OTC COURSE

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Objectives of the OTC course

- How to be a professional pharmacist
- How to dispense drugs
- When to refer the doctor
- How to read prescribtion
- How to answer cases
- In this course you will not need other source for study

Why the OTC course in drug & tube

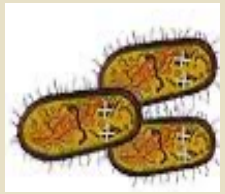
- Our material is updated
- you won’t face problems in the course
- Ask your Questions anytime
- You will not found this course and the value in any another academy
- This course is presented to “Pharmacist only”

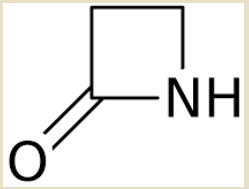
Outline

- Antibiotics
  - Penicillin's
  - Cephalosporins
  - Carbepenems
  - Aminoglycosides
  - Macrolides
  - Fluroquinolones
- Antivirals
- Antifungals
- Anti-helmintics

Symbols in this lecture

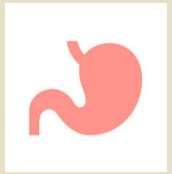
 -bacteriostatic
gastric

 - bacteriocidal



-B-lactam antibiotic

 - not

 -gastric (orally)

 - before meal

 - after meals

ANTI-BIOTICS

Important definitions

- Anti-microbial :

  Include anti-viral , anti-fungal , anti-protozoal , antibiotics

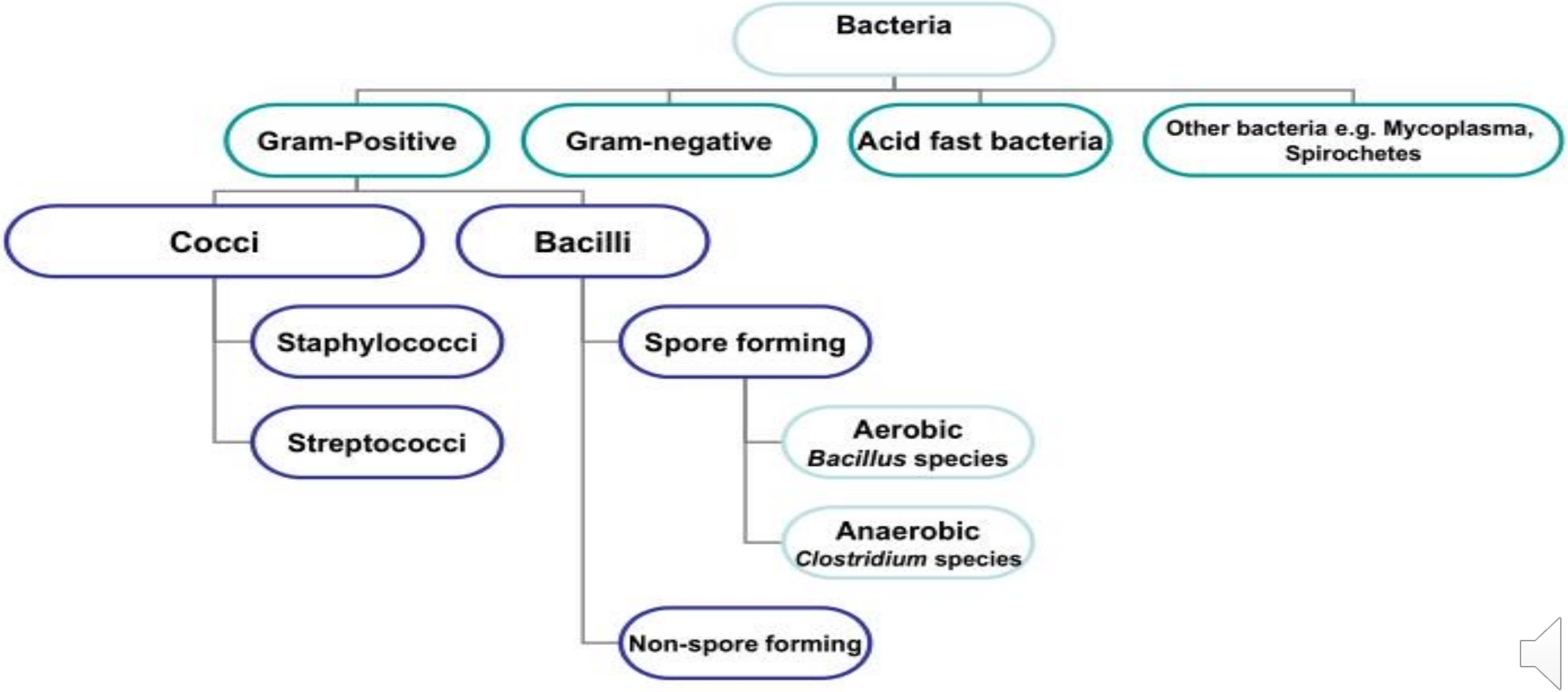
- Antibiotics :

  a substance extracted from miroorganism that is effective in killing other microorganisms

