

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 is a substance that stops or slows the growth or proliferation of cells by disrupting the processes that leads directly to the generation of new proteins.

An example of a bacterial protein synthesis inhibitor is Cycloheximide , this is a protein synthesis inhibitor in eukaryotes.

Cycloheximide is a naturally occurring fungicide produced by the bacterium *Streptomyces griseus*. Cycloheximide exerts its effects by interfering with the translocation step in protein synthesis (movement of two tRNA molecules and mRNA in relation to the ribosome), thus blocking eukaryotic translational elongation. Cycloheximide is widely used in biomedical research to inhibit protein synthesis in eukaryotic cells studied *in vitro*, It is inexpensive and works rapidly. Its effects are rapidly reversed by simply removing it from the culture medium.

MECHANISM OF ACTION OF CYCLOHEXIMIDE

Cycloheximide blocks the movement of peptidyl-tRNA from acceptor (aminoacyl) site to the donor (peptidyl) site on reticulocyte ribosomes. This translocation reaction is dependent upon the transfer enzyme, TF-II, and GTP hydrolysis. Cycloheximide has no effect on the ribosome dependent GTPase activity of TF-II or on the peptidyl transferase reaction by which peptides on tRNA in the donor site are transferred to an amino acid on tRNA in the acceptor site.

USES OF CYCLOHEXIMIDE

Cycloheximide is supplied as a lyophilized powder. For a 10 mg/ml stock, carefully weigh out and reconstitute 50 mg in 5 ml DMSO or EtOH. Working

concentrations and length of treatments vary depending on the desired effect, but it is typically used at 5-50 µg/ml for 4-24 hours.

ADVERSE EFFECT OF CYCLOHEXIMIDE.

Due to its significant toxic side effects, including DNA damage, teratogenesis and other reproductive effects such as birth defects and toxicity to sperm. This drug is not suitable for human use as a therapeutic compound.

TOXICITY OF CYCLOHEXIMIDE

Cycloheximide is extremely toxic, lethal symptoms include renal injury, adrenal cortex damage. There is insufficient information in the literature to accurately assess the range of toxicity of cycloheximide in humans. Humans with fungal disease have tolerated up to 180 mg/day .