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**COURSE: PHA 302**

**Question**

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

**Answer**

Chloramphenicol is an antibiotic useful for the treatment of a number of bacterial infections.This includes use as an eye ointment to treat conjunctivitis.By mouth or by injection into a vein, it is used to treat meningitis, plague, cholera, and typhoid feverIts use by mouth or by injection is only recommended when safer antibiotics cannot be used.Monitoring both blood levels of the medication and blood cell levels every two days is recommended during treatment.

An antibiotic first isolated from cultures of Streptomyces venequelae in 1947 but now produced synthetically. It has a relatively simple structure and was the first broad-spectrum antibiotic to be discovered. It acts by interfering with bacterial protein synthesis and is mainly bacteriostatic.

**Mechanism of action**

Chloramphenicol is lipid-soluble, allowing it to diffuse through the bacterial cell membrane. It then reversibly binds to the L16 protein of the 50S subunit of bacterial ribosomes, where transfer of amino acids to growing peptide chains is prevented (perhaps by suppression of peptidyl transferase activity), thus inhibiting peptide bond formation and subsequent protein synthesis.

**Indication for use**

Used in treatment of cholera, as it destroys the vibrios and decreases the diarrhea. It is effective against tetracycline-resistant vibrios. It is also used in eye drops or ointment to treat bacterial conjunctivitis.

**Toxicity**

Oral, mouse: LD50 = 1500 mg/kg; Oral, rat: LD50 = 2500 mg/kg. Toxic reactions including fatalities have occurred in the premature and newborn; the signs and symptoms associated with these reactions have been referred to as the gray syndrome. Symptoms include (in order of appearance) abdominal distension with or without emesis, progressive pallid cyanosis, vasomotor collapse frequently accompanied by irregular respiration, and death within a few hours of onset of these symptoms.

**Pharmacodynamics**

Chloramphenicol is a broad-spectrum antibiotic that was derived from the bacterium Streptomyces venezuelae and is now produced synthetically. Chloramphenicol is effective against a wide variety of microorganisms, but due to serious side-effects (e.g., damage to the bone marrow, including aplastic anemia) in humans, it is usually reserved for the treatment of serious and life-threatening infections (e.g., typhoid fever). Chloramphenicol is bacteriostatic but may be bactericidal in high concentrations or when used against highly susceptible organisms. Chloramphenicol stops bacterial growth by binding to the bacterial ribosome (blocking peptidyl transferase) and inhibiting protein synthesis.

**Adverse effects**

diarrhea

nausea

vomiting

mouth pain

headache

altered mental status

confusion

fever

rash

severe allergic reactions