- Chemotheraputics

The use of any chemical (drug) to treat any disease or condition

Classification of Bacteria




Sir Alexander Fleming, F.R.S.
Bacteriology,
of London,
Hospital, W. 2.
The mould
which makes
Penicillin
Alexander Fleming
BBC NEWS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Drug & Tube

Anti-bacterial (antibiotics)

- Antibacterial can be derived from microbe (natural=antibiotic)

Penicillin

- Antibacterial extracted from microbe and modification occurs (semi-synthetic)

Ampicilin

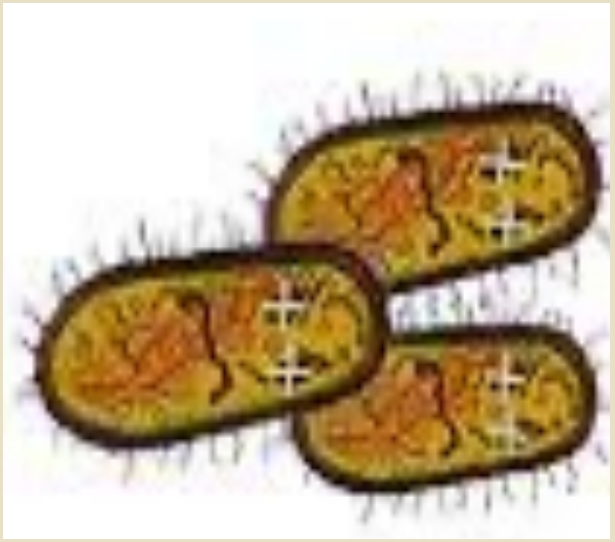
- Synthetic Antibacterial

Quinolones

Antibiotics can either be bacteriostatic or bactericidal

What is the deference between ?

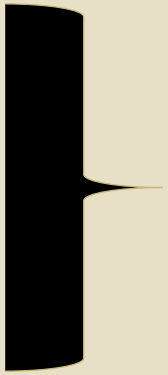
Bacteriostatic



Bactericidal

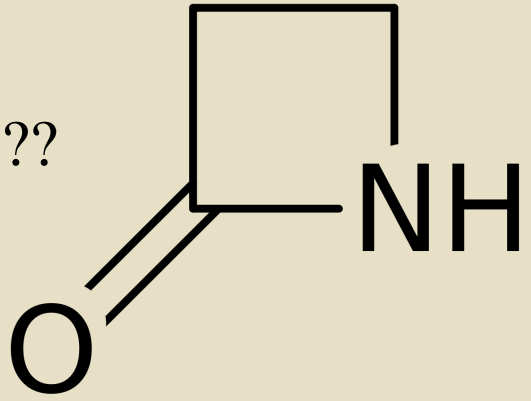
Antibiotic classification :

- Penicillins
- Cephalosporins
- Monobactam
- Carbepenems
- Aminoglycosides
- Macrolides
- Fluroquinolones



B-lactam antibiotic

Why????



Beta Lactams

Penicillins

PCN

Penicillin G
Benzathine PCN
VK PCN (PO)

Anti-Staph

Oxacillin (IV)
Nafcillin (IV)
Dicloxicillin (PO)

Amino-PCN

Amp +/-
Sulb (IV) #
Amox +/-
Clav (PO) #

Anti-Pseud

Pip +/- Tazo ^ #
Tic +/- Clav ^ #
(not available)

Cephalosporins

1. Cephalexin
   Cefazolin
2. Cefuroxime
3. Ceftriaxone
   Ceftazidime ^
4. Cefepime ^

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5. Ceftaroline
   (Like CTX+MRSA)

Increasing gram neg coverage

Extended GNR

Ceftol-Tazo * ^ ~
Ceftaz-Avi * ^ ~

Monobactam

Aztreonam ^

- Aerobic Gram neg
- Pseudomonas
- Bad 4 gram pos
- Bad 4 anaerobes

KEY

* ESBL
^ Pseudomonas
~ Carbapenem-R
# Anaerobes

Carbapenems

Imipenem * ^ #

Meropenem * ^ #
+/- vaborbactam ~

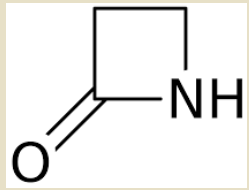
Doripenem * ^ #

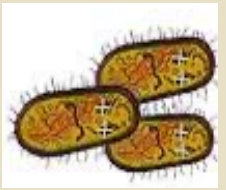
[Ertapenem] * #

- No pseudomonas
- 1x daily dosing

D. Serota 2018

B-lactam antibiotics





1. They're considered to be bactericidal antibiotics
2. They bind to penicillin binding protein (مجموعة من البروتينات اللي بتمسك في البنسلين) thus

