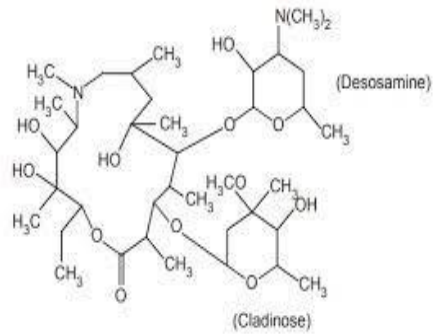
ANTBIOTICS

- MACROLIDE
- POLYPEPTIDE
- MISCELLANEOUS

MACROLIDE:-These are antibiotics which contain chemically related compound which are isolated from actinomyces and contain macrolide is called as macrolide antibiotics.The large microlide contain one or more sugar usually cladinose and desosamine are attatched

CLASSIFICATION

- 1)1,2members
  - eg methycine
- 2)14 members
  - Erythromycin
  - semisynthetic
    - 1)Clarithromycine
    - 2)Dirithromycine
- 3)15 members
  - eg azithromycin
- 4)16 members
  - eg spiramycin



❖ CHEMISTRY OF MICROLIDE ANTIBIOTICS

The macrolide antibiotics have :

a) Large lactone ring which is called aglycone ring
b) Ketone function
c) Glycosidely linked animosugar portion which is called as glycone part.

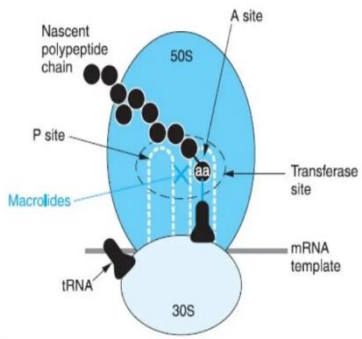
SAR

1)The structure of macrolide antibiotic contain 14 members in ring which increases upto 15 acid stability increases.

2)At 2nd position methyl group replace by halogen then acids stability decreases

3)At 3rd position in cladinose sugar the sugar hydroxyl group is replaced by amino at 4th position then activity against gram negative bacteria is included

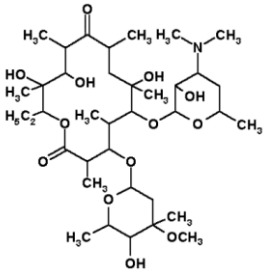
MOA



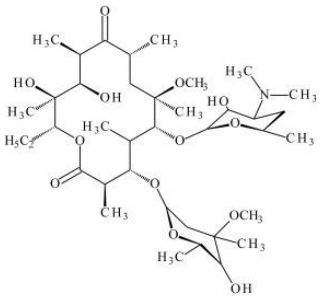
Inhibit protein synthesis by reversibly binding to 50s ribosomal subunit.

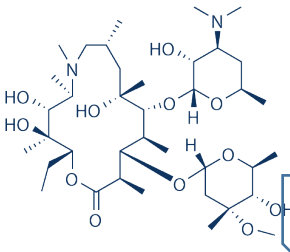
Suppression of RNA dependent protein synthesis by inhibition of tanslocation of mRNA

Typically bacteriostatic activity



Polypeptide antibiotics





ERYTHROMNCIN

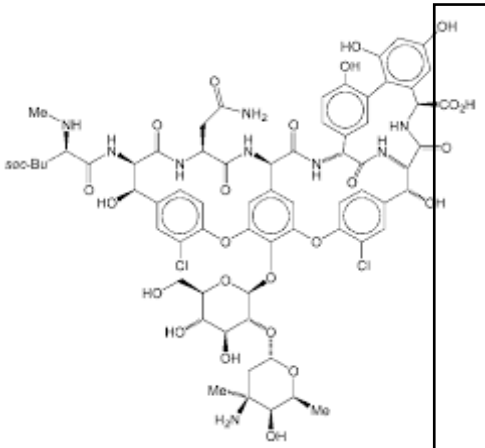
CLARITHROMYCIN

AZ

AZI

- Vancomycin
- Bacitracin

Polypeptide antibiotics-polypeptide antibiotics are class of antibiotics which shows polypeptide structure but have limited clinical use. They are used for treatment of eye, ear, or bladder infection, throat infection



