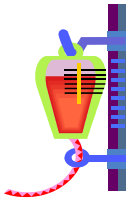


Antibiotics(Antiinfectives)

Historical perspective-1

WHAT ARE ANTIBIOTICS ???

Historical perspective-2

Staphylococci➔ ➔Mould contaminated nutrient agar 

Penicillium notatum ➔➔The Clear benefits of microbial studies just close to open-windows (**)

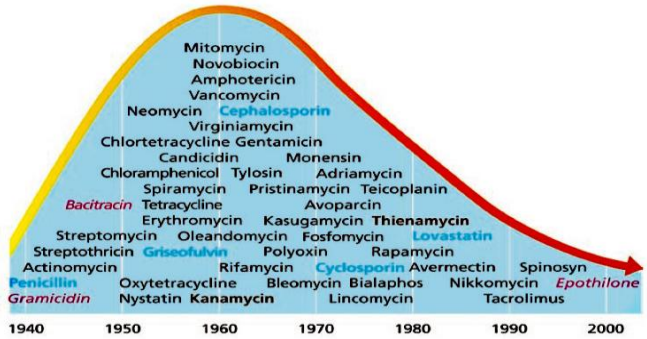
Historical perspective-3

Microbial Sources of Antibiotics:

TABLE 20.1 **Representative Sources of Antibiotics**

Microorganism	Antibiotic
Gram-Positive Rods	
Bacillus subtilis	Bacitracin
Bacillus polymyxa	Polymyxin
Actinomycetes	
Streptomyces nodosus	Amphotericin B
Streptomyces venezuelae	Chloramphenicol
Streptomyces aureofaciens	Chlortetracycline and tetracycline
Streptomyces erythraeus	Erythromycin
Streptomyces fradiae	Neomycin
Streptomyces griseus	Streptomycin
Micromonospora purpureae	Gentamicin
Fungi	
Cephalosporium spp.	Cephalothin
Penicillium griseofulvum	Griseofulvin
Penicillium notatum	Penicillin

Development of antibiotics



Biological antibiotics

Resistance development

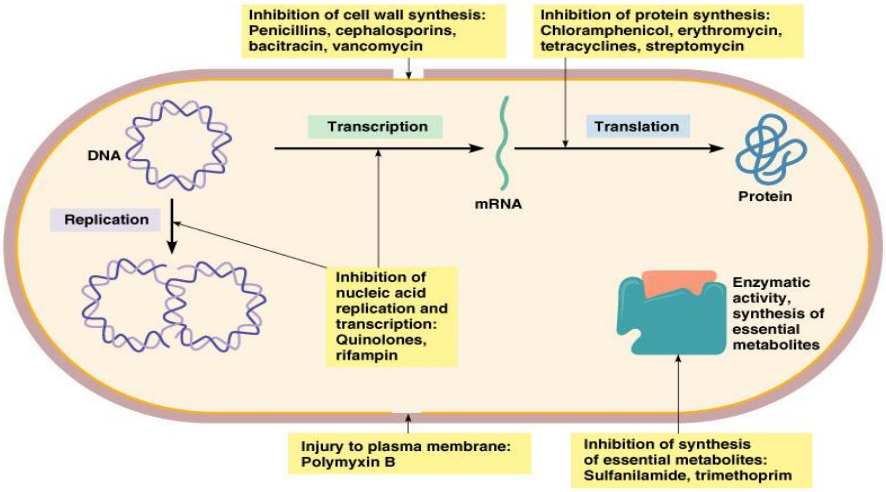
Semisynthetic antibiotics

Synthetic antibiotics

Classification of antibiotics

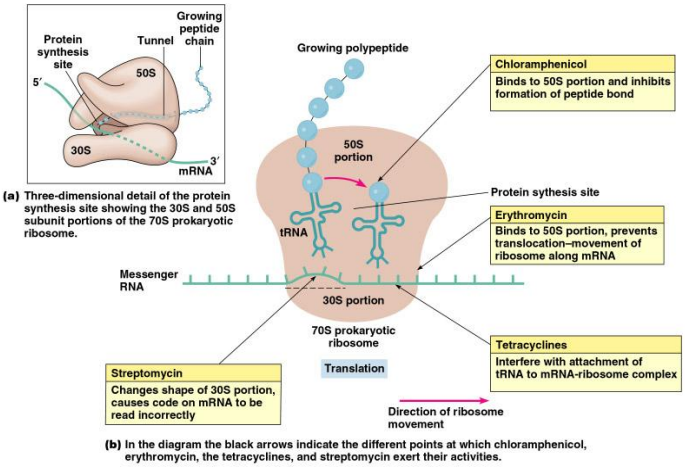
Bactericidal antibiotics **(MBC)**	Destroy (kill) Peniscillins, Cephalosporins, Vancomycin, Carbapenems, Streptomycin, Floroquinolons, Metronidazole, Rifampicin
Bacteriostatic antibiotics **(MIC)**	Stop (inhibit) growth Chloramphenicol, Macrolides, Tetracyclines, Sulphonamides, Isoniazid

