

HIGH-YIELD

ANTIBIOTICS

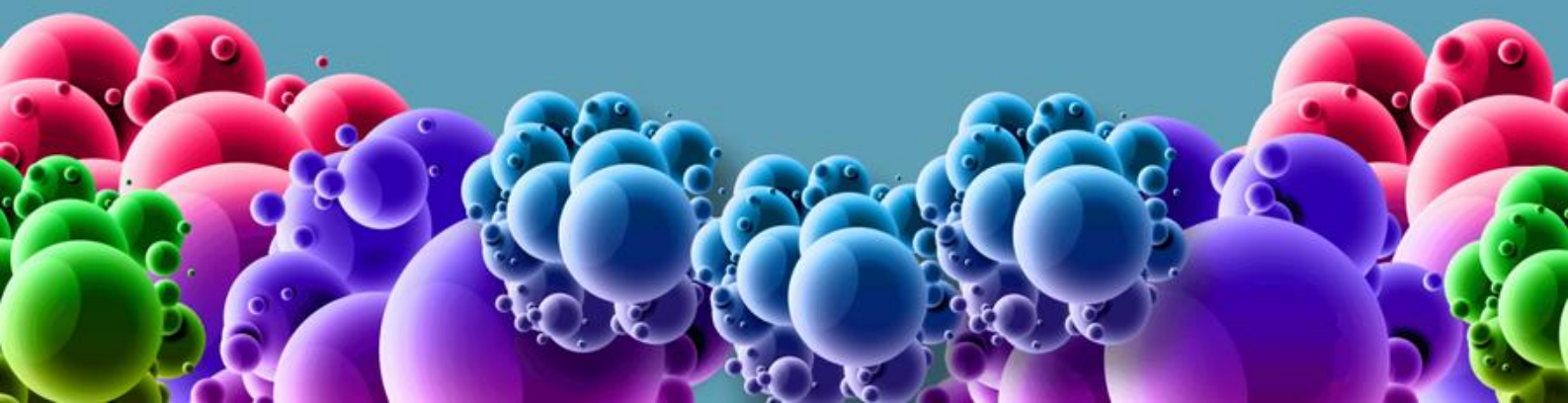
for USMLE, NBDE, FMGE, NEET

**500+ High-yield points
50+ Illustrations & Mnemonics**

References and updates from Goodman Gilman's 13/e, Katzung & Trevor 13/e, Harrison's 19/e, CMTD 2018 & Standard journals

DR. NAZMUL ALAM

DR. HIMEL MONDAL





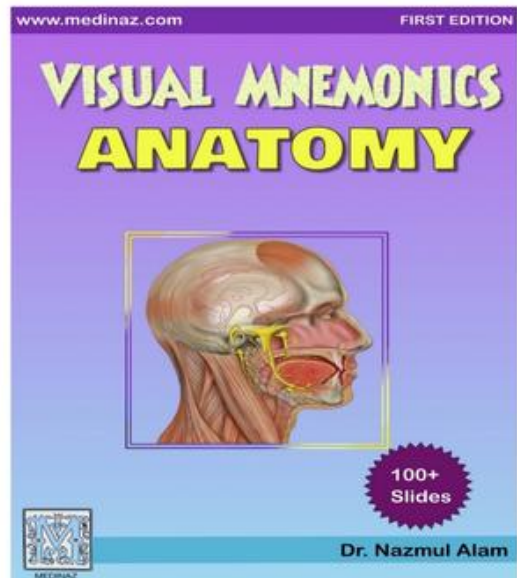
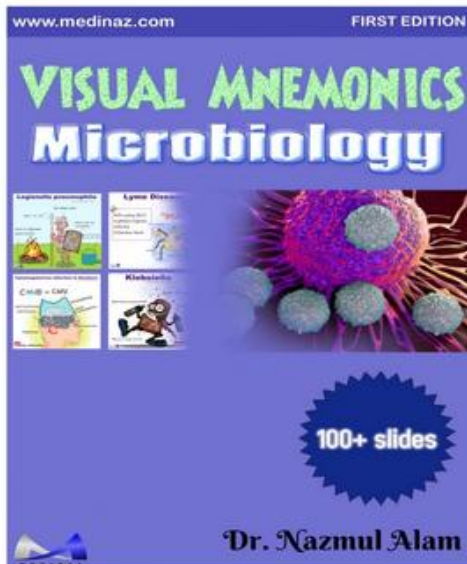
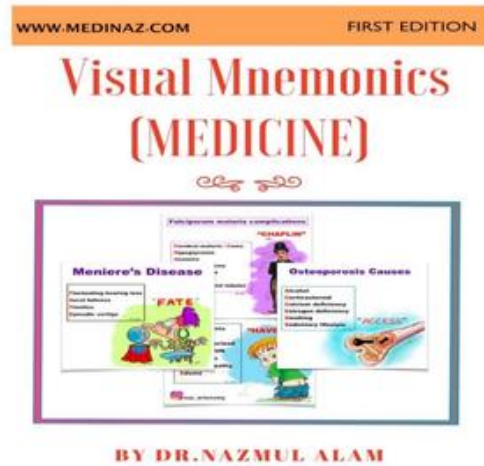
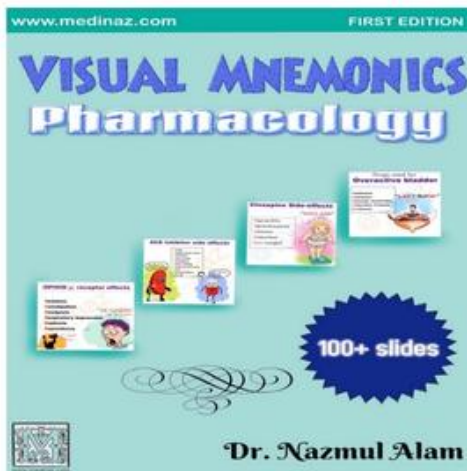
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Penicillin

Penicillin **G** (IV and IM form), penicillin **V** (oral).

