

Pharmacology

Modified slides
Chemotherapy 5

Done by: Sohیب Al-Shabatat

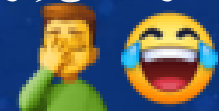
The Penicillins

■ Ampicillin:

- Broad-spectrum penicillin (antibiotic), its efficient for wide range of bacterial kinds.
- it isn't well-absorbed from the intestine so it can cause diarrhea, due to overgrowth of normal flora, and incomplete absorption.
- Its usually given with a β -lactamase inhibitor which is needed to avoid any problem with resistant to Ampicillin.



الكبسولات الأحمر وأسود طلوعوا بالآخر
مضاد حيوي واحنا نازلين نسيف منهم
لوجع الراس والحرارة وكل الأمراض
والأعراض .. لا والأحلى إنو كنا نطيب



The Penicillins

■ Amoxicillin:

- Similar to Ampicillin with its higher efficiency against wide range of bacteria, but more completely absorbed than ampicillin (we edit its structure to be more absorbable).

⇒ So, less diarrhea, and longer acting than ampicillin.

- **Azlocillin, Piperacillin, and Ticarcillin:** Have extended spectrum of efficiency, they have higher efficacy against wider range of bacteria, they have extra action on other kinds of bacteria which aren't present among the range of activity of Ampicillin & Amoxicillin e.g. Proteus, Pseudomonas, Klebsiella, and certain other gram-negative microorganisms ,, (we edit the structure to increase the efficacy).



■ Adverse Effects of penicillins:

Penicillins Relatively are very safe drugs (their side effects are less as possible and acceptable); except:

- Pain of injection (if its taken as injection) in the site of injection.
- Abscess formation also in the site of injection.
- Allergic reactions:
 - Skin rash.
 - Urticaria.
 - Rash (little and accepted by the patient).
 - fever, bronchospasm.
 - Anaphylaxis (which is a serious allergic reaction that is rapid in onset and may cause death).
 - dermatitis, Stevens–Johnson syndrome (which is a form of toxic epidermal necrolysis, its a life-threatening skin condition, in which cell death causes the epidermis to separate from the dermis).

From google:

Urticaria is a rash of round, red welts on the skin that itch intensely

We scare from patients to had a history of hypersensitivity reaction, otherwise penicillins are considered safe.

the last two are considered danger when arised.

- Management of the Patient Potentially Allergic to Penicillin.

History is the best practical way to know if the patient has hypersensitivity reaction or not

- Evaluation of the patient's history is the most practical way.
- Most patients who give a history of allergy to penicillin should be treated with a different type of antibiotic.

Antistaphylococcal (penicillinase resistant) Penicillins (they are not affected by penicillinase produced by bacteria).

- They considered strong antibiotics because they avoid the resistance.
- Examples include: *Nafcillin*, *oxacillin*, *cloxacillin*,
- and *dicloxacillin* which are more resistant to bacterial B-lactamases than is penicillin G.

-Consequently, these antibiotics are effective against methicillin-resistant *Staphylococcus Aureus* and *epidermidis* (MRSA) & (MRSE).

*Methicillin, is no longer marketed in the United States, is another penicillinase- resistant antibiotic similar to nafcillin and oxacillin.



- Many hospitals are reservoirs for MRSA and MRSE. These pathogens are resistant in vitro to all B-lactam antibiotics (so they are considered real issue and because of that we developed these special drugs for them).
- For parenteral therapy, nafcillin and oxacillin offer comparable efficacy and antimicrobial spectra of activity.
- Indications for nafcillin or oxacillin include only severe staphylococcal infections like cellulitis, empyema, endocarditis, osteomyelitis, pneumonia, septic arthritis, and toxic shock syndrome

The second way to eradicate these resistant bacteria...