MODE OF ACTION OF ANTIBIOTICS



MOA OF PROTEIN SYNTHESIS INHIBITORS
(In ribosomes)

MOA AND ANTIBIOTICS:



Inhibitors of cell-wall synthesis

Betalactams (Penicillins, cephalosporins, glycopeptides: vancomycin, teikoplanin, monobactamsr: Aztreonam, Carbapenems: İmipenem, meropenem, ertapenem): Interfere with penicillin binding proteins

Polymyxin B: Not in use

MOA AND ANTIBIOTICS

Inhibitors of protein synthesis

Binding to 30S Ribosomal subunits

Aminoglycosides (Streptomycin, gentaycin, tobramycin, amikcin, netilmucin, neomycin): Aerobic, extracallular

Tetracyclins(Tetracyclin, dokxicyclin, minocyclin): Broad spectrum, intracellılar

Spectinomycin: for gonococci

Binding to 50S Ribosomal sub-units

Chloramphenicole, Lincomycin,Clindamycin:

Macrolydes(Erythromycin, Chlarythromycin)

Blockers of elongation factors

Fucidic acids **: Binding to** EF-G

MOA AND ANTIBIOTICS

Inhibitors of nucleic acids

Inhibitors of RNA Sentsynthesis

Rifampcin, Rifamycin: Inhibits DNA-boınded RNA polymerase enzyme ➔➔ They stop RNA synthesis... Broad spectrums. Gram(+) andM tuberculosis'e etkili

Inhibitors of DNA Synthesis

Quinolones (Nalidixic acids , Fluoroquinolones: Oflxacin, ciprofloxacin, Moxifloxacin(Avelox) , Levofloxacin (Tavanic)): Binds to DNA gyrase A sub-unit. Blocks supercoiled position ➔➔ Inhibit DNA synthesis... Rffecyine aerobic and generally Gram(-) rods

MOA AND ANTIBIOTICS

Antimetabolites

Inhibitors of Folic acid synthesis

Sulphonamides: Substitutes with PABA, Inhibits dihydropteric acid synthesis, Broad spectrum activity

Trimethoprim: Blockage of dihyrdopholate reductase ➔ İnhibit synthesis of Tetrahydro folate, Used in combination

