

STDs

TREATMENT OF SYPHILIS & GONORRHEA

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We advice u first to go through the mind maps in the extra file. This will help u to have an obvious and general idea about the contents of the lect. ^ - ^

& & = for reading
Underlined = imp.
Red = notes

OBJECTIVES

- At the end of lecture , the students should :
- Describe drugs used in the treatment of syphilis & gonorrhea regarding :
- Describe the mechanism of action of each drug
- Describe the adverse effects of each drug
- Describe the contraindications of each drug used
- Describe the recommended regimens used for treatment of syphilis & gonorrhoea
- Describe the alternative treatments in allergic patients

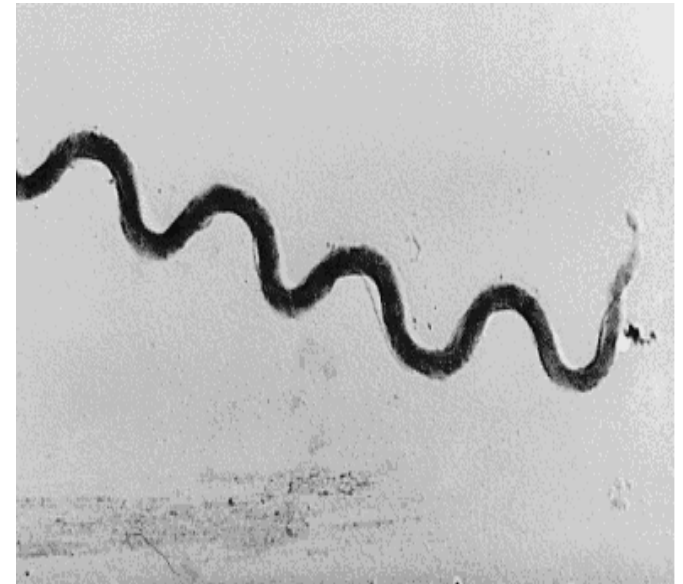
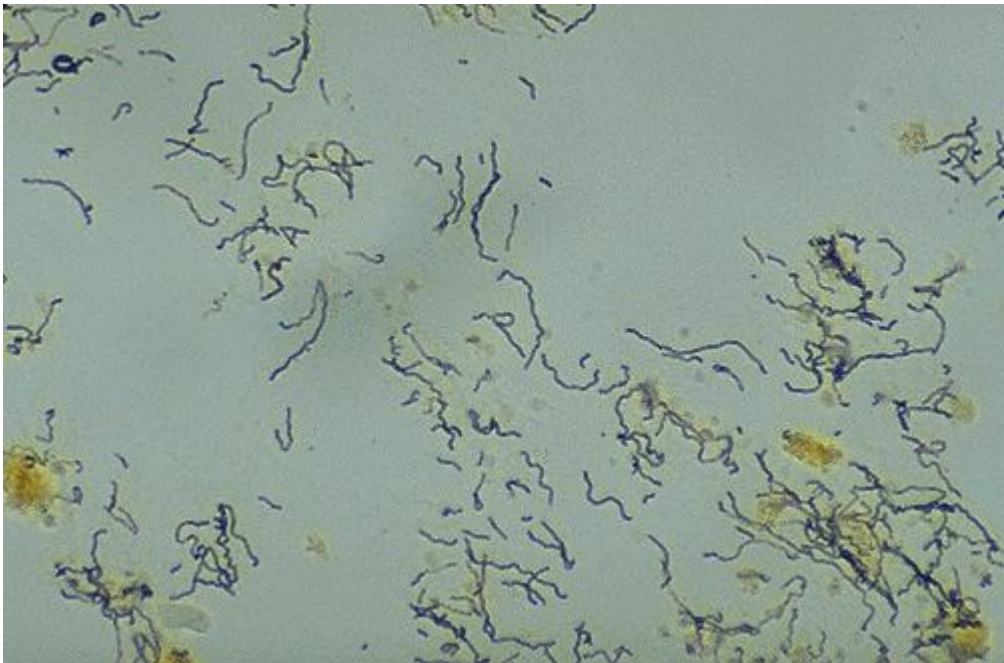


WHAT IS SYPHILIS ?

- Is sexually transmitted disease caused by bacterium **Treponema Pallidum**
- In treatment of syphilis we must treat with bactericidal antibiotics. Why ?
Because it is an acute infection with acute symptoms

& & Treponema Pallidum

- Treponemes are helically coiled, corkscrew-shaped.