Vancomycin

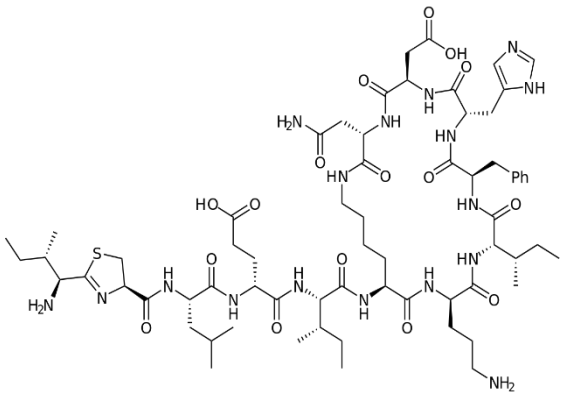
- VANCOMYCIN

Vancomycin is glycopeptide antibiotics which is used for treatment of infection caused by gram negative microorganism

SOURCE:-It is obtained from Streptomyces orientalis

CHEMISTRY:-vancomycin contain two glycosidic linkage which connect vancosamine and cyclic peptides.

Aglycone portion containing aromatic residue which are linked together in resorcinol ether system



SIDE EFFECT:- Skin rashes ,renal failure

THERAPEUTIC USES:-Skin infection,treatment of gram positive cocci.

M.O.A:-It inhibit cell wall synthesis by inhibiting synthesis of cell wall glycopeptide polymer , which leads to lysis of bacterial cell.

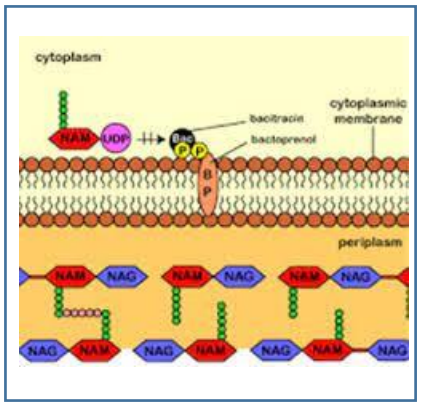
- BACITRACIN

Bacitracin is used to help prevent minor skin injuries such as cuts, scrapes and burns from becoming infected. Bacitracin is in class of medication called antibiotics. Bacitracin works by stopping the growth of bacteria.

Bacitracin

Bacitracin works by stopping the growth of bacteria. Bacitracin is polypeptide which is obtained from bacillus subtilis ; containing L-aspargin, L-histidine are joined by polypeptide chain

SOURCE:-It is obtained from Bacillus subtilis



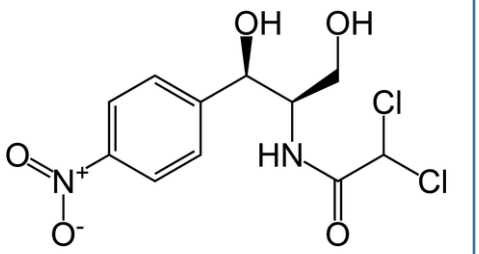
M.O.A:-

- In case of microorganism cell wall is important for survival of it. So cell wall synthesis is inhibited by bacitracin.
- It inhibit both polypeptide and cell wall synthesis at last stage , so it can stop function of plasma membrane and lysis of cell takes place.

Therapeutic uses:-Bacitracin is used in treatment of diarrhoea.

MISCELLANEOUS AGENTS

- Chloramphenicol
- Clindamycin
- Linzolide



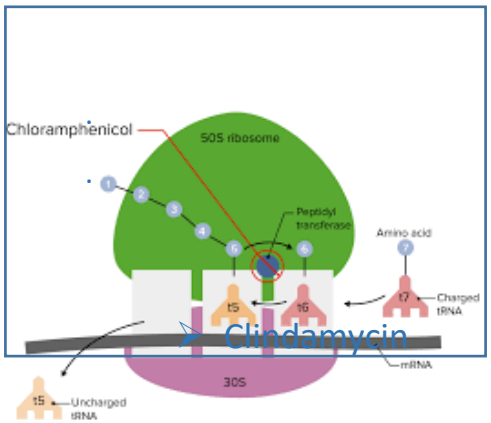
Chloramphenicol

It is broad spectrum antibiotics widely used for controlling growth of microorganism. It is bacteriostatic antimicrobial which have IUPAC name-2-dichloroacetoamine 1-P nitrophenyl

propane 1,3diol

SAR:-1)SAR of paranitrophilic group- the nitro group at first position is essential for activity.In shifting of nitro group from para position to other position reduces activity