Mn. Penicillin **G** destroys with **G**astric acid



D-Ala-D-Ala structural analog. Bind penicillin-binding proteins (**transpeptidases**). Block transpeptidase cross-linking of peptidoglycan in cell wall. Activate autolytic enzymes leads to **osmotic burst**.

Extend spectrum penicillin – **Ampicillin**, **Amoxicillin**, **Carbenicillin**, **Ticarcillin**, **Mezlocillin**, **Azlocillin**, **Piperacillin**

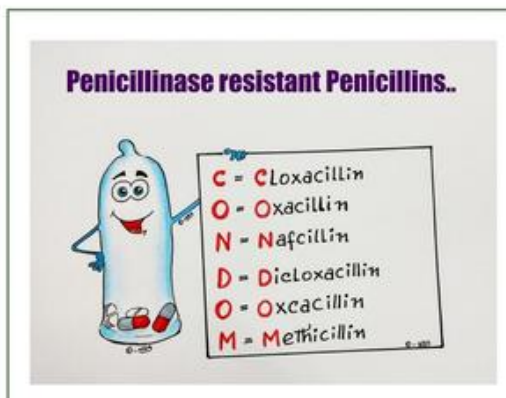
Mn. **A CT MAP**



Acid resistant penicillin



Penicillinase resistant penicillin





Extended spectrum penicillin prevent **H** influenzae, **H** pylori, **E** coli, **L**isteria monocytogenes, **P**roteus mirabilis, **S**almonella, **S**higella, enterococci.

Mn. **HHELPSS**

Aqueous **penicillin G** is **DOC** for **neurosyphilis**

Methicillin resistance is developed due to the formation of alternative penicillin binding proteins that have less affinity for the drugs

Ampicillin is **DOC** for **Listeria meningitis**

Side effects:

Methicillin – interstitial nephritis

Oxacillin – hepatitis

Nafcillin – neutropenia

Carbenicillin high dose – bleeding

Nafcillin = Neutropenia

β -lactamase inhibitors - Include **C**lavulanic acid, **A**vibactam, **S**ulbactam, **T**azobactam.

Mn. **CAST**

Anti-pseudomonal penicillin

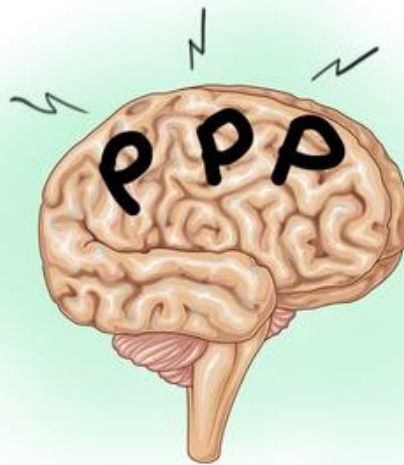
Anti-Pseudomonal Penicillin

Piperacillin
Ticarcillin
Carbenicillin



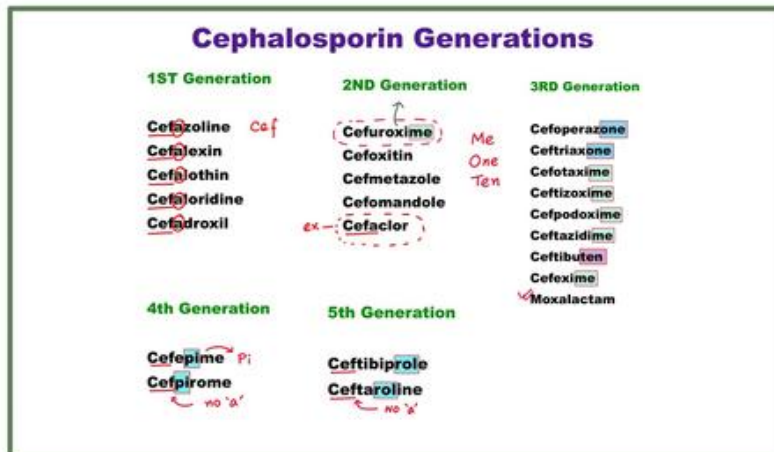


- **Benzathine penicillin** is the **longest acting** penicillin and it does **not** cross **BBB**
- If a patient develops severe **hypersensitivity** to **penicillin**, all other beta lactam antibiotics are contraindicated except **Aztreonam**
- **Procaine penicillin** can cause **Seizures** in high dose





- Excreted via kidney through tubular secretion (Ceftriaxone & Cefoperazone are secreted in bile)



- 4th generation cephalosporins – Cefpirome, cefepime
- 5th generation cephalosporins – Ceftobiprole, Ceftaroline
- Ceftazidime (max) & Cefoperazone are active against Pseudomonas
- Organisms typically not covered by 1st–4th generation cephalosporins are Listeria, Atypicals (Chlamydia, Mycoplasma), MRSA, and Enterococci (treated by ceftaroline).

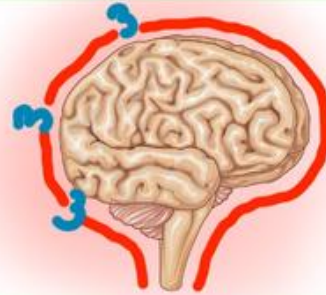
“LAME”

Listeria
 Atypicals (Chlamydia, Mycoplasma),
 MRSA
 Enterococci



- 3rd generation cephalosporin can cross blood-brain barrier (BBB)

BBB = 3 letters
3rd generation



- 5th generation cephalosporins are useful against MRSA
- Most nephrotoxic – Cephalexin

Cephalexin = Renal Impairment



- Cefazolin is DOC for surgical prophylaxis
- Ceftazidime is DOC for melioidosis
- Ceftazidime has maximum antipseudomonal activity
- Cefoperazone is active against pseudomonas, secreted in bile, doesn't cross BBB
- Important side effects - disulfiram-like reaction, vitamin K deficiency, increase nephrotoxicity of aminoglycosides.