& & Classification Of Syphilis

- A primary stage (a single sore (a chancre))
- This primary stage is where the disease causes only skin ulceration

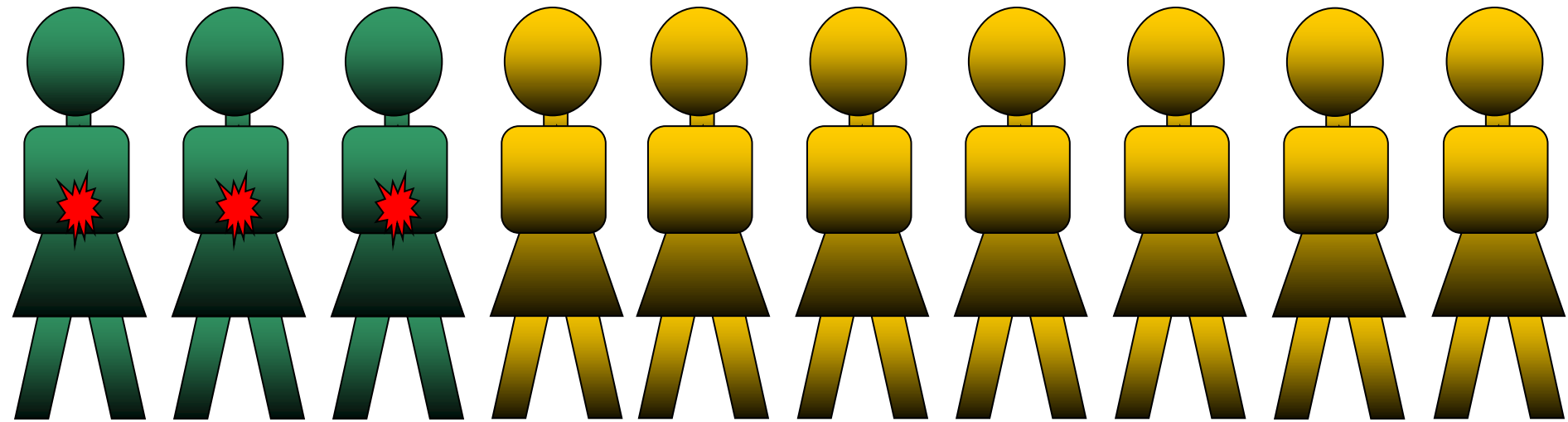


& & Secondary Stage

- Skin rash & mucous membranes lesions
- Due to blood invasion



& & Latent stage



70% may have NO SYMPTOMS

This is the tertiary e

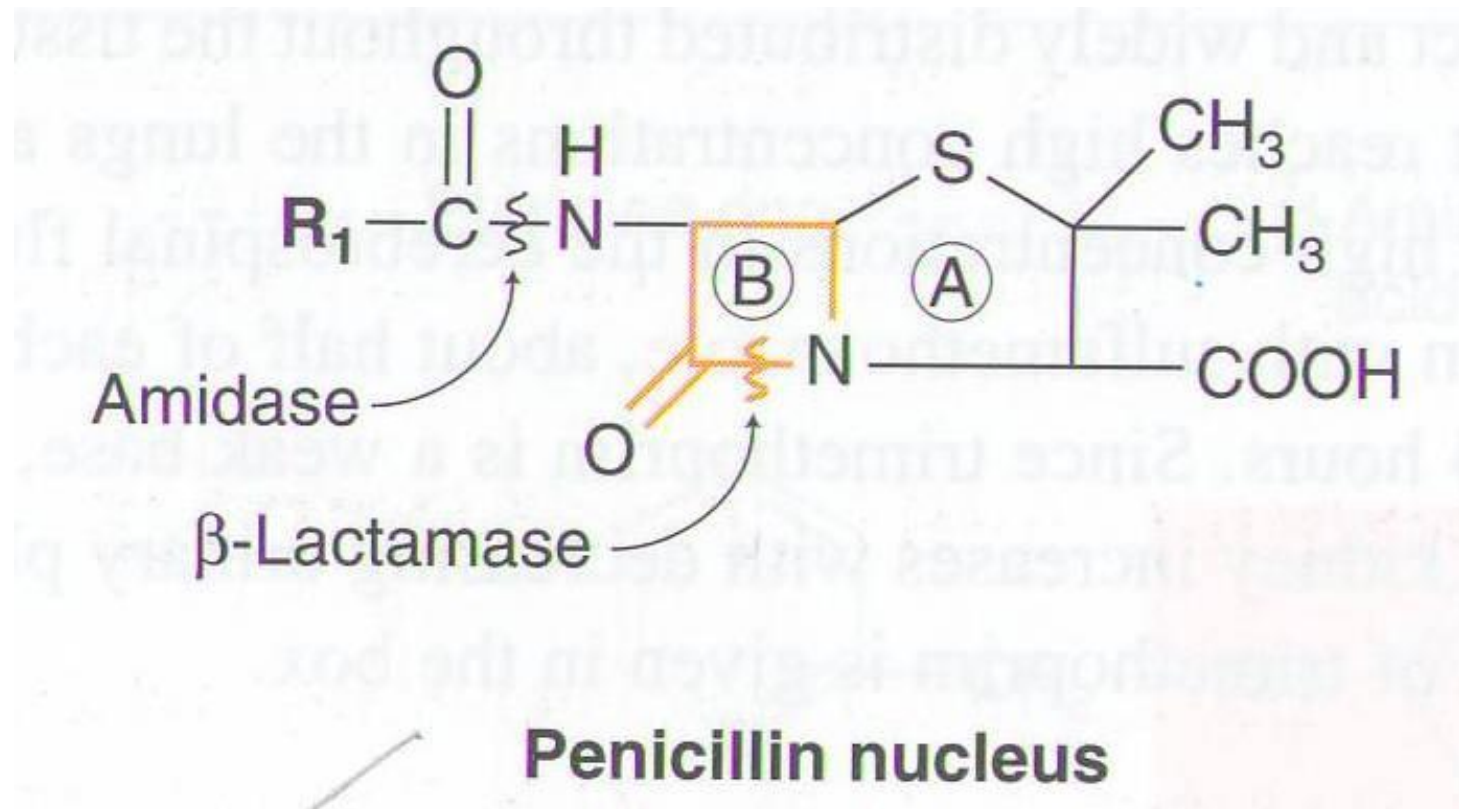
& & Congenital Syphilis

- If a woman is pregnant and has symptomatic or asymptomatic early syphilis, hematogenously disseminating organisms may pass through the placenta to infect the fetus.

