

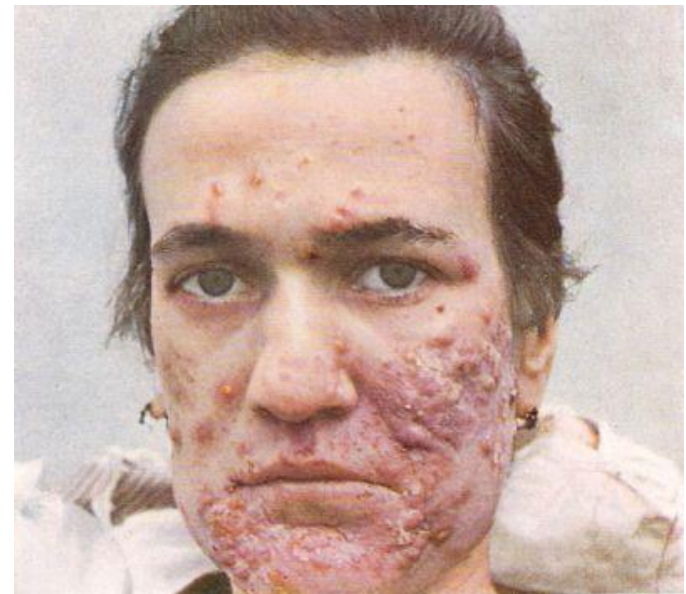
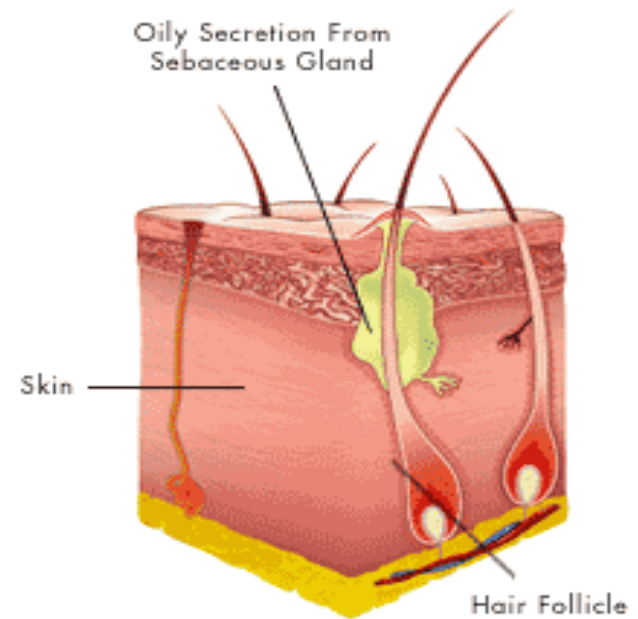


Anti-microbial Agents and acne preparations

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Treatment of Acne Vulgaris

- increased sebum production,
- sloughing of keratinocytes,
- bacterial growth (***Propionibacterium acnes***), and
- inflammation.



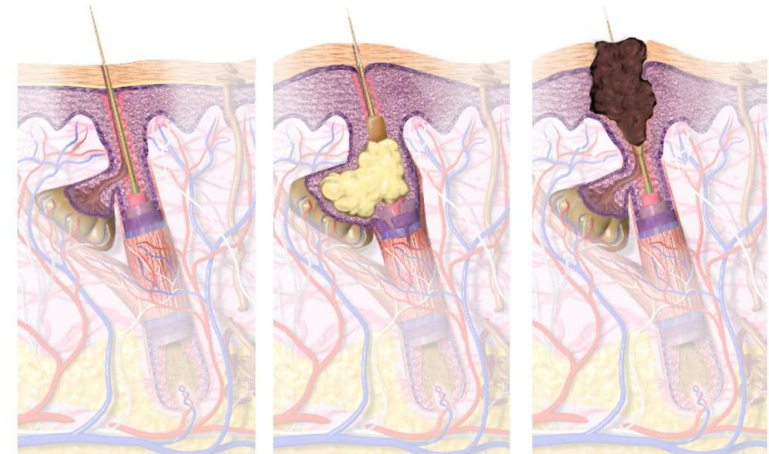
A **comedo** is

a clogged hair follicle (pore) in the skin. Keratin (skin debris) 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



Normal
Skin Pore

Whitehead

Blackhead

Treatment of Acne Vulgaris

Benzoyl Peroxide

- 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).

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 benzoyl peroxide.
- It is also useful for **postinflammatory hyperpigmentation because it has skin-lightening properties.**
- Although uncommon, mild transient burning, pruritus, stinging, and tingling may occur

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.
- Concomitant use of an antibacterial agent with tretinoin can decrease keratinization, inhibit *P. acnes*, and decrease inflammation.
- *A regimen of benzoyl peroxide each morning and tretinoin at bedtime may enhance efficacy and be less irritating than either agent used alone.*

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.