Carbapenems

Doripenem, Imipenem, Meropenem, Ertapenem
(DIME antibiotics are given when there is a
10/10 [life-threatening] infection).

Doripenem
Imipenem
Meropenem
Ertapenem



Always administered with cilastatin (inhibitor
of renal dehydropeptidase I) to decrease
inactivation of drug in renal tubules.

the kill is **lastin'**
with **cilastatin**



Only beta-lactam which are reliably efficacious
against **Extend spectrum beta lactamase**.





- Newer carbapenems include **ertapenem** (limited *Pseudomonas* coverage) and **doripenem**.
- **Meropenem** has a **lower risk** of seizures and is stable to **dehydropeptidase I**



Monobactams

- **Aztreonam** is the only beta-lactam antibiotic that can be used in patients having severe allergy to penicillin or cephalosporin.

Aztreonam in
Allergy

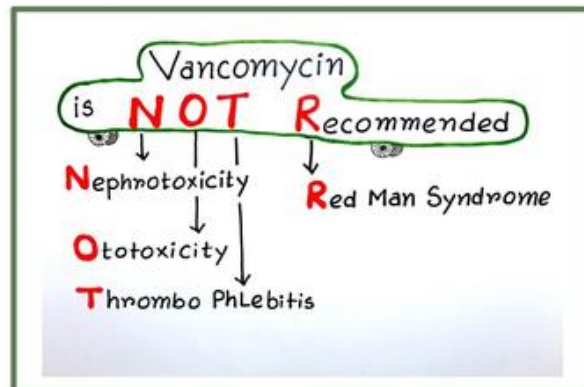


- **Gram -ve** rods only - **no** activity against gram + ve rods or anaerobes



Vancomycin

- **Bactericidal** glycopeptide antibiotic that inhibit cell wall synthesis by inhibiting **transglycosylase enzyme**
- **DOC** for **MRSA** and **Clostridium jeikeium**
- **Bacteriostatic** against **C difficile**
- **Rapid IV** infusion can cause “**Red Man Syndrome**”
- Other side effects - **Nephrotoxicity**, **Ototoxicity**, **Thrombophlebitis**



- Resistance - Occurs in bacteria (eg, Enterococcus) via **amino acid modification** of D-Ala-D-Ala to **D-Ala-D-Lac**.

Vancomycin

www.medinaz.com

2nd line drug for Pseudomembranous colitis

side effects... Red Man Syndrome

“If you **Lack** a **D-Ala** (dollar), you can’t ride the **van** (vancomycin).”

* According to the current guideline Vancomycin is the **first line** drug for pseudomembranous colitis

(DOC for) MRSA

The illustration shows a yellow van with 'VAN' written on its side. A purple bacterium is running towards the van. Inside the van, a pink organ (likely the colon) is shown with a red man figure inside it, representing Red Man Syndrome. The text 'side effects... Red Man Syndrome' is written above the van.



- **Bacitracin** – Only for **topical** use because of **nephrotoxicity**

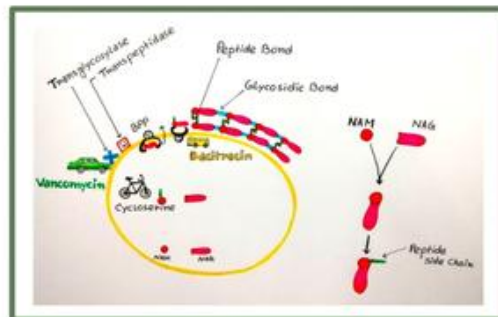
Inhibits cell wall formation by interfering with

dephosphorylation in cycling of the **lipid carrier**

that transfer peptidoglycan subunits to the growing cell wall.

- **Cycloserine** - can cause neuropsychiatric symptoms

Inhibit **cell wall** synthesis



- All protein synthesis inhibitors are bacteriostatic, except **aminoglycosides** (bactericidal) and **linezolid** (variable).

30S inhibitors

Aminoglycosides, **Tetracyclines**

50S inhibitors

Chloramphenicol, **Clindamycin** **Erythromycin**

(macrolides) **Linezolid**

“Buy **AT 30**,
CCEL (sell) at **50**.”





Aminoglycosides

- Bactericidal, 30S inhibitor
- Post antibiotic effect and concentration dependent killing is seen
- It is ineffective against anaerobes
- Curare like effect is seen. Neomycin & Streptomycin should not be used with d-TC
- Do not cross BBB / CSF
- Streptomycin is not used in TBM (Tuberculous Meningitis)
- Streptomycin is the DOC for Plague & tularemia
- Neomycin can be used orally for hepatic encephalopathy & gut sterilisation
- Side effects - Nephrotoxicity, Neuromuscular blockade, Ototoxicity (especially when used with loop diuretics).