Therapy of syphilis

1. Penicillins are drugs of choice.
2. Benzathine penicillin G, cannot pass the blood brain barrier. So can never be used to treat neurosyphilis
3. Procaine penicillin G can pass the blood brain barrier, so used in neurosyphilis. Drug of choice for neurosyphilis

1- Penicillins (β -lactam antibiotic)



PENICILLINS

Mechanism of action:

- Inhibit the synthesis of bacterial cell wall through inhibition of transpeptidase enzyme.
- These drugs are bactericidal

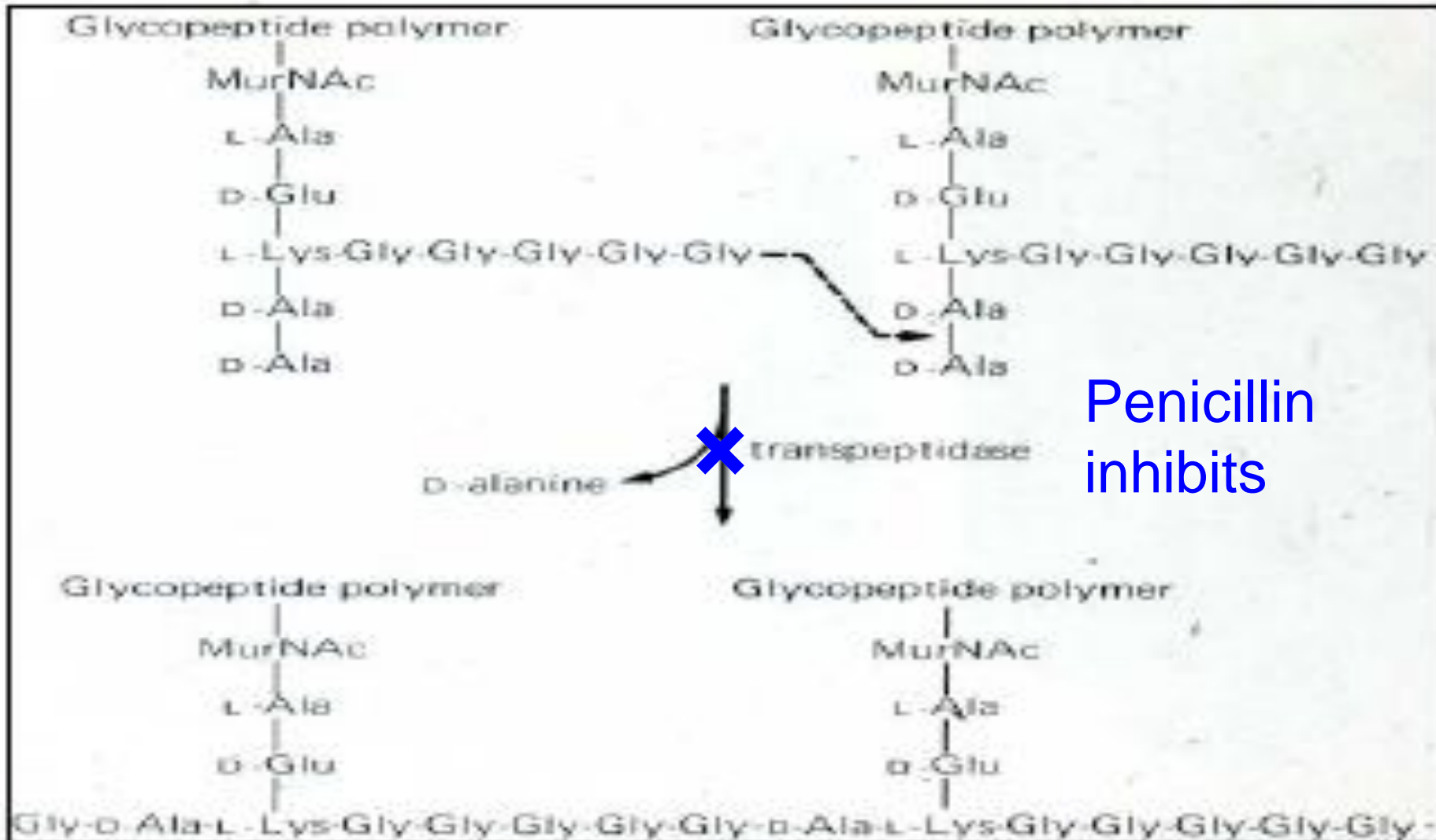
Note :