Erythromycin

- Erythromycin in concentrations of 1% to 4% with or without zinc is effective against inflammatory acne.
- 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.

Clindamycin

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

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

Isotretinoin

- 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.
- A 5-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.

Oral Antibacterial Agents

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

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

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

Topical Antibiotics

Mupirocin + + + +

- Mupirocin works against Gram-positive bacteria only
- Mupirocin inhibits bacterial tRNA synthetase
- Can be used to treat MRSA (although resistance is rising)

Polymyxin - - -

- 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,

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.



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.

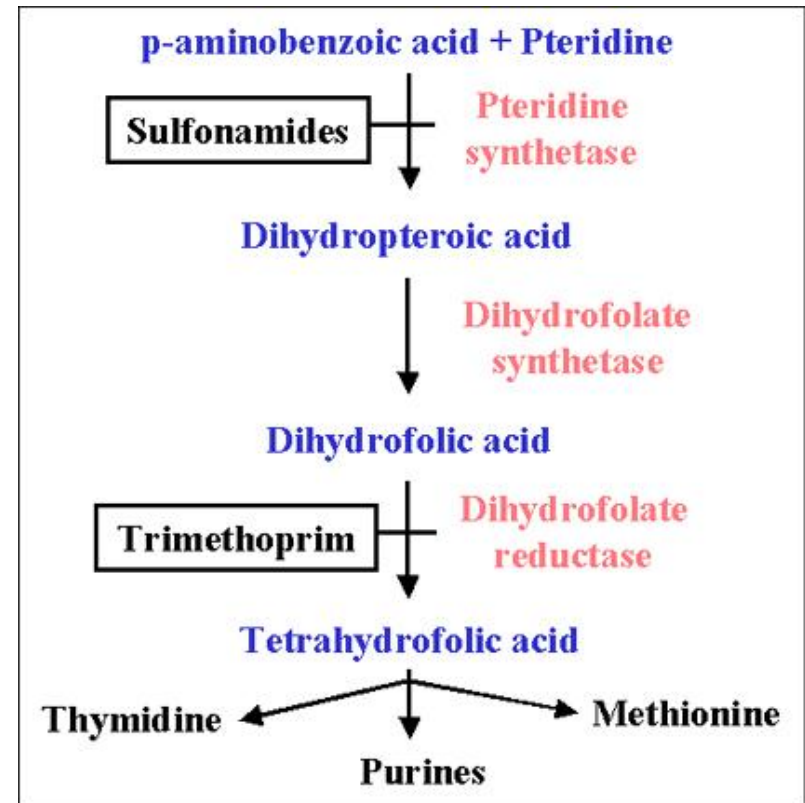
Neomycin

- 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.

Silver sulfadiazine

- **MOA:**

1. Sulfa drug act by interfering with the biosynthesis of folic acid
2. Heavy metals, like silver, seem to be toxic to bacteria, probably due to their ability to denature proteins through reaction with disulfide bonds



Uses



- **Silver sulfadiazine is used to treat burn patients**

Topical Antifungal

FUNGAL INFECTIONS

Superficial Infections

- Tinea (dermatophyte) infections
 - Tinea pedis, corporis, cruris, capitis, etc
- Onychomycosis
 - Infection of finger/toenails by dermatophytes
- Seborrheic dermatitis
- Vaginal candidiasis (yeast infection)
 - Most common species is *C. albicans*, though other spp are on the rise
- Oropharyngeal (thrush) and Esophageal candidiasis
 - Infection can spread from oral mucosa into esophagus



Nystatin

- is a **polyene** antifungal drug with a ring structure mechanism of action
- **MOA:** bind to the fungal cell membrane component ergosterol, leading to *increased fungal cell membrane permeability*
- Too toxic for systemic use, Nystatin is limited to the **topical treatment of superficial infections caused by C. albicans.**
- Uses: candidiasis (thrush), mild esophageal candidiasis, and vaginitis.

2. Antifungal Azoles

- Azoles are synthetic drugs with broad-spectrum fungistatic activity.
- Azoles can be divided into two groups:
 1. the older *Imidazole*
(clotrimazole, ketoconazole, miconazole)
 2. the newer *Triazole*
(fluconazole, itraconazole, and voriconazole),

Clotrimazole

- ✓ used in the topical treatment of oral, skin, and vaginal **infections with *C. albicans*.**
- ✓ It is also employed in the treatment of infections with **cutaneous dermatophytes.**
- ✓ less than 10% of the drug is systemically absorbed.