Teratogen

Nephrotoxicity
Neuromuscular blockade,
Ototoxicity
Teratogen

“NOT”



- Neuromuscular blockade is due to inhibition of pre-synaptic release of ACh which can cause severe respiratory depression (Reversed by IV calcium)



Tetracyclines

- **Bacteriostatic** & binds with **30S** ribosome
- All tetracyclines undergo **enterohepatic circulation**
- **Demeclocycline** is used in **SIADH**, the most potent inhibitor of **V2 receptors** in kidney
- Use

T
E
T } **TET**racyclines

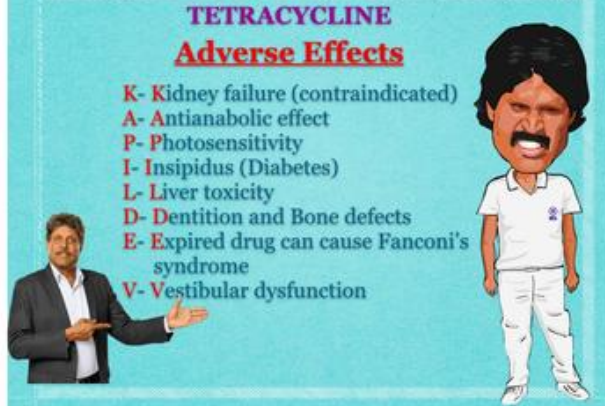
R – **R**ickettsia, **R**elapsing fever
A – **A**typical pneumonia
C – **C**holera
Y – **LY**me's disease
C – **C**hlamydia
L – **LG**V

I
N } **IN**guinale (granuloma)

E – **E**pidemics of plague

TETRACYCLINE
Adverse Effects

- K**- Kidney failure (contraindicated)
- A**- Antianabolic effect
- P**- Photosensitivity
- I**- Insipidus (Diabetes)
- L**- Liver toxicity
- D**- Dentition and Bone defects
- E**- Expired drug can cause Fanconi's syndrome
- V**- Vestibular dysfunction





- **Doxycycline** is **DOC** for – **Mycoplasma hominis** (urogenital), **Plague prophylaxis**, **Rickettsia**, **Borrelia**, **Brucella**, **Chlamydia**, **Cholera**



- **Contraindicated** in **pregnancy** as it can cause fetal tooth **enamel hypoplasia** and **discoloration** and irregularities in the fetal bone growth.
- **Minocycline** specifically produce **vestibular toxicity** and **brown discoloration** of skin
- Children with **<8 years** with tetracycline (dose) cause **tooth discolouration**
- **Doxycycline**, **Tigecycline**, **Minocycline** can be used in patients with **renal failure** because of fecal elimination.



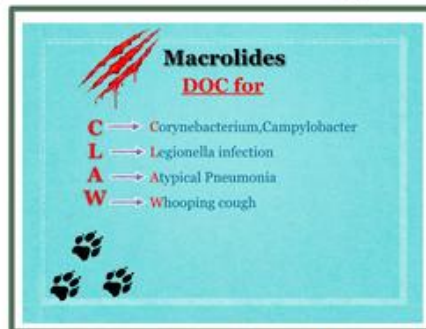


- Do not take tetracyclines with **milk** ($\text{Ca } 2+$), **antacids** ($\text{Ca } 2+$ or $\text{Mg } 2+$), or iron-containing preparations because divalent cations inhibit drugs' absorption in the gut.
- Effective against **intracellular organisms** like **Rickettsia** and **Chlamydia**
- Tetracyclines are used for **prophylaxis** of **Cholera** & **Leptospirosis**



Macrolides

- Binds to **50S** ribosome and block the **translocation** of **peptide chain**
- **Erythromycin** is excreted by **biliary root**.
- **Erythromycin** can cause **diarrhea** by the stimulation of **motilin receptors**
- **DOC** for Chancroid by Haemophilus ducreyi, Corynebacterium, Campylobacter, Legionella infection, Atypical pneumonia, Whooping cough



- **Erythromycin** estolate can cause **pyloric stenosis**, **cholestatic jaundice**, **QT prolongation**
- **Azithromycin** is **DOC** for **Mycoplasma pneumoniae** and genitalium, **C**ampylobacter, **L**egionella and **C**hancroid

“**CALM** down **Azithro** is coming”

- C** - Campylobacter, Chancroid
- A** - Azithromycin
- L** - Legionella
- M** - Mycoplasma pneumoniae and genitalium



- **Azithromycin** is **DOC** for treatment of **cholera** and **chlamydia** in **pregnancy**
- **Macrolides** decrease inflammatory mediators and have **anti-inflammatory** and **immunomodulatory** effect.



Chloramphenicol

- **Bacteriostatic** and **blocks peptidyltransferase** at **50S** ribosomal subunit.
- It can cause dose **independent aplastic anemia** and **gray baby syndrome** (in **premature infants** because they lack liver **UDP-glucuronosyltransferase**)

Clindamycin

- **Clindamycin** treats anaerobic infections **above the diaphragm** and **metronidazole** treats anaerobic infections **below diaphragm**.



- Cause **Pseudomembranous colitis** (**C difficile** overgrowth)
- **DOC** for treatment of **Toxic Shock Syndrome** (TSS)



Linezolid

- Active against **MRSA**, **VRSA** & **VRE**
- **MAO inhibitory activity** can cause **Serotonin syndrome**
- It is associated with **bone marrow suppression**, **optic neuritis** and **lactic acidosis**

Sulfonamides

- **Bacteriostatic**, inhibit **folate synthase** competitively
- **Not** effective in the presence of **pus** because it contains large amount of **PABA**

Drugs undergo **hepatic metabolism** by **Acetylation**

- **Sulfisoxazole** is **most soluble** and has minimum risk of causing crystalluria
- **Sulfadoxine** is **longest** acting and **Sulfacytine** is **shortest** acting
- **Sulfadoxine** along with **pyrimithamine** and **Artesunate** is used for the treatment of **chloroquine resistant malaria**
- **Sulfadiazine** along with **pyrimithamine** is the treatment of choice of **Toxoplasmosis**



- **Spiramycin** is the **DOC** for **toxoplasmosis in pregnancy**
- **Side effects** – **A**plastic anemia, **B**ilirubin displacement (kernicterus), **C**rystalluria, **R**ash, **A**cetylation, **S**LE, **H**emolysis in G-6-PD deficiency