- Transpeptidase is an enzyme that cross links the glycopeptides of the bacterial cell wall together
- By inhibiting it we make the wall weaker
- And then killing the bacteria

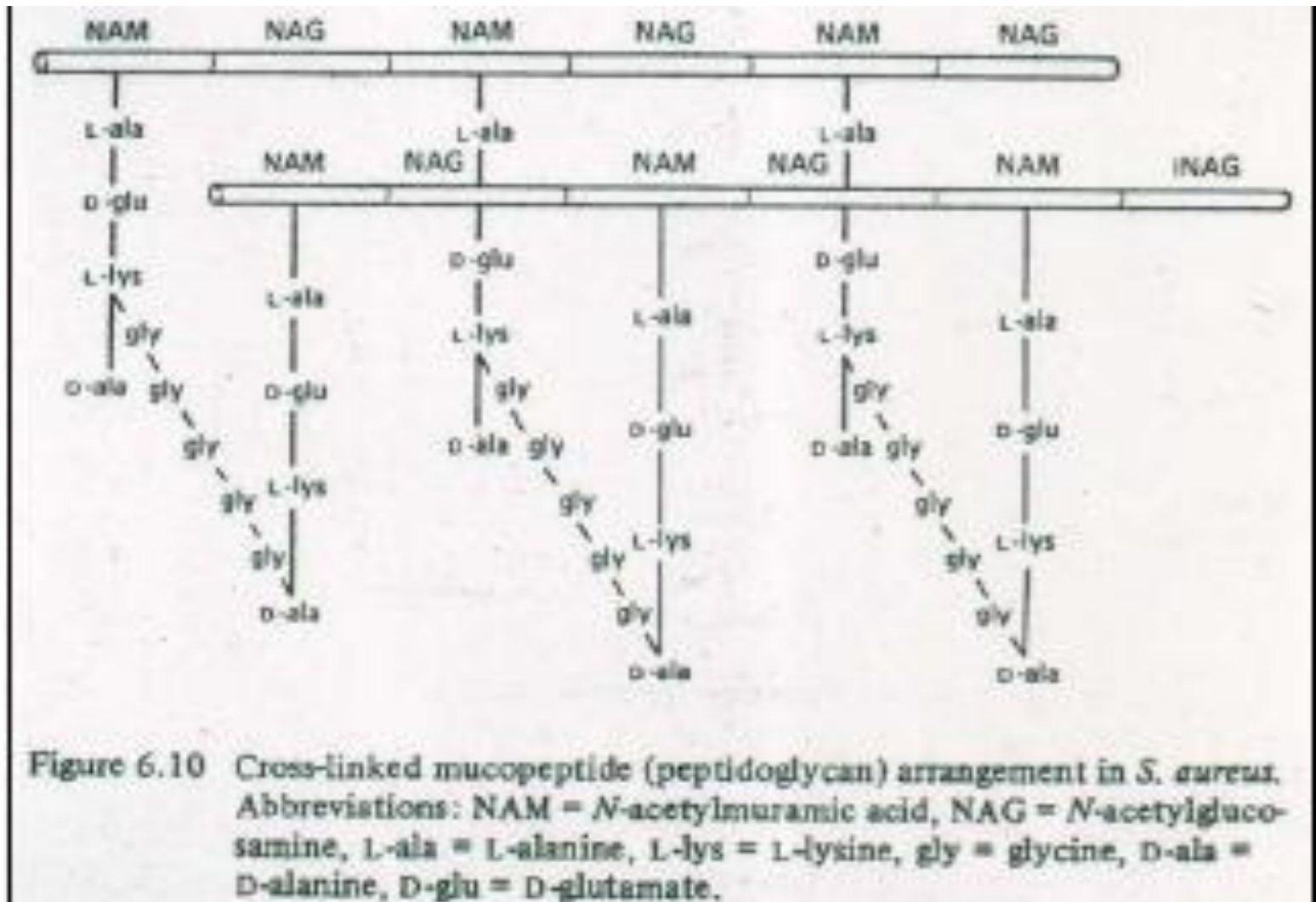
Note

- Penicillin and cephalosporin are beta-lactam antibiotics (have b-lactam ring)
- Most of the bacteria have an enzyme called beta-lactamase which breaks the beta lactam ring and stops the action of the antibiotic

Cross linking of peptides in bacterial cell wall synthesis



Cross linked cell wall



Preparations of penicillins used for treatment of syphilis

- A. Aqueous crystalline penicillin G**
- B. Procaine penicillin G**
- C. Benzathine penicillin G**

A. Penicillin G

- **Short duration of action** around only 4 hrs
- **Acid unstable (destroyed by gastric acidity)**
Cannot be given orally is taken by injection (IM.IV)
- **Penicillinase (β lactamase) sensitive**

Note:

The Beta-lactam antibiotics are either :

-beta-lactam sensitive (affected by beta-lactamase enzyme)

OR

-beta-lactam resistance (not affected by beta-lactamase enzyme)

B. Benzathine penicillin

- Long acting (every 3-4 weeks)
- Acid unstable
- Penicillinase sensitive
- Not cross BBB >> So can never be used to treat neurosyphilis

C. Procaine penicillin

- Long acting (24/48 hours)
- Acid unstable
- Penicillinase sensitive
- Penetrates well C.N.S. **cross BBB >> good for neurosyphilis**

Adverse effects of penicillins

- **Hypersensitivity**
 - Causing vasodilation leading to hypotension << lead to anaphylactic shock
- **Nephritis**
 - Penicillin is eliminated by active transport from the kidney tubules , so if it concentrates in large amounts it can cause nephritis
- **Convulsions with high doses or in renal failure**
