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**MATRIC NO -17/MHS06/007**

**COURSE CODE - PHA 302 (pharmacology and toxicology II)**

**Assignment**

**Question :- Write on a named bacterial protein synthesis inhibitor,stating its mechanism of action,indication for use ,toxicity and adverse effects**

**ANSWER**

**Protein synthesis inhibitor**

**TETRACYCLINE**

**Tetracyclines are a large group of drugs with a common basic structure and activity.**

**•All tetracyclines have a nucleus of four cyclic rings.**

**•They are called broad spectrum antiboitics.**

**•All tetracyclines are slightly bitter solids, weak water soluble, however their hydrochlorides are more soluble.**

**They are classified as**

**•short acting (chlortetracycline, tetracycline, oxytetracycline),**

**•intermediate acting (demeclocycline and methacycline), or**

**• long-acting (doxycycline and minocycline) based on serum half-lives**

**Mechanism of Action**

**Tetracycline antibiotics are protein synthesis inhibitors.They inhibit the initiation of translation in variety of ways by binding to the 30S ribosomal subunit, which is made up of 16S rRNA and 21 proteins. They inhibit the binding of aminoacyl-tRNA to the mRNA translation complex. Some studies have shown that tetracyclines may bind to both 16S and 23S rRNAs.Tetracyclines also have been found to inhibit matrix metalloproteinases.**

**This mechanism does not add to their antibiotic effects, but has led to extensive research on chemically modified tetracyclines for the treatment of rosacea, acne, diabetes and various types of neoplasms.**

**Indications For Use**

**Tetracyclines are used in urinary tract infections amoebiasis, as an adjuvant to quinine or sulfadoxine-pyrimethamine for chloroquine resistant strains of malaria, acne, chronic obstructive lung disease,**

**Their use for these indications is less popular than it once was due to widespread development of resistance in the causative organisms.Tetracyclines are widely used in the treatment of moderately severe acne and rosacea (tetracycline, oxytetracycline, doxycycline or minocycline).Anaerobic bacteria are not as susceptible to tetracyclines as are aerobic bacteria.**

**Toxicity of Tetracycline**

1. **Nausea**
2. **vomiting**
3. **loss of appetite**
4. **Dizziness**
5. **Mouth sores**

**Adverse Effects**

**1)Discolor permanent teeth (yellow-gray-brown), from prenatal period through childhood and adulthood. Children receiving long- or short-term therapy with a tetracycline or glycylcycline may develop permanent brown discoloration of the teeth.**

**2)Be inactivated by aluminium, iron, and zinc ions, not to be taken at the same time as indigestion remedies (some common antacids and over-the-counter heartburn medicines)**

**3)Cause skin photosensitivity, so exposure to the sun or intense light is not recommended**

**4)Cause drug-induced lupus, and hepatitis**

**5)Cause microvesicular fatty liver**

**6)Cause tinnitus**

**7)Interfere with methotrexate by displacing it from the various protein-binding sites**

**8)Cause breathing complications, as well as anaphylactic shock, in some individuals**

**9)Affect bone growth of the fetus, so should be avoided during pregnancy**

**10)Fanconi syndrome may result from ingesting expired tetracyclines.**