“**ABC RASH**”





MEDINAZ

Fluoroquinolones

- Inhibit DNA gyrase and topoisomerase IV
- Sparfloxacin has longest half life
- Gatifloxacin has maximum bioavailability
- Ciprofloxacin is the DOC for prophylaxis and treatment of anthrax and for prophylaxis of meningococcal meningitis
- In case of Acute diarrhea Ciprofloxacin is DOC and used only if patient is febrile
- NSAIDs increase CNS toxicity of fluoroquinolones

Quinolones side effects

| | | |
|----------|---|-------------------|
| The | → | Tendinitis |
| Good | → | GI discomfort |
| Clinical | → | Chelation of ions |
| Practice | → | Phototoxicity |



- Pefloxacin is the most lipid soluble fluoroquinolone and cross BBB maximum
- Ozenoxacin is a topical fluoroquinolone recently approved for treatment of Impetigo
- Contraindicated in pregnant women, nursing mothers, and children < 18 years old due to possible damage to cartilage. Some may prolong QT interval
- QT prolongation is maximum with sparfloxacin May cause tendonitis or tendon rupture in people > 60 years old and in patients taking prednisone



MEDINAZ



Metronidazole

- Forms toxic free radical metabolites in the bacterial cell that **damage DNA**. **Bactericidal**, **antiprotozoal**
- **Disulfiram-like reaction** (severe flushing, tachycardia, hypotension) with **alcohol**
- Treats **anaerobic** infection **below the diaphragm**
- **DOC** for the treatment of **pseudomembranous colitis**, **bacteroides**, **symptomatic intestinal amebiasis**, **extra intestinal amebiasis**, **bacterial vaginosis**, **trichomoniasis** (strawberry vagina) & **tetanus**

METRONIDAZOLE
Clinical uses

- Giardia**
- Entamoeba**
- Trichomonas**
- Gardnerella vaginalis**
- Anaerobes**
- H. Pylori**

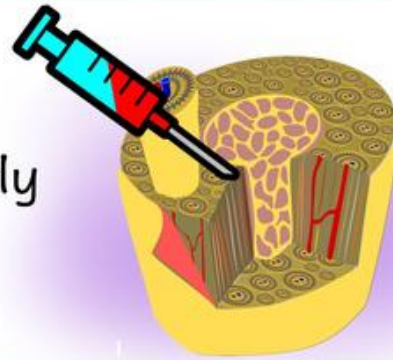
"GET GAP"
I am Metro

naz_artonomy



- Dapsone cause Hemolysis in G6PD deficient patients, methemoglobinemia
- Trimethoprim can cause Megaloblastic anemia, leukopenia, granulocytopenia, which may be avoided with coadministration of folic acid.

TMP Treats Marrow Poorly



- Antitubercular drugs - Rifampin, Isoniazid, Pyrazinamide, Ethambutol

Rifampin

Isoniazid

Pyrazinamide

Ethambutol

“RIPE”





Refampicin

- **Bactericidal** and acts by inhibiting **DNA dependent RNA polymerase**
- It undergoes **enterohepatic circulation** and can be used **safely in renal failure patient**
- It can penetrate **BBB** and **placental barrier**
- Only bactericidal drug active **against dormant bacteria** and **solid caseous lesions**
- It is the **most effective** and **fastest** acting drug in **leprosy**
- It is the **least toxic** drug for TB and is also the safest drug in **pregnancy**

Rifampin's 4 R's:

RNA polymerase inhibitor

Ramps up microsomal cytochrome P-450

Red/orange body fluids

Rapid resistance if used alone






Isoniazid

- Isoniazid is a **prodrug** activated by **catalase-peroxidase**
- **Bacteriostatic** against **resting** and **bactericidal** against **rapidly dividing organisms**
- Metabolized by **Acetylation** which is **genetically controlled**
- **Kat G** gene mutation is the most common mechanism of **resistance**
- **DOC** for **prophylaxis of TB**
- Isoniazid causes **B 6 deficiency** (**peripheral neuropathy, sideroblastic anemia**) (Mn. **INH** Injures **N**eurons and **H**epatocytes)

INH Side effects



- I**nducer of Lupus
inhibitor of cytochrome P450
- N**europathy (peripheral)
- H**epatotoxicity
hemolysis in G6PD deficiency


- **Peripheral neuritis** can be prevented and treated by **pyridoxine**
- Can cause **hemolysis** in **G6PD deficient** patients
- **Side effects of INH**

INH Side-effects

www.medinaz.com

“CHANGE”

Change in memory
Hepatotoxic, **H**allucinations
Anemia, **A**rthritis
Neuropathy
Gynecomastia
Euphoria, **E**pilepsy



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Ethambutol

- **Bacteriostatic** and inhibit **arabinosyl transferase**
- **Contraindicated** in **Children**
- Ethambutol cause **Optic neuropathy**

Ethambutol = **E**ye problem



Pyrazinamide

- **Weakly bactericidal** and works **best at acidic pH** (eg, in host phagolysosomes)

Pyrazinamide is a **prodrug** that is converted to the active compound **pyrazinoic acid**

Pyzinamide = **P**rodrug





Antimicrobial drugs contraindicated in Pregnancy

- Sulfonamides**
- Aminoglycosides**
- Fluoroquinolones**
- Erythromycin**
- Metronidazole**
- Tetracyclines**
- Ribavirin**
- Griseofulvin**
- Chloramphenicol**

"SAFE Moms Take Really
Good Care"



Chloroquine Uses



My RED LIP

- Malaria**
- Rheumatoid arthritis**
- Extra intestinal amoebiasis**
- DLE**
- Lepra reaction**
- Infectious mononucleosis**
- Photogenic reactions**