2)SAR of dichloroacetamino side chain-if chlorine is replaced by other halogen potency of compound decreases

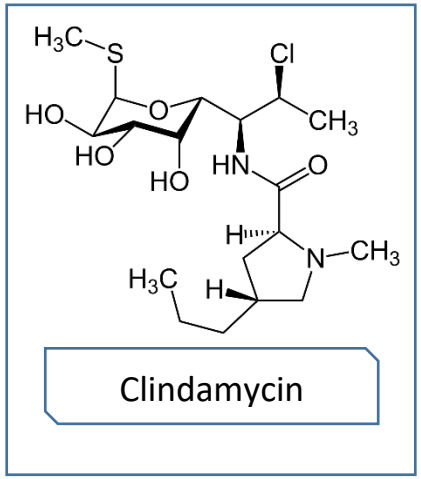


MOA:-chloramphenicol bind with 50s which blocks the site of t-RNA on the site of m-RNA which inhibit protein synthesis.

SIDE EFFECT:-rashes,fever

- Clindamycin

It is semisynthetic derivative of lincomycin , a natural antibiotic produced by actinobacterium Streptomyces lincolnensis



Clindamycin

MOA:- Clindamycin

50s ribisome

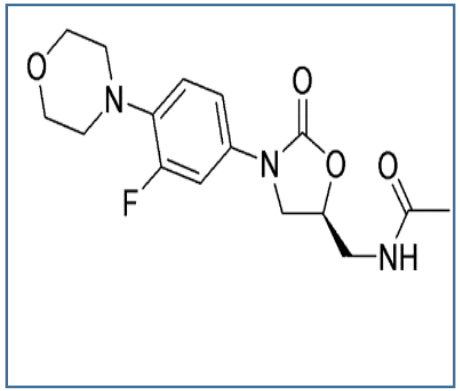
binding of aminoacyl t-RNA to m-RNA

Protein synthesis

Bacteriostatic effect

- Linzolide

Linzolide is antibiotic used for treatment of infection, caused by gram positive bacteria.



The main use is treatment of infection of skin and pneumonia

MOA:-It inhibit bacterial protein synthesis by preventing formation of ribosome complex that initiate protein synthesis by binding to 23s ribosomal RNA of 50s subunit.

Linzolide

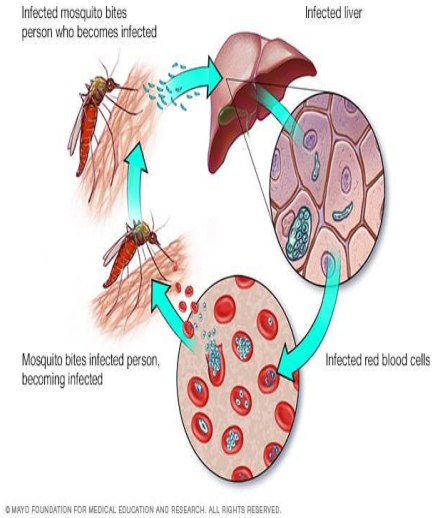
Adverse effect:- nausea ,vomiting

Therapeutic uses:-1)Infection caused by gram positive bacteria.

2)Skin and soft tissue infection

ANTI MALARIALS

Malaria: A human disease that is caused by sporozoan parasites (genus plasmodium)in the red blood cells , is transmitted by bite of anopheline mosquitoes, and is characterized by periodic attack of chills and fever



The parasite is transmitted to humans most commonly through mosquito bite.Malaria spreads when mosquito becomes infected with disease after biting an infected person .