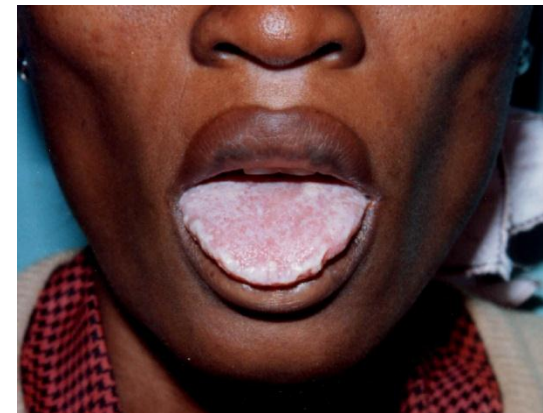


Ketoconazole (Nizoral®)

- ✓ can be absorbed orally, but it **requires an acidic gastric environment**.
- useful in the treatment of **cutaneous and mucous membrane dermatophyte and yeast infections**,
- Ketoconazole is usually effective in the treatment of *thrush*,



Thrush



Itraconazole

Orally

It is the drug of choice for all forms of *sporotrichosis*
rose-gardeners' disease



3. Allylamines

MOA—inhibit **ergosterol synthesis**, thus affecting fungal cell membrane synthesis and function.

1. **Naftifine** is available for topical use only in the treatment of cutaneous dermatophyte and Candida infections.
2. **Terbinafine** is available for topical and oral tablet in the treatment **of dermatophyte skin and nail infections.**



4. Tolnaftate

is an antifungal agent effective in the topical treatment of dermatophyte infections and **tinea**

5. Griseofulvin

MOA: it **inhibits fungal growth** by binding to the microtubules responsible for mitotic spindle formation.

- The drug **binds to keratin precursor cells** and newly synthesized keratin in the stratum corneum of the **skin, hair, and nails**, stopping the progression of dermatophyte infection.
- Is an oral fungistatic agent used in the **long-term treatment of dermatophyte infections**

Topical Antiviral

HERPES INFECTIONS

- **HSV1**

- Herpes labialis or “cold sores”, fever blisters



- **HSV2**

- Genital herpes
- Acquired through sexual contact, lifelong recurrent infection
- Can be asymptomatic, still transmissible

- **Herpes Zoster**

- Varicella zoster virus
- Causes chicken pox in children



Antivirals For Herpes Infections

- When would you use topical for what indication
- Acyclovir is only one available topically
- **Acyclovir (Zovirax®)**
 - Oral capsule, tablet, and IV
 - Oral suspension
 - Topical cream, ointment



- Valacyclovir (Valtrex®)
 - Oral tablet
- Famciclovir (Famvir®)
 - Oral tablet



Treatment of Common skin disorders

TREATMENT OF SEBORRHEIC DERMATITIS

- **Can be suppressed but not cured**
- **Mild topical corticosteroids useful for acute forms (1% to 2% hydrocortisone)**
- **Once controlled, maintenance with medicated shampoos that act against yeast, eg, selenium sulfide, ketoconazole, tar shampoos**





ROSACEA

Diffuse erythema, with papules.

Location: cheeks, forehead & chin

Nose: thickened, erythematous
rhinophyma.

Common in fair-skinned persons of all
ages

Common symptom: Recurrent facial
flushing from a variety of stimuli
(sunlight, alcohol, hot beverages,
drugs that cause vasodilation)

Chronic condition with frequent flares



TREATMENT OF ROSACEA

- **Avoid skin irritants, strong soaps**
- **Reduce sun exposure: use sunscreens**
- **For moderate to severe flares:**
oral antibiotics (tetracyclines, eg, doxycycline, minocycline) or erythromycin
- **For mild cases and maintenance:**
topical antibiotics (erythromycin, clindamycin, metronidazole)
- **Severe or refractory rosacea:**
some rosacea patients have very severe outbreaks and do not respond to topical treatments or oral antibiotics. In those cases, isotretinoin can be considered at low doses and monitored closely by their dermatologist.

Atopic dermatitis (eczema)

- **eczema is a condition that makes your skin red and itchy. It's common in children but can occur at any age. Atopic dermatitis is long lasting (chronic) and tends to flare periodically. It may be accompanied by asthma or hay fever. No cure has been found for atopic dermatitis.**



Atopic dermatitis (eczema)

Treatment

- emollients (moisturisers) – used every day to stop the skin becoming dry.
- topical corticosteroids – creams and ointments used to reduce swelling and redness during flare-ups.
- Apply an anti-itch cream to the affected area.
- Take an oral allergy or anti-itch **medication**
- Don't scratch.
- Apply bandages.
- Take a warm bath.
- Choose mild soaps without dyes or perfumes.



THANK YOU!

thank you!