Miscellaneous

Antibiotics **contraindicated in Renal failure**

- Cephalthin
- Cephaloridine
- Nitrofurantoin
- Nalidixic acid
- Tetracyclines (except Doxycycline)



CNN Tv Channel



Antibiotics contraindicated in **Liver disease**

- Pyrazinamide, Pefloxacin
- Erythromycin estolate
- Tetracycline

“PET”





Antibiotics causing important syndromes

Gray baby syndrome – Chloramphenicol

Pseudocholecystitis – Ceftriaxone

Fanconi syndrome – Outdated Tetracycline

Red man / Red neck syndrome – Vancomycin

Sicca syndrome – Sulfonamides

Sicca syndrome – Sulfonamides

Antimicrobial prophylaxis

- High risk for **endocarditis** and undergoing surgical or dental procedures - Amoxicillin
- Exposure to **gonorrhoea** – Ceftriaxone
- **Rheumatic fever** - Benzathine penicillin
- **Meningococcal meningitis** – Rifampicin / Ciprofloxacin / Ceftriaxone
- **Rickettsial infection** – Tetracyclines
- **Malaria** – Chloroquine / Mefloquine / Doxycycline
- **Otitis media** - Amoxicillin
- **History of recurrent UTIs** - TMP-SMX



- Exposure to **meningococcal infection** - Ceftriaxone, ciprofloxacin, or rifampin
- **Petrussis** – Azithromycin
- **Plague** – Tetracyclines
- **Toxoplasmosis** - Clotrimoxazole
- **Pregnant** woman carrying **group B strep** - Intrapartum penicillin G or ampicillin
- Prevention of **gonococcal conjunctivitis** in newborn
= Erythromycin ointment on eyes
- Prevention of **postsurgical infection** due to **S aureus**
= Cefazolin
- Prophylaxis of **strep pharyngitis** in child with prior **rheumatic fever** - Benzathine penicillin G or oral penicillin V
- Exposure to **syphilis** - Benzathine penicillin G



ONE LINERS

- **MIC** (Minimum Inhibitory Concentration) is the **lowest possible** concentration of the drug that inhibits visible growth **after 24 hours** of incubation. **Lesser MIC = more Potent**
- **Optimal dose** is the dose of antimicrobial drug that inhibits growth of **90% organisms** at the site of infection
- **Mutation** cause resistance to **one drug** whereas **plasmid** can cause **multidrug resistance**
- **Ambler's** classification of beta lactamase is based on **structure of enzyme** and **Bush's** classification is based on **substrate of enzymes** and its **inhibitors**
- **Long post antibiotic effect** has been noted with – Fluoroquinolones, aminoglycosides, Beta-lactam antibiotics
- **Bactericidal** drugs are must in **immunocompromised** patients
- **DOC** for **syphilis in pregnancy** – **Penicillin**
- **Longest acting** fluoroquinolone – **Sparfloxacin** (20 hrs)
- Methicillin resistance occurs due to **altered PBP** (Penicillin Binding Proteins)
- **DOC** for **chlamydial infection** – **Doxycycline**
- **Demeclocycline** > **Doxycycline** cause **photosensitivity**
- **Isoniazid** maximum crosses **BBB** & is associated with **neuropsychiatric** symptoms like **memory loss, euphoria & hallucinations**
- **Multi Drug Resistance** (MDR) TB is resistance to both **Isoniazid & Rifampicin**





ONE LINERS

- **Extremely Drug Resistance (XDR)** TB is a case of MDR with additional resistance to **Fluoroquinolone** and to at least one of the injectable second line drugs like **Amikacin**, **Kanamycin** or **Caperomycin**.
- **Bedaquiline** & **Delamanid** are recent drugs for the treatment of MDR TB
- **DOC** for **chlamydial** infection in **pregnancy** – **Macrolides** (eg. Erythromycin)
- **Sulfonamides** can cause **Acute intermittent porphyria**
- **Brinzolamide** is contraindicated in patient with **sulfonamide allergy** because of structural similarity
- **Sulfasalazine** is used orally for the treatment of **Ulcerative colitis**
- **Sparfloxacin** and **Astemizole** can cause **Ventricular arrhythmia**
- **Multiple drug resistance** is transferred through – **Conjugation**
- **Most common** mechanism of transfer of **resistance** in **Staphylococcus aureus** is **Transduction**
- **Sutezolid** is currently under trial for treatment of **TB**
- **Chloramphenicol** is responsible for **Bone marrow suppression**
- **Mupirocin** is a **topical** antibiotic of choice for **staphylococcal nasal carriage**



Anti-tumor Antibiotics

Dactinomycin

Doxorubicin (Adriamycin)

Daunorubicin

Bleomycin

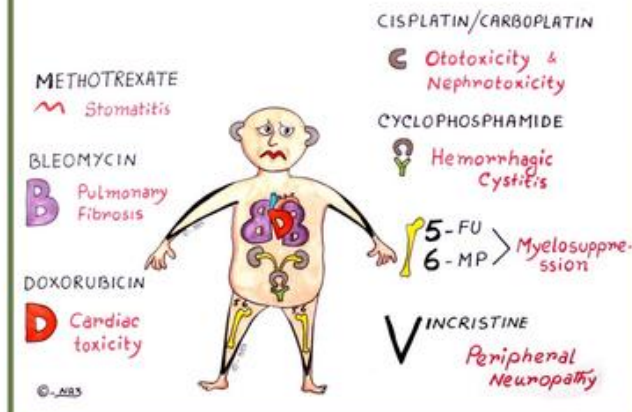
Mitomycin C

Mitoxantrone

“mycin & bicin”