Antimicrobial agents

Para amino salisilic acid: Same as sulphonamides, Used in tuberculse treatment

Dapson: Same as sulphonamides, Treatmwnt of lepra

İsoniazid: Infibits mycolic acid synthesis

Route of administration of antibiotics

Parenteral

İntramuscular

İntravenous

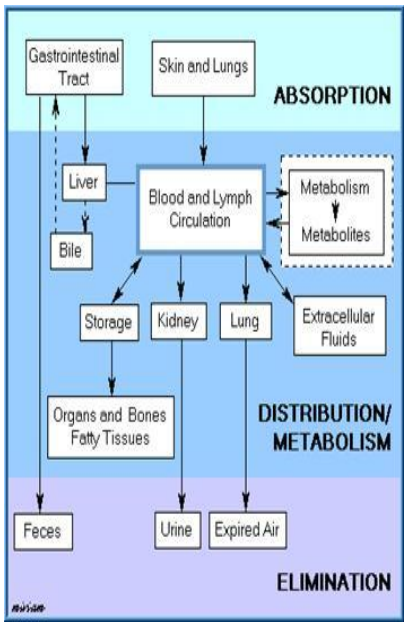
İntrathecal

İntravitreal

(Per)oral route

Topical

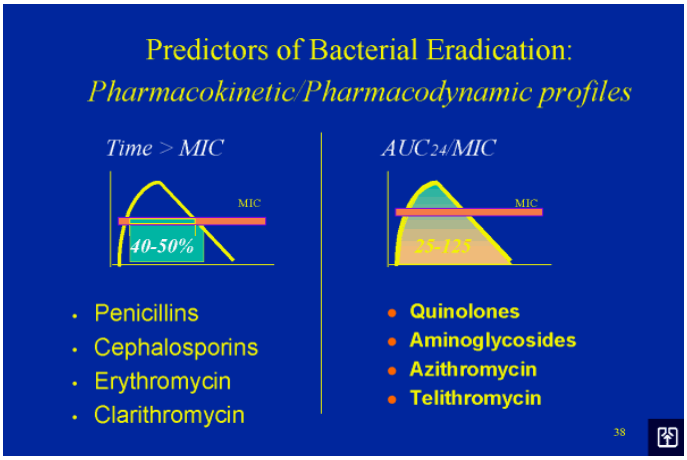
PK: Antibiotic circulations



Capillary and Tissue distribution of antibiotics

Pharmacokinetic consepts-1

Concentration of Abx



Pharm

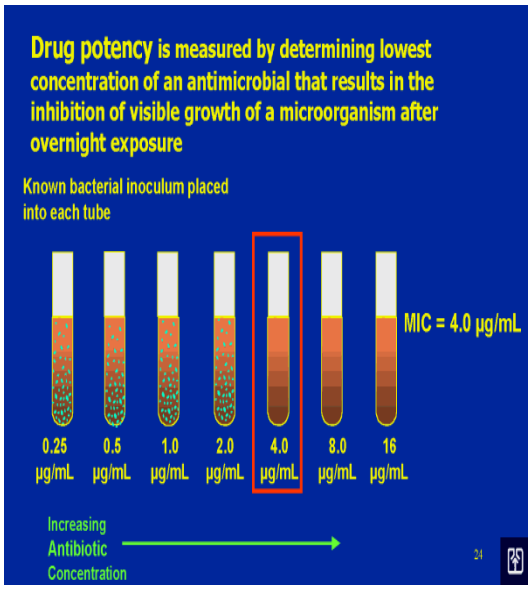
SUSCEPTIBILITY TEST OF ANTIBIOTICS

Kirby-Bauer disc diffusion test.

$MIC_{50\ And}$ MIC_{50}

MIC_{50}

MIC_{90}



Main consepts and Pharmacology of the Antibiotics

The anti-infective drugs

Anti-infective drugs - range from

Antibacterials

Antifungals

Antiprotozoals

Antihelminthics

Antivirals

Antimycobacterial

Spectrum of Activity of Anti-infectives

Narrow spectrum

Broad-spectrum

Spectrum of Activity of
Anti-infectives

Narrow spectrum anti-infectives

affect only a few bacterial types

The early penicillin drugs are examples.

Spectrum of Activity of Anti-infectives

Broad-spectrum anti-infectives

affect many bacteria.

e.g.➔ Meropenem

Narrow spectrum antibiotics are

➔➔ selective,

➔➔*more active against single organisms*

Factors That Determine the Likehood Of a microorganism Causing an Infection:

1. Virulence of the microorganism
2. Number of the microorganism present
3. Resistance of the host

PATIENT – MICROORGANISM – DISEASE RELATIONS

There are three in this relationship

Common Adverse Reactions to Anti-infective Therapy

The most common adverse effects are due to the direct action of the drugs in the following organ system-

Neuro,

nephro and

GI system

Haematopietic..

Ect.

Common Adverse Reactions to Anti-infective Therapy

1. *Nephrotoxicity*

Antibiotics that are metabolized and excreted in the kidney most frequently cause kidney damage..

Common Adverse Reactions to Anti-infective Therapy

2. Gastro-intestinal toxicity

Direct toxic effect to the cells of the GI tract

can cause nausea,

vomiting,

stomach pain and

diarrhea.

Some drugs are toxic to liver cells and can cause

hepatitis or

liver failure.

Common Adverse Reactions to Anti-infective Therapy

3. CNS toxicity

When drugs can pass through the brain barrier and accumulate in the nervous tissues, they can interfere with neuronal function.

Common Adverse Reactions to Anti-infective Therapy

4. Hypersensitivity

Most protein antibiotics

can induce the body's immune system to produce allergic responses.

Drugs are considered foreign substances and when taken by the individual, it encounters the body's immune cells.

Common Adverse Reactions to Anti-infective Therapy

5. Super-infections

SUPERINFECTIONS. ➔➔

Opportunistic infections

Develop during the course of antibiotic therapy

THANK YOU FOR YOUR ATTENTION