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**COURSE CODE:** PHA 302

**COURSE TITLE:** INTRODUCTORY PHARMACOLOGY AND TOXICOLOGY II

**CHLORAMPHENICOL**

Chloramphenicol is a bacteriostatic broad-spectrum antibiotic that is active against both aerobic and anaerobic gram-positive and gram-negative organisms. It is active also against rickettsiae. Haemophilus influenzae, N. meningitidis, and some strains of Bacteroides are highly susceptible, and for them chloramphenicol may be bactericidal. Clinical significance emerges and may be due to chloramphenicol acetyltransferase, an enzyme that inactivates the drug. This is by the transfer of R-factor by conjugation. Also decreased permissibility into the resistant bacterial cells and lowered affinity of bacterial ribosome for chloramphenicol is another mechanism.

Its use by mouth or by injection is only recommended when safer antibiotics cannot be used.[3] Monitoring both blood levels of the medication and blood cell levels every two days is recommended during treatment.

**Mechanisms of action:**

•Chloramphenicol blocks proper binding of 50S site which, stops protein synthesis.

• It does inhibit mitochondrial ribosomal protein synthesis because these ribosomes are 70S, the same as those in bacteria.

•It hinders the transfer of the elongating peptide chain to the newly attached amino acyl tRNA at the ribosome mRNA complex.

•It specifically attaches to the 50S ribosome and therefore hinders the access of aminoacyl-tRNA to the acceptor for amino acid importation

* It prevents formation of peptide bonds

**Pharmacokinetics**:

* Following oral administration, chloramphenicol is rapidly and completely absorbed.
* It is widely distributed to virtually all tissues and body fluids. The drug penetrates cell membranes readily.
* Excretion of active chloramphenicol and of inactive degradation products occurs by way of the urine. A small amount of active drug is excreted into bile or feces

**Clinical Uses:**

•Chloramphenicol has a broad spectrum of activity and has been effective in treating ocular infections such as conjunctivitis, blepharitis etc. caused by a number of bacteria including Staphylococcus aureus, Streptococcus pneumoniae, and Escherichia coli. It is not effective against Pseudomonas aeruginosa. The following susceptibility data represent the minimum inhibitory concentration for a few medically significant organisms.

•Because of potential toxicity, bacterial resistance, and the availability of other effective drugs, chloramphenicol may be considered mainly for treatment of serious rickettsial infections, bacterial meningitis caused by a markedly penicillin-resistant strain of pneumococcus or meningococcus, and typhoid fever.

**Adverse Reactions**

Common side effects include bone marrow suppression, nausea, and diarrhea.The bone marrow suppression may result in death.To reduce the risk of side effects treatment duration should be as short as possible.People with liver or kidney problems may need lower doses.In young children a condition known as gray baby syndrome may occur which results in a swollen stomach and low blood pressure.Its use near the end of pregnancy and during breastfeeding is typically not recommended.Chloramphenicol is a broad-spectrum antibiotic that typically stops bacterial growth by stopping the production of proteins.

•Gastrointestinal disturbances: Adults occasionally develop nausea, vomiting, and diarrhea.

•Oral or vaginal candidiasis may occur as a result of alteration of normal microbial flora.

•Bone marrow disturbances: Chloramphenicol commonly causes a dose-related reversible suppression of red cell production at dosages exceeding 50 mg/kg/d after 1-2 weeks

• Aplastic anemia is a rare consequence of chloramphenicol administration by any route. It is an idiosyncratic reaction unrelated to dose, though is occurs more frequently with prolonged use. It tends to be irreversible and can be fatal.

**Toxicity for newborn infants:**

•Newborn infants lack an effective glucuronic acid conjugation

•mechanism for the degradation and detoxification of chloramphenicol.

•Consequently, when infants are given dosages above 50 mg/kg/d, the drug may accumulate, resulting in the gray baby syndrome, with vomiting, flaccidity, hypothermia, gray color, shock, and collapse.

**Interaction with other drugs**

•Chloramphenicol inhibits hepatic microsomes enzymes that metabolizes several drugs like other bacteriastatic inhibitors of microbial protein synthesis.

•chloramphenicol can antagonize bactericidal drugs such as penicillins or aminoglycosides.

This medication is used to treat bacterial eye infections. Chloramphenicol is an antibiotic that works by stopping the growth of bacteria.