B-Lactamase Inhibitor Combinations

Several formulations combine a B-lactam antibiotic with a B-lactamase inhibitor such as:

- ampicillin-sulbactam = [Unasyn],
- ticarcillin-clavulanic acid = [Timentin],
- piperacillin-tazobactam = [Zosyn],
- and amoxicillin-clavulanic acid = [Augmentin].



All of the B-lactamase inhibitor combinations except amoxicillin-clavulanic acid are parenteral formulations.

- Elimination of the combination drugs occurs primarily by renal excretion.

- all of the B-lactamase inhibitor combinations require dose adjustments in patients with renal insufficiency (we need special care when prescribing the dose).
- The addition of the B- lactamase inhibitor significantly broadens the spectrum of antibacterial activity against B- lactamase-producing organisms (which makes it useful and more efficient in some types of infection which has more than one type of bacteria).
- Consequently, these drugs have clinical use in treating infections with known or suspected mixed bacterial flora, such as: biliary infections التهاب قنوات الحوصلة الصفراوية, diabetic foot ulcers, endomyometritis التهاب بطانة الرحم , and peritonitis.



سلايد زياده عدد للتذكير فقط..

- Gram-positive bacteria are bacteria that give a positive result in the Gram stain test. then appear to be purple-coloured .This is because the thick peptidoglycan layer in the bacterial cell wall retains the stain after it is washed away from the rest of the sample
- Gram-negative bacteria cannot retain the violet stain after the decolorization step; Their peptidoglycan layer is much thinner and sandwiched between an inner cell membrane and a bacterial outer membrane, causing them to take up the counterstain and appear red or pink.

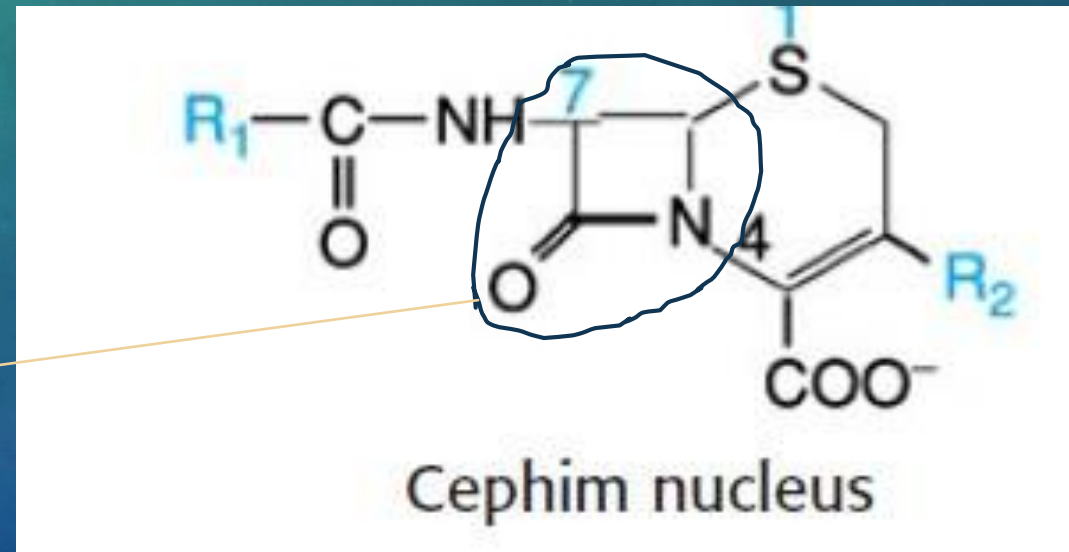
The Cephalosporins

****Its also B-lactam antibiotics, it has lactam ring in its structure.**

- **Came one decade later after the penicillins.**
- **Rarely the drugs of first choice for any infection.**
- **Mainly used for surgical prophylaxis وقاية (to avoid any secondary infection).**
- **Expensive, especially the newer generations.**
- **Same toxicity as penicillins.**
- **Cross allergic with the penicillins.**
- **Activity differs among the generations.**

