

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

The tetracyclines are a series of derivatives of a basic four-ring structure shown next for doxycycline. Demeclocycline, tetracycline, minocycline, and doxycycline are available in the U.S. for systemic use. Glycylcyclines are tetracycline congeners with substituents that confer broad-spectrum activity and activity against tetracycline-resistant bacteria; the currently available glycylcycline is tigecycline. Tetracycline is also used to treat infections you can get from direct contact with infected animals or contaminated food.

In some cases, tetracycline is used when penicillin or another antibiotic cannot be used to treat serious infections such as Anthrax, *Listeria*, *Clostridium*, *Actinomyces* etc.

Inhibition of bacterial protein synthesis by tetracyclines. mRNA attaches to the 30S subunit of bacterial ribosomal RNA. The P (peptidyl) site of the 50S ribosomal RNA subunit contains the nascent polypeptide chain; normally, the aminoacyl tRNA charged with the next amino acid (aa) to be added moves into the A (acceptor) site, with complementary base pairing between the anticodon sequence of tRNA and the codon sequence of mRNA. Tetracyclines bind to the 30S subunit, block tRNA binding to the A site, and thereby inhibit protein synthesis.

#### Mechanism of Action

Tetracyclines and glycylcyclines inhibit bacterial protein synthesis by binding to the 30S bacterial ribosome and preventing access of aminoacyl tRNA to the acceptor (A) site on the mRNA-ribosome complex. These drugs enter gram-negative bacteria by passive diffusion through channels formed by porins in the outer cell membrane and by active transport that pumps tetracyclines across the cytoplasmic membrane.

#### Tetracycline side effects

Get emergency medical help if you have signs of an allergic reaction to tetracycline: hives; difficult breathing; swelling of your face, lips, tongue, or throat.

Call your doctor at once if you have:

- \* severe blistering, peeling, and red skin rash;
- \* fever, chills, body aches, flu symptoms;
- \* pale or yellowed skin, easy bruising or bleeding;
- \* any signs of a new infection.