 - in renal failure because they are eliminated by the kidney

& & Recommended Regimens for syphilis

- A **single** IMI of benzathine penicillin is the standard treatment for **primary , secondary and early latent syphilis**
- Adult with late latent syphilis , **benzathine penicillin** administered as **3 IMI at a dose** of 2.4 million units each at one week interval.

& & CONTINUE

- **Adult with neurosyphilis or with syphilitic eye disease , aqueous crystalline penicillin G 18-24 million units /day IV every 4 hours or continous infusion for 10-14 days .**
- **Alternative therapy is procaine penicillin 2.4 million units IMI once daily 10-14 days**

For Allergic Patients To Penicillins

- Tetracyclines as :

Doxycycline

Minocycline

But remember it is contraindicated in pregnancy

- Macrolides as:

Clarithromycin

azithromycin

- Cephalosprins as :

Ceftriaxone

cefixime

TETRACYCLINES

- Doxycycline , Minocycline
- Well absorbed orally
- Long-acting (once daily)
- Not effective for treatment of gonorrhea

Mechanism of action

- Inhibit bacterial protein synthesis by reversibly binding to 30 S bacterial ribosomal subunits .

Side Effects and contraindication

Side effects:

1-gastric upset

2-Effects on calcified tissues (discoloration & hypoplasia of teeth) & bone deformity

3-Hepatotoxicity

4-Phototoxicity

5-vestibular problems (vertigo,nausea, vomiting)

6-Superinfections

Contraindication:

1. Children (below 10 years)

2. Pregnancy-

3. Nursing mothers

MACROLIDES (clarithromycin)

Mechanism of action

- Inhibits bacterial protein synthesis by binding to bacterial 50S ribosomal subunits
- Bactericidal at high concentration
- Don't cross BBB and placenta

ADVERSE EFFECTS

.

