silver sulfadiazine

□ MOA:

1. Sulfa drug act by interfering with the **biosynthesis of folic acid**
2. ~~passage~~ Heavy metals, **like silver, seem to be toxic to bacteria**, probably due to their ability to denature proteins through reaction with disulfide bonds
3. **Silver sulfadiazine is used to treat burn patients**



فيديو من إسموزيز ممكن يفيد

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ركزوا على مزايا كل دوا وفكرة الزنك والفضة/silver وايش الأدوية
المفضلة لما يكون في scars وفيتامين A كثييير عاد فكرته
وهيك بتكون تمت المحاضرة ، ربنا يفتحها عليكم ويكون فاينل سعيد خالٍ من
الأعياد... كلّ الحبّ..