

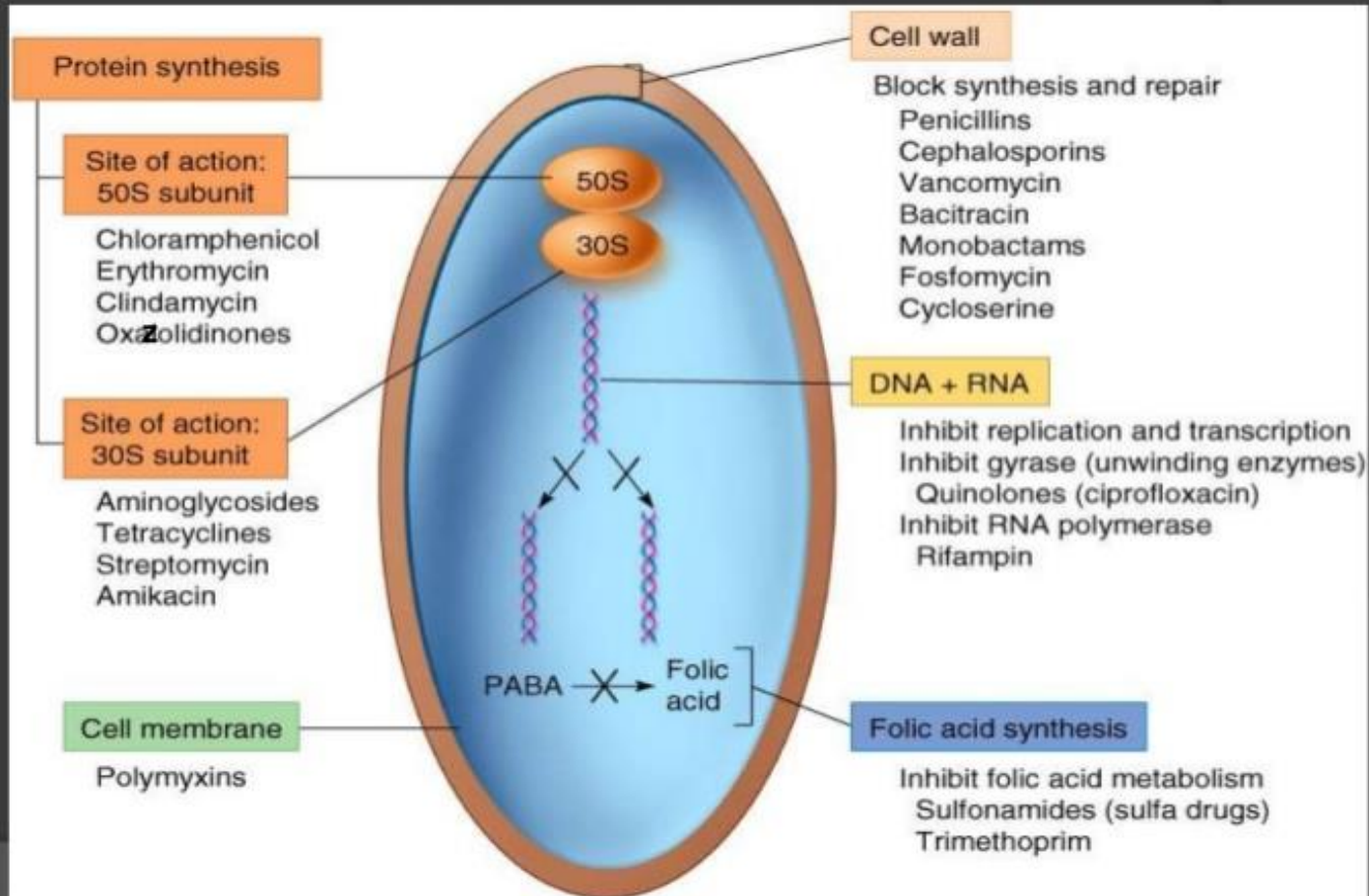
TOPICAL ANTIBACTERIALS



ANTIBACTERIALS

- Antibacterial is an agent which destroys or inhibits the growth of bacteria.
- Topical antibiotics are used for various purposes in dermatology.
- Treatment of acne,
- Treatment and prevention of wound infection,
- Impetigo or impetiginized dermatitis, and staphylococcal nasal carrier state

Antimicrobials Targets



Topical antibacterial agent in acne vulgaris and rosacea

- Topical antibiotics are used as anti inflammatory and antibacterial
- They have limited benefit in noninflammatory and comedonal acne



BENZOYL PEROXIDE

- It is a bactericidal for *P.acnes*, inhibits triglyceride hydrolysis, reduces inflammation It acts as a keratolytic and comedolytic
- Once absorbed by the skin, it is converted to benzoic acid.
- Its effects are due to oxidation of bacterial proteins by reactive oxygen species, which are released when the drug is decomposed by cysteine in the skin.