- Gastric upset
- Inhibits hepatic microsomal enzyme (P-450 system)

Cephalosporins

3rd Generation

3rd generation are effective on gram (-)

- β -lactam antibiotics

-e.g. of cephalosporins :

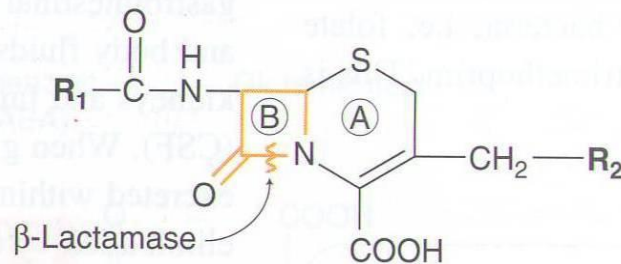
cefixime

Ceftriaxone

mechanism of action

Inhibits bacterial cell wall synthesis

Bactericidal



Cephalosporin nucleus

Adverse effects

- Allergic manifestations
- Thrombophlebitis (I.V. route)
- Nephritis
 - Because they are cleared the same way as penicillin
- Superinfections
- Diarrhea

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Note

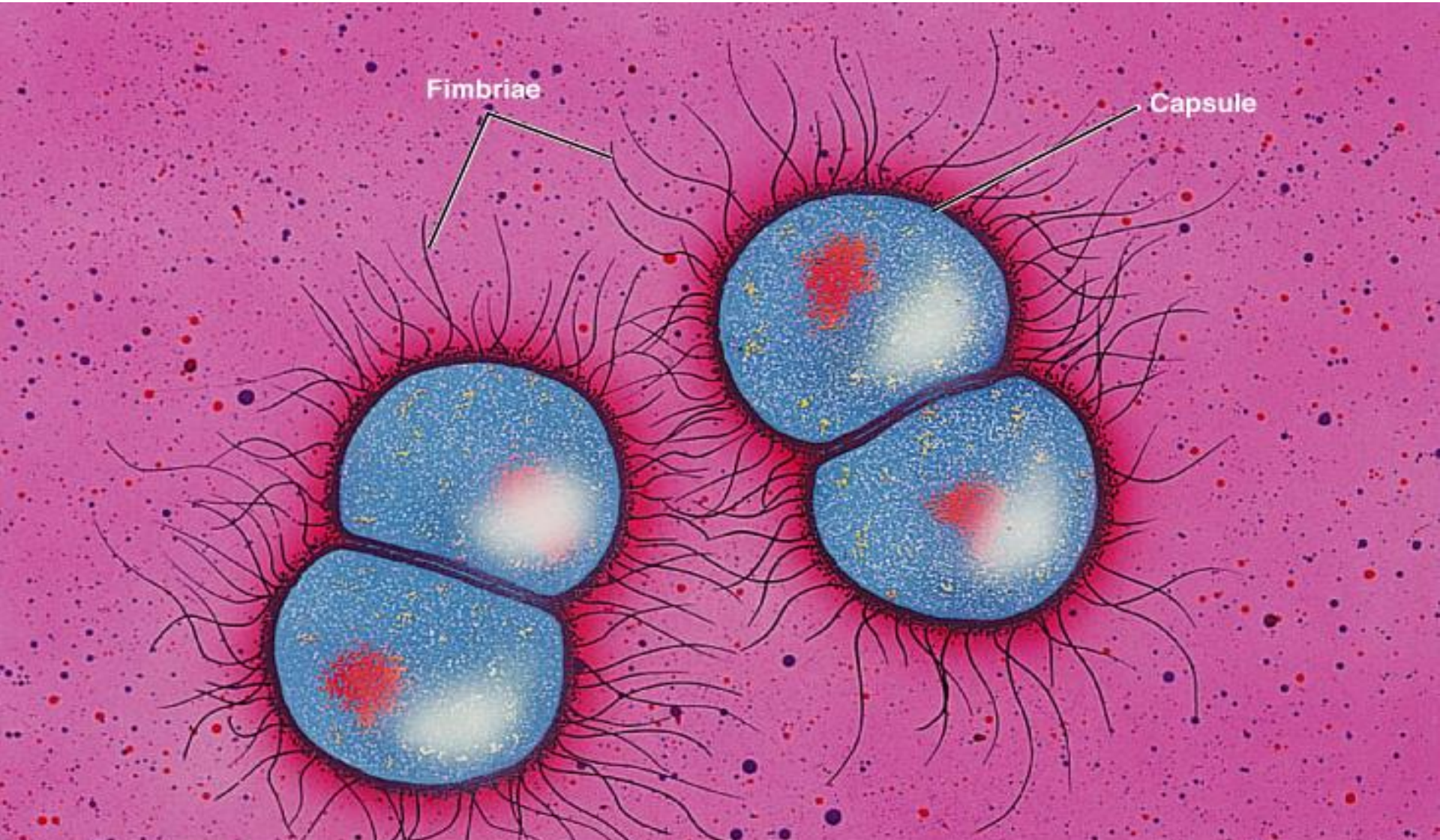
- Macrolides
 - Don't cross placenta : safe in pregnancy
 - Don't cross BBB : cannot be used to treat neurosyphilis
- If patient is infected with syphilis and is penicillin resistant or has allergy:
 - we use tetracycline
 - If tetracycline is contraindicated (pregnancy, children ,etc..) we use ceftriaxone or macrolides

