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Lecture title: Antibacterial Drugs

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4. Inhibitors of bacterial nucleic acids function or synthesis

Fluoroquinolones

Types

Enrofloxacin, ciprofloxacin, flumequine.

They are bactericidal, broad spectrum drug and structurally related to nalidixic acid.

Mechanism of action

Inhibition of bacterial DNA gyrase which is essential for DNA synthesis.

Indications

1. Pneumonia.

2. Urinary tract infection.

3. Air sacculitis.

4. Enteritis.

5. Osteomyelitis.

Side effects

1. Anorexia.

2. GIT disturbances.

3. Neurotoxicity.

5. Inhibitors of bacterial metabolism

Sulfonamides

Types

Sulfamerazine, sulfadiazine and sulfamethazine.

It is broad spectrum act on G^-, G^+ bacteria and coccidia. It is usually active in the early stages of infection because the accumulation of pus and necrotic tissue provide folic acid to the bacteria.

Sulfonamides are usually combined with Trimethoprim to potentiate their antibacterial action by inhibiting the formation of tetrahydrofolate through inhibition of the enzyme tetrahydrofolate reductase.

Mechanism of action

Compete with para-amino-benzoic acid (PABA) for the synthesis of folic acid which is essential for RNA synthesis.

Clinical uses

Treatment of respiratory, GIT and urinary tract infections.

Side effects and toxicity

1. Simple toxicity may cause ataxia, vomiting and convulsion.

2. Chronic use may produce renal toxicity.

3. Neuritis, acidosis and decrease egg production in chickens.

Nitrofurans

Types

Nitrofurazone, nitrofurantoin and furazolidone.

These are bacteriostatic and in high doses it becomes bactericidal. They are well absorbed orally, distributed into different parts of the body and high levels are found in the urinary system therefore, they are effective in treatment of urinary tract infections. It may cause nausea, vomiting and diarrhea.

Mechanism of action

They inhibit the bacterial enzyme responsible for the energy production in the bacteria.