MATRIC NUM: 14/MHS06/034

Pharmacology assignment

Carry over student (500level)

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

Answers: A bacterial protein synthesis inhibitor is a substance that slows or stops the growth or proliferation of cells by disrupting the processes that lead directly to the generation of new proteins.

ERYTHROMYCIN

Erythromycin is an antibiotic used for the treatment of a number of bacterial infections, respiratory tract infections, skin infections, chlamydia infections, pelvic inflammatory disease and syphilis.

MECHANISM OF ACTION

Erythromycin displays bacteriostatic activity or inhibits the growth of bacteria, especially at higher concentrations. By binding to the 50s subunit of the bacterial RRNA complex, protein synthesis and subsequent structure and function processes critical for life or replication are inhibited. Erythromycin interferes with aminoacyl translocation preventing the transfer of the TRNA bound at the A site of the RRNA complex. Without this translocation, the A site remains occupied, thus the addition of an incoming TRNA and its attached amino acid to the nascent polypeptide chain is inhibited. This interferes with the production of functionally useful proteins, which is the basis of this antimicrobial properties. Erythromycin increases gut motility by binding to Motillin, thus it is a Motillin receptor agonist in addition to its antimicrobial properties.

INDICATION FOR USE OF ERYTHROMYCIN

Erythromycin is used to treat certain infections caused by bacteria such as infections of the respiratory tract including bronchitis, pneumonia, legionnaires' disease (a type of lung infection) and pertussis (whooping cough; a serious infection that can cause severe coughing);diphtheria (a serious infection in the throat); sexually transmitted diseases (STD) , including syphilis; and ear, intestine, gynecological, urinary tract and skin infections. It is also used to prevent recurrent rheumatic fever. Erythromycin is in a class of medications called macrolide antibiotics, it works by stopping the growth of bacteria.

TOXICITY

Macrolide antibiotics have varying levels of cardiotoxicity. Erythromycin carries the most prominient risk of cardiotoxicity among the more commonly used macrolide antibiotics. It induces QT prolongation and increases the risk of the potentially deadly heart rhythm known as torsades de pointes. Careful monitoring of the QTc interval on the ECG is recommended to minimize the risk, patients at higher risk should also have their potassium, magnesium and calcium levels monitored.

ADVERSE EFFECT

Gasrointestinal disturbances, such as diarrhea,nausea, abdominal pain and vomiting are very common because erythromycin is a motillin agonist.

More serious side effectsn include arrhythmia with prolonged QT intervals, including torsades de pointes and reversible deafness, allergic reactions range from urticarial to anaphylaxis.