Treating Syphilis in pregnancy

- Benzathine penicillin G and repeat the dose after one week.
- Repeat dose because of the wide distribution rate >> due to increased mother's extracellular volume
- Ceftriaxone as alternative
- Avoid tetracycline during pregnancy

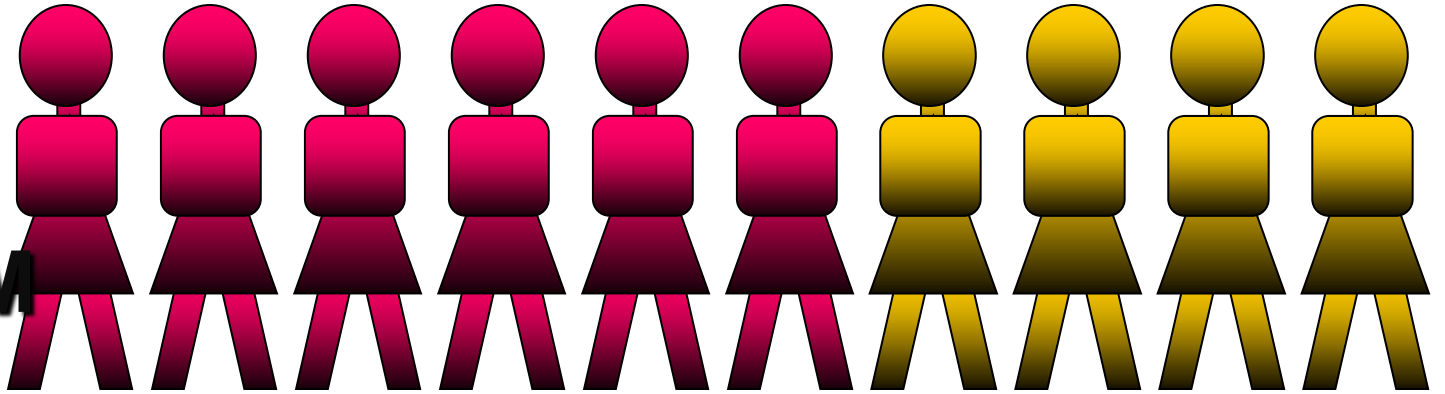
GONORRHEA

Caused by *Neisseria gonorrhea*, a pus producing bacteria

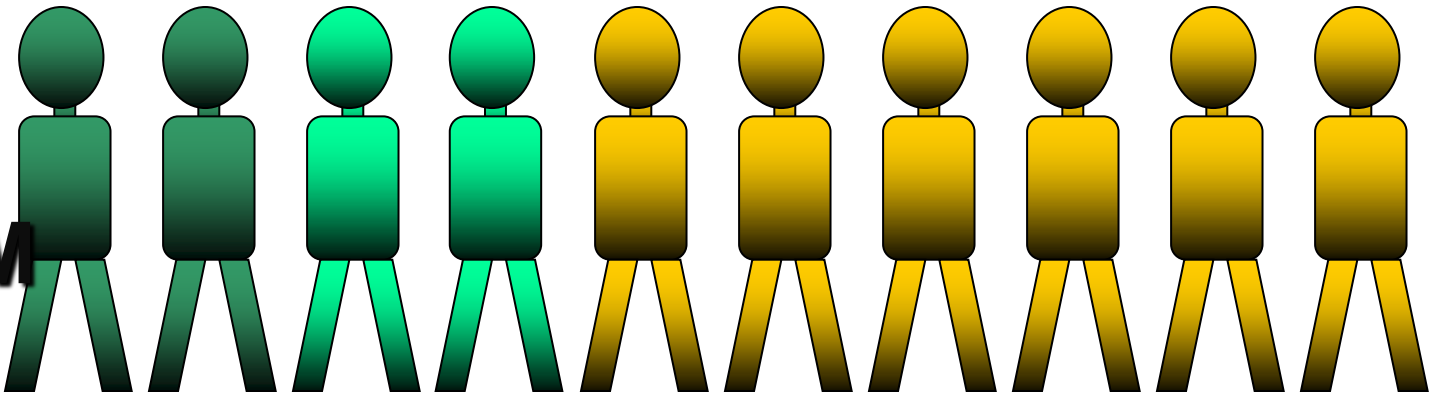


GONORRHEA

**NO
SYMPTOM
S**

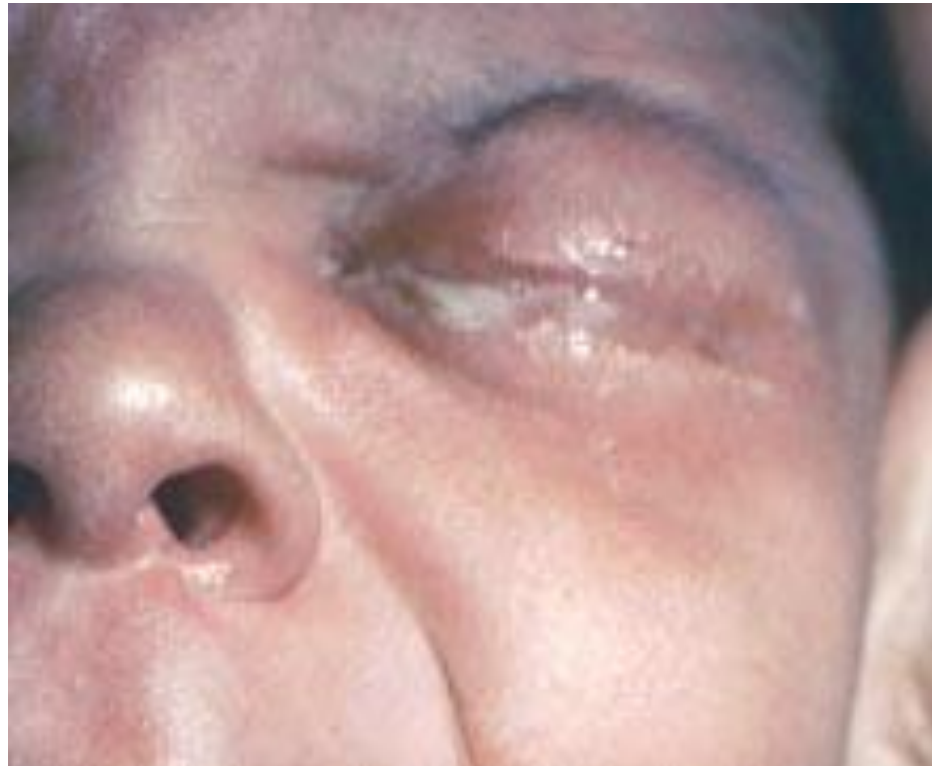


**NO
SYMPTOM
S**



Harmful effects of gonorrhea

1- Newborn eye infections, may lead to blindness



**2- Adult eye infections, spread on fingers,
can lead to blindness**

3- Abscess of vulva

**4- Abscess of finger, can spread germs to other
places and to other people**

**5- Epididymitis: infection in the sperm-carrying
tubes, can lead to sterility**

6- Spread through blood stream:

Joints

Heart valves

Brain

: Recommended regimens (1st line treatment)

Uncomplicated gonorrheal infections

**Single –dose treatment with 3rd generation
cephalosporins**

–125mg of ceftriaxone, IMI

–400 mg of cefixime , orally

FLUOROQUINOLONES

Single oral dose of :

Ciprofloxacin

Ofloxacin

Levofloxacin

MECHANISM OF ACTION of fluoroquinolones

- All are bactericidal
- Inhibit DNA synthesis by inhibiting DNA gyrase enzyme

ADVERSE EFFECTS

GIT upset

Diarrhea
nausea

arthropathy

Bone deformity is major concern