Life cycle of malaria: Malaria in humans is caused by infection with protozoa parasite of genus plasmodium .

These parasite spend asexual phase in human host and sexual phase in female anopheles mosquito.

Phases:-

1) Transmission phase

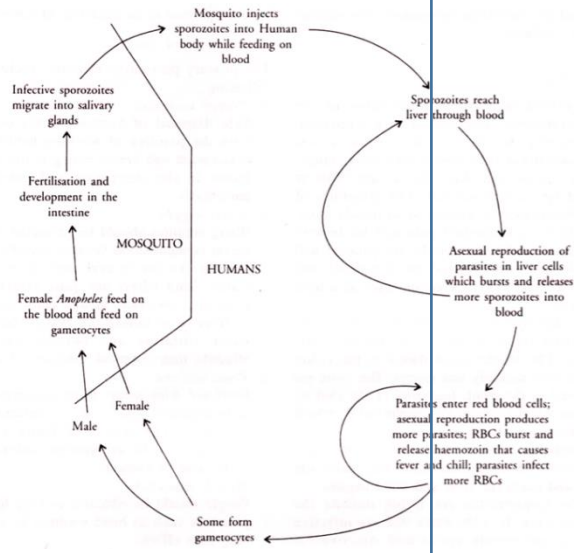
2) Pre- erythrocytic phase

3)Erythrocytic phase

4)Sexual phase

Life cycle of malaria

Phase 1:Transmission-malaria is caused due to bite of infected female anapholous mosquito which release motile sporozytes which is stored in salivary gland of mosquito . After biting of mosquito to human being sporozyte enter in blood stream in parenchyma of liver.



Life cycle of Malaria

Phase 2:Free erythrocytic phase –by repeated nuclear division of sporozyte which is converted in primary seizome.After5-6 days liver cells rupture and primary seizome is converted to merizoites approximately 20000 merizoites are released.

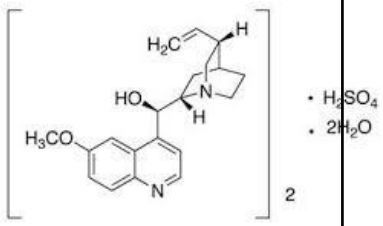
Phase3:Erythrocytic phase-merizoites now enter in blood circulation .

Phase 4: Sexual phase

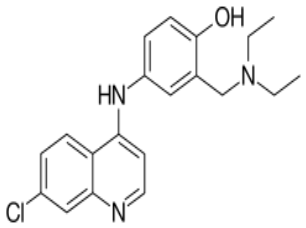
The gametocyte from human are taken by mosquito during another blood meal.both fuse together to form zygote and zygote is converted to oocytes which release sporocytes which migrates in salivary gland of mosquito and now mosquito is ready for next infection.

- Classification
  - Quinolines
  - Biguanides and dihydrotriazine
  - Miscellaneous