Uses:

- Acne vulgaris: monotherapy and in combination with topical retinoids
- Rosacea:

Side effects:

- Burning, erythema ,peeling, dryness increases when combined with adapalene
- Contact allergy [0.2-1%]

Concentration: 2.5%, 5%,10% gel,lotion, solution, soap bar

CLINDAMYCIN

Clindamycin is a semisynthetic lincosamide antibiotic isolated from *Streptomyces* species that is active against Gram-positive cocci and anaerobes including staphylococci, streptococci, *P. acnes*, *Corynebacterium*, *Clostridium* and *Gardnerella vaginalis*

MOA:

It binds irreversibly to 50s subunit of bacterial ribosome, this inhibits bacterial protein synthesis and produce bactericidal and bacteriostatic effects.

USES:

- Acne vulgaris
- Erythrasma
- Folliculitis
- Periorificial facial dermatitis
- Rosacea
- Fox Fordyce disease
- Pitted keratolysis

Side effects:

- Itching
- Burning
- Stinging
- Excessive dryness
- Peeling
- Erythema
- Contact allergy is rare
- Pseudomembranous colitis

Concentration : 1% lotion, gel

ERYTHROMYCIN

- Erythromycin is a macrolide antibiotic isolated from *Streptomyces erythraeus* that is active against Grampositive cocci including group A β -hemolytic streptococci and *Staph aureus*, as well as some Gram-negative bacilli.
- It is bactericidal inhibits 50s subunit of bacterial ribosome.

USES:

- Acne vulgaris
- Rosacea

Side effects:

- Erythema ,scaling, tenderness,burning, itching, irritation, oiliness and dryness
- ACD

Concentration: 2%,3% gel,solution

METRONIDAZOLE

- It is a synthetic nitroimidazole
- It is active against anaerobic bacteria and protozoa
- It results in DNA disruption and inhibits nucleic acid synthesis
- It acts as antiinflammatory agent

USES:

- Rosacea
- Acne vulgaris
- Cutaneous ulcers
- Seborrheic dermatitis

Side effects:

- Dryness, itching, burning and stinging
- Contact allergy

Concentration: 0.75% gel, cream ,1%gel

AZELAIC ACID

- Azelaic acid is a dicarboxylic acid derivative found in whole grain cereals and animal products, and it is normally present in human plasma. In vitro, azelaic acid has activity against *Propionibacterium acnes* and *Staphylococcus epidermidis*.
- It is usually bacteriostatic but may be bactericidal in high concentrations. Its activity may be due to inhibition of microbial cellular protein synthesis

USES:

- Acne vulgaris
- Rosacea ,perioral dermatitis
- Plaque psoriasis
- Senile freckles, lentigines, pigmented seborrheic keratosis

SIDE EFFECTS

- Itching, burning and scaling.

Concentration: 15%,20% gel, cream

DAPSONE

- Inhibits dihydropteroate synthetase and prevents bacterial folic acid synthesis.
- It decreases neutrophil chemotaxis and myeloperoxidase activity

FDA approved uses:

- Acne vulgaris

Side effects :

- Transient dryness
- Erythema
- Rash,
- Sunburn
- Orange brown discolouration when combined with benzoyl peroxide.

Concentration: 5% gel

SODIUM SULFACETAMIDE

- Antiinflammatory, antibacterial
- Inhibits nucleic acid and protein synthesis and cell growth by impeding bacterial synthesis of dihydrofolic acid.
- Competitive inhibition of dihydropteroate synthetase prevents condensation of pteridine precursors with PABA

Uses:

- Acne
- Rosacea

Side effects:

- Mild to moderate dryness
- Transient pruritus

Concentration: 5%,10% cream

BACITRACIN

- It is derived from *Bacillus subtilis*, is active against Gram-positive organisms.
- It is generally used topically in combination with other antibiotics, such as neomycin or polymyxin-B

USES:

- Treatment of leg ulcers.

SIDE EFFECTS:

- Localised itching
- Burning sensation
- Contact dermatitis
- Anaphylactic shock

POLYMYXIN B

- It is a cyclic peptide derived from a Gram-positive bacterium (*Bacillus polymyxa*) and active against Gram-negative organisms including *Pseudomonas aeruginosa*.

USES:

- Minor skin wounds used in combination with neomycin and bacitracin

SIDE EFFECTS

- Contact allergy occurs rarely

NEOMYCIN

- It is a bactericidal aminoglycoside produced by *streptomyces fradiae*.
- It binds to 30s subunit of bacterial ribosome to inhibit protein synthesis and also inhibits DNA polymerase.