in pregnancy & young

phototoxicity

dizziness

headache

CONTRAINDICATIONS

- **Pregnancy**
- **Nursing mothers**
- **Children under 18 years
(arthropathy)**

Alternative treatment in allergic patients to 1st line treatment

Spectinomycin

- **2g IMI once**

Mechanism of action

- Inhibits protein synthesis by binding to 30 S ribosomal subunits

& & Adverse Effects



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graph TD; A["& & Adverse Effects"] --> B["1. Pain at the site of injection"]; A --> C["2. Fever<br/>Nausea"]; A --> D["Nephrotoxicity<br/>(not common)"]
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1. Pain at the
site of
injection

2. Fever
Nausea

Nephrotoxicity
(not common)

MCQ:

In case of gonorrhea and the Pt is resistance to betalactam antibiotics and **fluoroquinolones**, what is the best treat. ??

Spectinomycin

Treatment of Complicated infections

- With conjunctivitis in new born:
 - **Silver nitrate:**
 - ✓ Inhibits growth of both gram-positive & gram-negative .
 - ✓ Germicidal effects are due to precipitation of bacterial proteins by liberated silver ions
 - ✓ Put into conjunctival sac once immediately after birth (not later 1 h after birth)

ERYTHROMYCIN

- **0.5% ointement for treatment & prevention of corneal & conjunctival infections.**
- **Put into conjunctival sac immediately after birth (no later 1 hr after delivery)**