The generations differ in modifications in the R1 and R2 groups and is based on general features of antimicrobial activity

Lactam ring

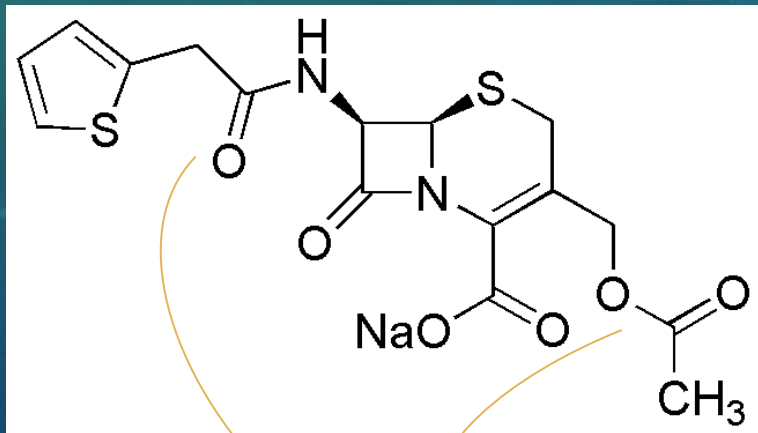


the Cephalosporins

■ **First Generation:** good activity against gram-positive bacteria and relatively modest activity against gram negative microorganisms.

■ Cephalothin

■ Cefazolin



Remember that modification always occur in the old generation to synthesize new generation which has wide spectrum of activity

لاحظ الاختلاف فقط في مواقع R1 & R2 في تركيب Cephalothin

The Cephalosporins

- **Second Generation:** somewhat increased activity against gram-negative microorganisms (it acts against more kind of bacteria than the 1st generation).
 - Cefamandole.
 - Cefoxitine.

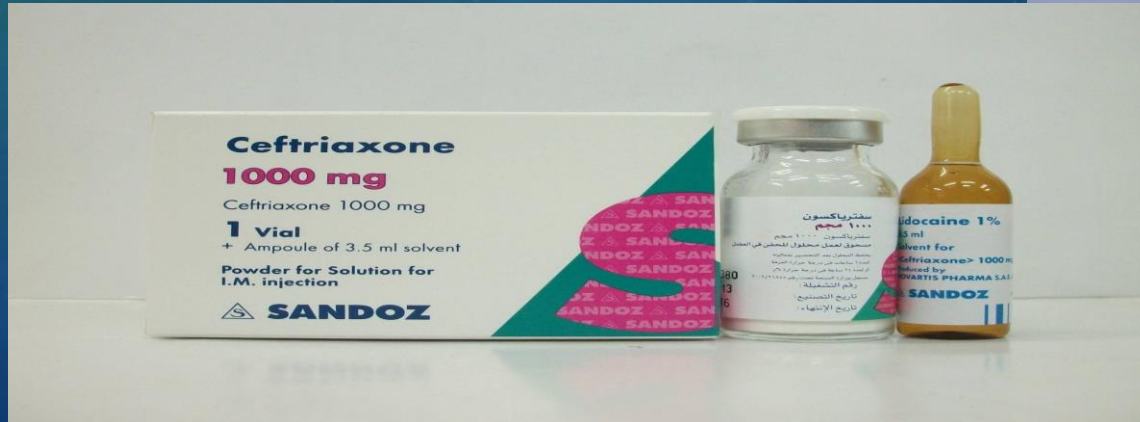


The Cephalosporins

- **Third Generation:** more active against the

Enterobacteriaceae, including β -lactamase-producing strains

- Cefoperazone.
- Cefotaxime.
- Ceftriaxone.



The Cephalosporins

- **Fourth-generation** extended spectrum of activity and stability from hydrolysis
- Cefepime



ملاحظة عالهامش: الصور كلهم
خارجيات والسلايدات الاصلية ما فيهم
غير الصورة الي بسلايد ١٢

The End