-Decrease transpeptidase enzyme which is responsible for the cross-linking of peptidoglycans, which is the final step in cell wall synthesis so ↓ ---------- → **cell wall synthesis**

-activate autolysins so -------→ lysis of the cell wall

-bacteria absorbs the water due it's interior high osmotic pressure thus ---------→ rupture and death of the microbe

-they activate the growing bacteria rather than the resting ones

3- selectivity : human cells doesn't have peptidoglycan wall

B-lactam antibiotics

- Beta-lactam antibiotics are among the most commonly prescribed drugs, grouped together based upon a shared structural feature, the beta-lactam ring. Beta-lactam antibiotics include:
- Penicillins
- Cephalosporins
- Cephamycins
- Carbapenems

Mechanisms of bacterial resistance

- Decreased penetration to the target site and efflux — The outer membrane of gram-negative bacilli provides an efficient barrier to the penetration of beta-lactam antibiotics to their target penicillin-binding proteins (PBPs) in the bacterial cytoplasmic membrane. Beta-lactams usually must pass through the hydrophilic porin protein channels in the outer membrane of gram-negative bacilli to reach the periplasmic space and cytoplasmic membrane. The permeability barrier of the outer membrane is a major factor in the relative intrinsic resistance of Pseudomonas aeruginosa to many beta-lactam antibiotics. Mutations that result in decreased amounts of porin channels, those that increase the amounts of native active efflux pumps, or both can contribute to acquired resistance to beta-lactams

Mechanisms of bacterial resistance

- Alteration of the target site — The target sites for the beta-lactams are the PBPs in the cytoplasmic membrane. Alterations in PBPs may influence their binding affinity for beta-lactam antibiotics and therefore the sensitivity of the altered bacterial cell to inhibition by these antibiotics. Such a mechanism is responsible for penicillin resistance in pneumococci , methicillin (oxacillin) resistance in staphylococci , and for bacteria with increasing intrinsic resistance to beta-lactams, such as gonococci, enterococci, and Haemophilus influenzae

Mechanisms of bacterial resistance

- Inactivation by a bacterial enzyme — Production of beta-lactamases is a major mechanism of resistance to the beta-lactam antibiotics in clinical isolates. Such bacterial enzymes may cleave predominantly penicillin's (penicillinases), cephalosporins (cephalosporinases), or both (beta-lactamases). Their production may be encoded within the bacterial chromosome (and hence be characteristic of an entire species) or the genes may be acquired on a plasmid or transposon (and hence be characteristic of an individual strain rather than the species). Bacteria may synthesize the beta-lactamase constitutively (as for many plasmid-mediated enzymes)

Adverse effects

- **IgE-mediated allergic reactions** — Type I, IgE-mediated reactions present with various combinations of pruritus, flushing, urticaria, angioedema, wheezing, laryngeal edema, hypotension, and/or anaphylaxis. Symptoms usually appear within four hours of drug administration and may begin within minutes. When the allergy first develops, the initial symptoms may appear during the later days of treatment and then escalate **rapidly**
- **Serum sickness** — Serum sickness is a late allergic reaction characterized by fever, rash (usually urticarial), adenopathy, arthritis, and occasionally glomerulonephritis. It is associated with circulating immune complexes and has been reported with all of the beta-lactam antibiotics. Each of the beta-lactam antibiotics is also capable of causing drug fever
- **Dermatologic reactions** — A variety of rashes occur with the beta-lactam antibiotics, of which morbilliform rash is the most common. Erythema multiforme is an acute eruption characterized by distinctive target skin lesions and diagnostic histology; when the mucosal surfaces are involved as well, the reaction is termed Stevens-Johnson syndrome. Exfoliative dermatitis is a severe skin disorder with generalized erythema and scaling. Toxic epidermal necrolysis is an acute severe reaction with widespread erythema and detachment of the epidermis; there may be a positive Nikolsky sign. Hypersensitivity angiitis is a small vessel vasculitis involving mainly the venules of the skin and characterized by palpable purpura. The beta-lactam antibiotics may also cause photosensitivity reactions