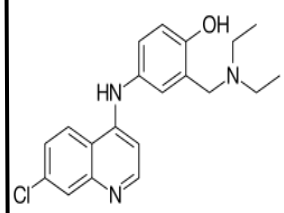
- QUINOLINE



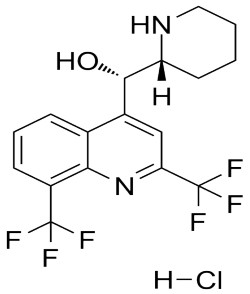
QUINOLINE SULPHATE



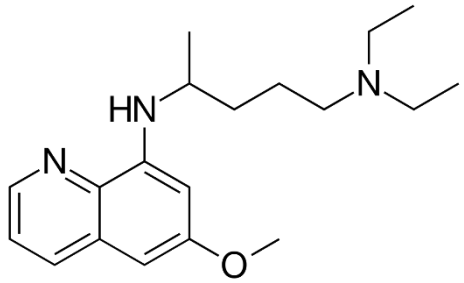
CHLOROQUINE



AMODIAQUINE



MEFLOQUINE



PAMAQUINE

M.O.A

Quinine sulphate

↓ enters

Infected RBCs

↓ Accumulation into

Acidic vesicles of parasite

↓ Prevents

Degradation of HB by parasite

↓

Quinine HB-complex

↓ Prevents

Conversion of toxic haeme to non toxic haeme

↓

Parasitic membrane

↓

Schizonticidal activity

SAR OF QUINOLINE

1. In quinolones tertiary amine is essential for antimicrobial activity. Halogen function is essential for activity.

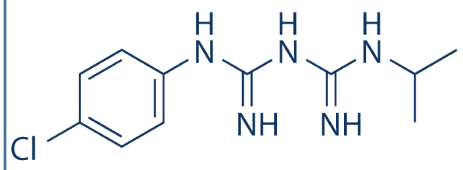
2. 4-diethylamino 1-methylbutyl aminoside chain is essential for activity

3. Introduction of aromatic ring in side chain gives compound with reduced toxicity.

4. Introduction of phenyl ring at position 2 increases activity.

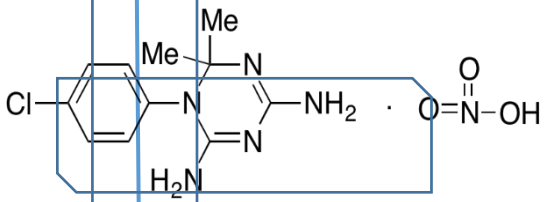
5. Substitution at 6th position of quinine enhances the activity.

Biguanides and dihydrotriazines



Proguanil

~~Cycloguanil~~ pamoate



Biguanide –

- ✓ It is example of prodrug.
- ✓ ~~It is slow acting erythrocytic schizontocide which also inhibits the~~ preerythrocytic stage of p. falciparum. Gametocytes exposed to proguanil are not killed but fail to develop properly in mosquito.
- ✓ It is cyclized in the body to triazine derivative which inhibits plasmodium in preference to mammalian enzyme .

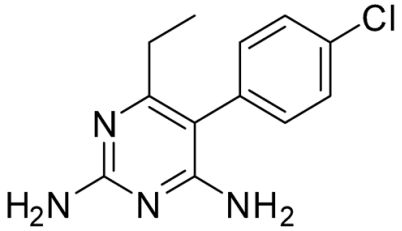
➔ Adverse effect

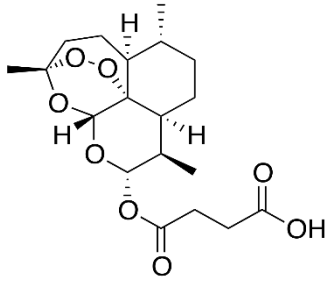
Occasional nausea and rashes

Megaloblastic anaemia and granulocytopenia with highest dose

Can be treated with folic acid

Mis cellaneous





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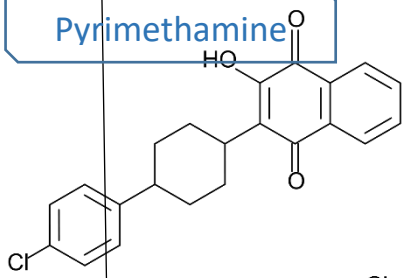
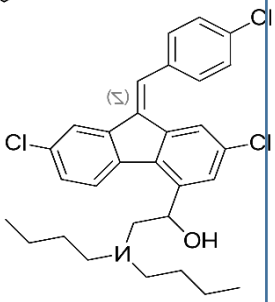
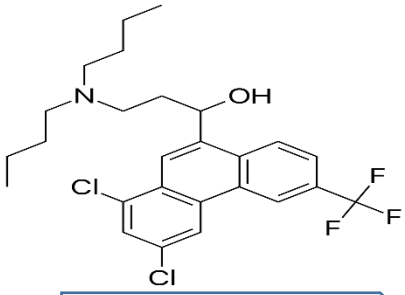
Pyrimethamine



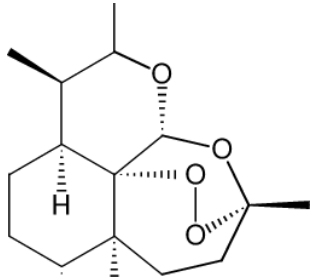


Atovoquone

Lum



Halofantrine



Artemether