- Substances derived from **microorganisms** that have inhibitory effect on **tumor cells**
- Bind to **DNA** inhibit **Topoisomerase II** and generate **free radicals** due to electron transfer
- They cause **DNA damage** in all phases, but the cell cycle arrest is seen particularly in **G2** and **S phase**
- **Toxicities** mostly caused by **free radicals** that can cause **Cardiomyopathy** and **Pulmonary fibrosis**

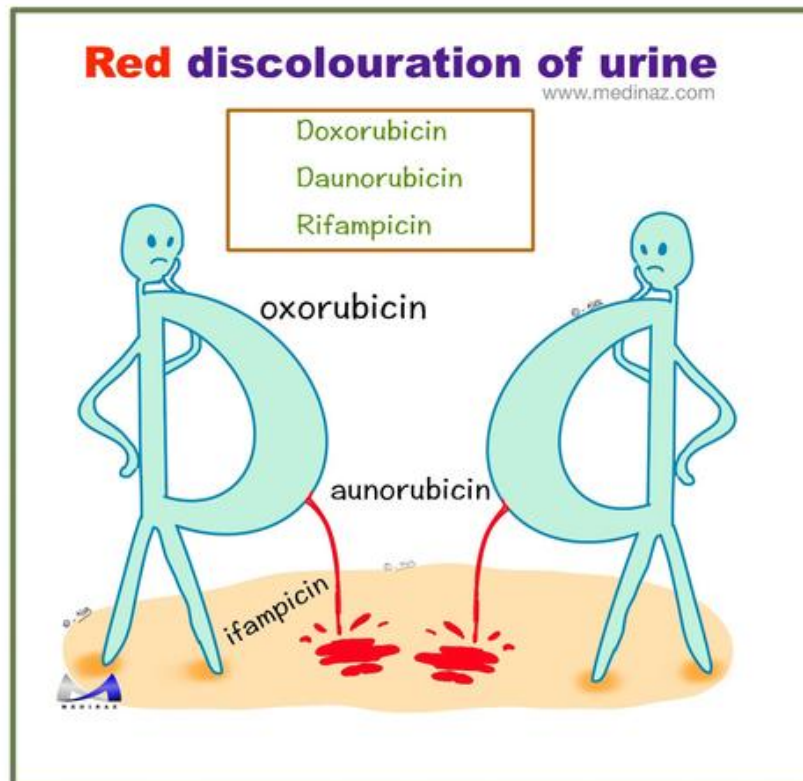
Chemotoxicities





Anthracycline Group

- Derived from a fungus *Streptomyces peucetius*
- Free radical production requires Fe atoms for electron transport
- Fe chelating agent *Dexrazoxane* is the antidote of choice for anthracycline toxicity
- *Doxorubicin* is used for the treatment of Ovarian cancer, Sarcoma (Osteosarcoma), Lymphoma, Multiple myeloma
- *Daunorubicin/ Idarubicin* along with *cytarabine (Ara-c)* is the treatment of choice for Acute Myelogenous Leukemia (AML)
- *Doxorubicin* & *Daunorubicin* are the DOC for Kaposi sarcoma
- *Epirubicin* is used for Breast cancer
- *Valrubicin* is used for Bladder cancer
- *Mitoxantrone* is a doxorubicin derivative with less cardiotoxicity (cause secondary leukemia)
- Cardiotoxicity is maximum with *Doxorubicin* & *Daunorubicin*
- Acute toxicity presents as Pericarditis-myocarditis syndrome followed by Arrhythmia
- Long term use can cause Congestive heart failure due to Dilated cardiomyopathy
- Vacuolar myofibril degeneration is seen under electron microscopy
- *Doxorubicin* is a powerful vesicant (Given by rapid flowing IV line)
- *Doxorubicin* & *Daunorubicin* cause Red discoloration of urine
- *Doxorubicin*, *Daunorubicin* & *Actinomycin D* Cause Radiation recall syndrome



(**Radiation recall syndrome** : Radiotherapy cause local changes like desquamation, erythema etc, which subsides with time. After this if chemotherapy is started and the same local changes reappear, which is called as Radiation recall)

Mitomycin-C

- Potent **radiosensitizer** and has an **alkylating agent like** activity
- It is used along with **5-FU** for the treatment of **anal cancer**
- It is used for the prevention of **laryngotracheal, esophageal stenosis & post nasal surgery synechiae** formation
- It can cause **Haemolytic Uremic Syndrome (HUS), TTP & Pulmonary fibrosis**





Dactinomycin (actinomycin D)

- Intercalates into DNA, prevent RNA synthesis.
- Wilms tumor, Ewing sarcoma, rhabdomyosarcoma. Used for childhood tumors.
- It can cause early myelosuppression, radiation recall syndrome.

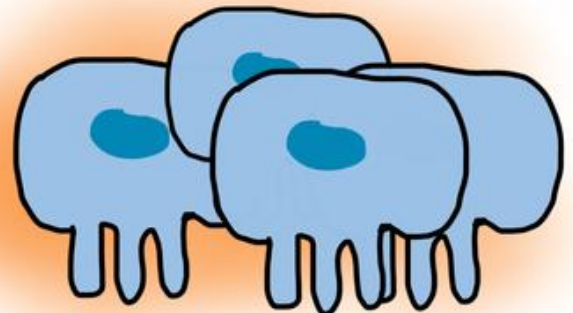
Bleomycin

- Induces free radical formation which breaks in DNA strands
- Used for the treatment of Testicular cancer in BEP regimen, Hodgkin lymphoma in ABVD regimen.
- It can cause Pulmonary fibrosis, flagellate dermatitis (skin hyperpigmentation). Minimal myelosuppression & Raynaud's phenomenon
- Free radicals damage type I pneumocytes which leads to type II pneumocytes hyperplasia

