

## CEPHALOSPORINS:

- $\beta$ -lactam Antibiotics.
- from Cephalosporium Accumatum

### STRUCTURE:

- $\beta$ -lactam Ring fused to dihydrothiazine Ring.

### MOA:

- similar to that of Penicillins, but bind to different PBPs.
- Inhibit bacterial cell wall synthesis.

1) AMONG

(Inhibit cross linking of peptidoglycan cell wall definite bce.)

### RESISTANCE:

→ efflux pump

→  $\beta$ -lactamase

→ Target Alteration

→ Alternate Pathway

→ Inactivating enzyme  $\downarrow$  Undergo lysis

Bactericidal effect.

### CLASSIFICATION:

#### ORAL

1st gen  $\rightarrow$  cephalexin

cephadroxil

2nd gen  $\rightarrow$  cefuroxime

Axetil

cefactor

cefprozil

#### PARENTERAL

cefazolin (sodium cephazolin)

cefuroxime

cefotetan

ceftriaxone

3rd gen  $\rightarrow$  cefixime

cefprozime

Proxetil

cefdinir

ceftibuten

ceftamandolil

ceftriaxone

ceftriaxone

ceftazidime

ceftazidime

ceftazidime



4th gen

cefepime

cefpirone

5th gen

(Anti HSR A)

### ANTIMICROBIAL SPECTRUM

- 1st → Gram (+) cocci > Gram (-ve) bacilli
- 2nd → Gram -ve microbes > Gram +ve cocci, Anaerobes
- 3rd → Gram -microbes > Gram (+) Anaerobes.
- 4th → Antipseudomonal
- 5th → Anti HSR SA

### ADR

- Pain after IM injections
- Hypersensitive Reaction
- Diarrhea - cefixime, cefoperazone, cephalexin.
- Bleeding - cefoperazone, ceftiozone (having methyl thiothiazolidine)
- Neutropenia & thrombocytopenia - ceftazidime.
- Disulfam like Reaction - cefoperazone

### 1st generation

- G+ve cocci
- Good Activity → streptococci, MSSA.
- Modest Activity → E. coli, Klebsiella, oral cavity Anaerobes.

### USES

- skin & soft tissue infection
- sinus infection due to HSR



→ Peri-operative surgical prophylaxis - cefazolin

## 2nd gen cephalosporins

→ Gram -ve mic → cefoxitin, cefotetan

→ Broad Activity → E. coli, Klebsiella

→ Pneumonia

→ Highest Activity - 5 days B. fragilis

### USES

→ URT infection

→ Gynae infection - cefoxitin, cefotetan

## Cefuroxime ~~Cefurox~~

→ Higher CSF concentration - meningitis

→ Single dose IM therapy - gonorrhea

→ CROX BB2

→ cefuroxime axetil

## 3rd generation cephalosporins

→ Gram (-ve)

→ Anaerobes - ceftizoxime, cefoperazone

→ - More Active Against E. coli

→ ceftriaxone & cefotaxime → Anti-streptococcal

→ Resistance to  $\beta$ -lactamase

## PHARMACOKINETICS:

→ Given orally / parentally

Distribution - Penetrates CSF

→ ceftriaxone

## Metabolism

cefotaxime - decoupled to a metabolite (less antimicrobial Activity)



## Excretion

mainly by kidney.  
except cefaperezone (Bile)  
ceftriaxone (mixed).

→ Probenid shows renal tubular secretion of cephalosporins.

## Cefotaxime

Uses -> Meningitis by gram -ve bacilli

Typhoid

PPNG infections.

Hospital Acquired infection, septicemia

→ Ceftriaxime -> B. fragilis.

## CERTRIAXONE

- Longer duration of Action (12h - shows)

- Penetration into CSF good

→ elimination

## Uses

Bac meningitis.

Multiresistant typhoid = ~~9/10~~

complicated UTI

Abdominal sepsis.

Gonorrhoea (PPNG)

## Ceftazidime

Highest Activity -> Pseudomonas Aeruginosa.

Indications - Febrile neutropenic patients  
haematological malignancies.



cefoperazone.

High Activity  $\rightarrow$  *Pseudomonas Aeruginosa*  
*S. typhi*, *B. fragilis*

cefixime

$\rightarrow$  200-400mg BD for Resp, urinary infections

cefpodoxime proxetil

$\rightarrow$  Ester ~~prodrug~~ <sup>prodrug</sup> of cefpodoxime

Active  $\rightarrow$  *S. Aureus*

*S. pneumoniae*

Uses.

4th gen cephalosporins

Gram -ve

- $\rightarrow$  Resistant to degradation by  $\beta$ -lactamase
- $\rightarrow$  Active against bacteria Resistant to other

Uses  $\rightarrow$  Hospital Acquired pneumonia

Septicemia

$\rightarrow$  Neutropenia

CEPERINE

$\rightarrow$  Higher conc in CSF

CEFTIOXIME

- $\rightarrow$  Zwitterion character (have + & -ve charges)
- $\rightarrow$  better penetration through pore channel of gram -ve

5th gen

NOT  $\rightarrow$  low affinity PBPS, of MRSA & penicillin resistant



Enhanced gram +ve

Uses → complicated skin & soft tissue infection  
HAP & CAP.

ceftazidime fassmil, ceftobiprole medocarell →  
Prodrug.

Antipseudomonal cephalosporins

- ceftazidime
- ceftoperidone
- ceftipime.

ANTIBIOTIC FOR TYPHOID.

- ceftriaxone #1
- cefotaxime
- levofloxacin

Other  $\beta$  lactam Antibiotics.

Carbapenems

- Imipenem
- Meropenem.

CARBAPENEMS:

Imipenem

→ extremely potent, broad spectrum.



## IMIPENEM:

Rapid hydrolysis by dehydropeptidase on brush border of renal tubular cells

# GLASTIN GLASTATIN → reversible Inhibitor of dehydropeptidase

### Uses:

→ Hospital Acquired Resp, urinary Abdominal, pelvic, skin & soft tissue infection.

### Side effect

→ Induce seizures

→ Diarrhoea, vomiting, skin Rash

hypersensitivity 12%

## Here MONOBACTAMS

### AZTREONAM:

→ only  $\beta$  Lactam Ring.

→ Active (+) enteric Bacilli H influenzae.

Pseudomonas.

→ Lack of amide