USES:

- Minor wounds and cutaneous infections

SIDE EFFECTS:

- Allergic contact dermatitis

MUPIROCIN

- It is derived from *Pseudomonas fluorescens*
- It inhibits bacterial isoleucyl-trna synthetase thereby hindering bacterial rna, protein and cell wall synthesis.
- **Concentration:** 2% ointment

USES:

- Impetigo
- Folliculitis
- Impetiginized eczema, burns, lacerations ,leg ulcers
- It is useful in the elimination of nasal carriage of staphylococci including multiply-resistant organisms

SIDE EFFECTS:

- Pain, burning, itching

FUSIDIC ACID

- Derived from *Fusidium coccineum*, this is active against staphylococcal infections

USES:

- It is used as a first-line treatment for pitted keratolysis .
- It is also used in combination with topical steroids in the treatment of infected eczema.
- Erythrasma
- Sensitization occurs very rarely

RETAPAMULIN

- It is a semisynthetic pleuromutilin derivative which exert antimicrobial activity by inhibition of bacterial protein synthesis following interaction with the peptidyltransferase centre of the 50S subunit of bacterial ribosomes
- Retapamulin is effective in vitro against *Staphylococcus aureus* (including methicillin-resistant strains) and *Streptococcus pyogenes* (including macrolide-resistant strains), and against a diverse range of anaerobic organisms including *Clostridium* species, anaerobic cocci and *Propionibacteria acnes*

USES:

- FDA approved primary impetigo due to staph aureus [methicillin susceptible]
- Secondarily infected dermatitis and traumatic wounds

SIDE EFFECTS:

- Pruritus, paresthesia, irritation, pain
- **Concentration:** 1% ointment

SILVER SULFADIAZINE

- It is active against Gram positive and Gram negative bacteria including MRSA AND P.aeruginosa

USES:

- Burns
- Leg ulcers

SIDE EFFECTS:

- Allergic reaction
- Argyria

IDOQUINOL

- Iodoquinol is a halogenated oxyquinoline with antibacterial and antifungal activity. Mechanism of action is unknown.

Uses:

- superficial bacterial and fungal skin infections.
- Concentration: 1% cream

MAFENIDE ACETATE

- It is a sulfonamide.
- It acts as antibacterial and antifungal activity.

Uses:

- Thermal burns

Side effect:

- burning
- urticaria
- facial edema

TETRACYCLINES

- Tetracycline hydrochloride is available as a 3% solution and as an ointment.
- It acts by inhibiting protein synthesis and are bacteriostatic against a wide range of Gram-negative and Gram-positive bacteria

Uses:

- Acne vulgaris
- Superficial skin infection

Side effects :

- stinging, burning and an unpleasant odor.

GENERAL INFORMATION

- Wash the affected skin with saline or water and a mild soap and pat dry with a soft towel. Be careful to remove previous topical drugs or cosmetics
- Apply a thin layer of the topical medication to the affected skin. The “fingertip unit” can be considered as the golden standard.
- Gently and thoroughly massage the topical medication onto the skin.

- The recommended dosage depends on the type of topical antibiotic.

In general, topical antibiotics should not be applied often more than three times a day.

- After the antibiotic is applied, the area should be covered with a dressing, such as a bandage.
- Hands should be washed with soap and water after handling the medication.
- All topical medication may cause side effects. Although side effects are usually local (itching, burning, stinging, tingling), systemic reaction can occur.

- Using certain topical antibiotics combined with a topical corticosteroid may hide signs of infection or allergic reaction. Certain compounds of two or more topical antibiotics may complicate the diagnosis of an accidental contact/systemic reaction.
- Treat carrier sites in impetigo, a frequent source of infection is nasal mucosa.

- In impetigo, avoid close contact with others, to use separate towels and flannels and to change and launder clothes and linen daily.
- Affected children must stay away from school until crusts have dried out.

CONCLUSION

- Topical antibiotics are widely used in dermatology for a variety of indications.
- Topical antibiotic change the inherent microbiologic environment of skin, and on prolonged use, can also alter the bacteriology of the anterior nares and oropharynx.
- This might lead to emergence of resistant pathogens.

- Topical antibiotics should not be used as monotherapy for acne as resistance is likely to develop.
- In care of a wound created in an aseptic setting, topical antibiotics are not recommended due to increasing rates of allergic contact dermatitis and emerging rates of bacterial resistance
- There is no perfect topical antibiotic agent, and as such, both researchers and clinicians must remain vigilant to detect resistance patterns, and to establish optimal treatment regimens.



THANK YOU