NAME: BAI DANIELLA NGUEMO

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TETRACYCLINES

They are a large group of drugs with a common basic structure and activity. These tetracyclines have a nucleus of four cyclic rings, they are called broad spectrum antibiotics, they are slightly bitter solids, weak water soluble, and however their hydrochlorides are more soluble.

Tetracyclines are classified as short acting, intermediate acting and long acting.

Tetracycline hydrochloride is a prescription antibiotic used to treat a wide range of infections.

**Mechanism of action**

They inhibit protein synthesis by binding to 30S ribosomal subunit at a site that blocks binding of charged tRNA to the 30S site of the ribosome. They are bacteriostatic.

Tetracyclines can inhibit mammalian protein synthesis, but because they are pumped out of most mammalian cells do not usually reach concentrations needed to significantly reduce mammalian protein synthesis.

1. Anti microbial activity:

* Tetracyclines are broad-spectrum antibiotics
* They are against many gram positive and negative bacteria

1. The mechanism of resistance

* Impaired influx or increased efflux by an active transport protein pump, so this efflux protein pumps tetracycline out.
* Plasmid mediated synthesis of protection protein which protects the ribosomal binding site from binding to tetracycline.
* Enzymatic inactivation of tetracyclines.

**Uses**

* A tetracycline is the drug of choice in infections with mycoplasma pneumonia, chlamydiae, rickettsiae etc
* They are used in combination regimens to treat gastric and duodenal ulcer disease caused by Helicobacter pylori.
* To treat a wide variety of infections, including acne. It is an antibiotic that works by stopping the growth of bacteria

**Adverse reaction**

Tetracycline can cause:

* Nausea, vomiting and diarrhea are the most common and they are attributed to direct irritation to the intestinal tract
* They are readily bound to calcium deposited in newly formed bone or teeth in young children.
* It causes decolouration and enamel dysplasia
* They can deposited in bone where it can cause deformity or growth inhibition
* Rectum or vaginal itching

**Toxicity**

* Increased intracranial pressure
* Photo toxicity: distortion of nails, sun burn like reaction on exposed parts is seen in some people
* Liver damage: it can cause acute hepatic necrosis in pregnant women
* Kidney damage: all tectracyclines except doxycyclines accumulate and enhance kidney damage.
* Superinfection: they are the most common antibiotics responsible for superinfection because they cause marked suppression of the flora.