type I



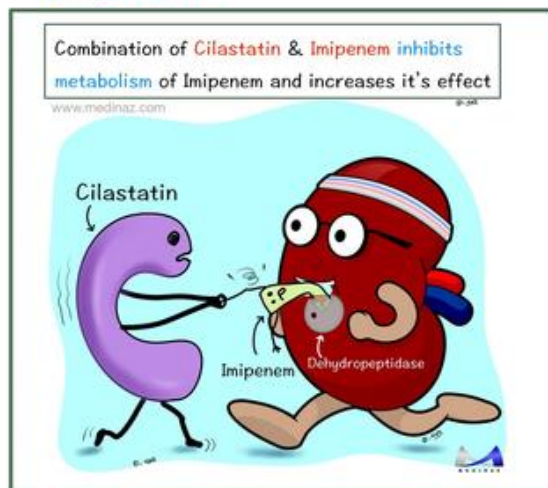
type II





One Liners

- Cell wall synthesis **inhibitors** like **penicillin** and **vancomycin** increase uptake of **aminoglycosides**.
- Drugs blocking enzymes sequentially like **DHPS** with **sulfamethoxazole** and **DHFR** with **trimethoprim** gives a **synergistic** effect in the form of **bactericidal** effect.
- Combination of **Cilastatin** & **Imipenem** **inhibits** metabolism of **Imipenem** and increases it's effect



- **Bacteriostatic** drugs like Tetracycline and Macrolides can **inhibit** the effect of **Bactericidal** drugs like penicillin
- Antibiotics like **ampicillin**, **cefoxitin** and **imipenem** can **induce beta lactamase production** and increase degradation of other beta lactamase drugs
- **Penicillin** can inactivate **aminoglycosides** in **solutions**
- **DOC** for **gonococcal plus non-gonococcal** mucopurulent cervicitis – **Azithromycin 2 gm oral single dose**



One Liners

- **Biofilm mechanism of resistance** to antibiotics includes –

Mechanical barrier (exopolysaccharide matrix)

Growth rate decreased

Persisters: Bacteria undergoes

phenotypic modification into dormant,

spore like structures and survive antibiotic insult

Efflux pump which pump the drug out of the biofilm

Enzymatic inactivation

“My Green PEE”



- **Empirical drug of choice** for treatment of **meningococcal meningitis** –

Ceftriaxone

- **DOC** for **prophylaxis** and **treatment** of **pneumocystis infection** in both **immunocompetent** as well as **immunocompromised** is **cotrimoxazole**

- Treatment of choice for **Burkholderia Cepacia** – **Carbapenams** & **3rd generation cephalosporin**

- **Auditory toxicity** is caused by – **Kanamycin, Amikacin, Neomycin**

Kanamycin

Amikacin

Neomycin

K

A

N





One Liners

- *H. influenza* has a **plasmid** for activity against **beta lactamase**, hence **Cefotaxime** is preferred over ampicillin
- **Silver sulfadiazine** can be applied **topically** for the treatment of **keratomycosis**
- **ESBL** production is detected by the ability of the microorganism to hydrolyze **3 rd generation** cephalosporin
- **Cefoperazone** is **safe** in **renal failure**
- Cephalosporins like **Ceftriaxone** and **Cephmandole** can cause **drug induced thrombocytopenia**

DOC for typhoid –

Outpatients – Cefixime 20mg/kg/day for 14 days or Azithromycin 500 mg BD for 7 days

Inpatients – Ceftriaxone 2gm IV BD for 2 weeks +/- Azithromycin 500mg BD for 7 days

- **Empirical treatment for meningitis**

0-3 months – Ampicillin + Cefotaxime

3 months – 55 years – Vancomycin + Cefotaxime / Ceftriaxone / Cefepime

> 55 years – Vancomycin + cefotaxime / ceftriaxone / cefepime + Ampicillin

Most effective antibiotic for acne – **Minocycline**





One Liners

- **Ceftriaxone** is the best drug for the treatment of **diplococci** like streptococcus and gonococcus
- Antibiotic of choice in **Campylobacter gastroenteritis** – **Erythromycin**
- **Daptomycin** **depolarizes the cell membrane** and bacteria dies due to **potassium efflux**
- **Daptomycin** can cause **myopathy**
- **Jarisch-Herxheimer reaction** is seen in **syphilis** with **Penicillin**
- **DOC** for **Nocardiosis** – **Trimethoprim + SMX**
- **Streptomycin** is a **glycoside**
- **Streptomycin** can **enhance the toxicity** of **depolarizing skeletal muscle relaxant**
- **Rifabutin** is more effective against **Mycobacterium avium complex (MAC)** as compared to **Rifampicin**

Second line antitubercular drugs

Two = Thioacetazone

P = PAS

E = Ethionamide

A = Amikacin

C = Caperomycin, Calithromycin

O = Ofloxacin

C = Ciprofloxacin, Cycloserine

K = Kanamycin

S = Streptomycin

Making = Moxifloxacin

Blind = Bedaquiline

Love = Linezolid

On

Date = Delamanid





One Liners

- **Rifampicin** being an **enzyme inducer** can **decrease efficacy** of anti-HIV drugs like Nevirapine and Protease inhibitors which are metabolized by microsomal enzymes **should be avoided in HIV +ve patients**
- **Gene** responsible for **Rifampicin resistance** – **rpoB**

Rifampicin resistance – rpoB

- **Fidaxomicin** - the new **FDA approved** drug for **Clostridium difficile infection**
- **Antitubercular drug** associated with **hypothyroidism** – **Ethionamide**
- **Cross resistance** of **Isoniazid** is seen with **Ethionamide**
- **Most common drug** used in **leprosy** - **Dapsone**