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16/mhs06/069

Assignment answers

**Protein synthesis is a complex, multi-step process involving many enzymes as well as conformational alignment. However, the majority of antibiotics that block bacterial protein synthesis interfere with the processes at the 30S subunit or 50S subunit of the 70S bacterial ribosome. The aminoacyltRNA synthetases that activate each amino acid required for peptide synthesis are not antibiotic targets. Instead, the primary steps in the process that are attacked are (1) the formation of the 30S initiation complex (made up of mRNA, the 30S ribosomal subunit, and formyl-methionyl-transfer RNA), (2) the formation of the 70S ribosome by the 30S initiation complex and the 50S ribosome, and (3) the elongation process of assembling amino acids into a polypeptide.**

**Protein synthesis**

**tetracyclines, including doxycycline, prevent the binding of aminoacyl-tRNA by blocking the A (aminoacyl) site of the 30S ribosome. They are capable of inhibiting protein synthesis in both 70S and 80S (eukaryotic) ribosomes, but they preferentially bind to bacterial ribosomes due to structural differences in RNA subunits. Additionally, tetracyclines are effective against bacteria by exploiting the bacterial transport system and increasing the concentration of the antibiotic within the cell to be significantly higher than the environmental concentration.**

**Uses**

[Tetracycline](https://www.webmd.com/drugs/2/drug-5919/tetracycline%2Boral/details) is used to treat a wide variety of infections, including [acne](https://www.webmd.com/skin-problems-and-treatments/acne/default.htm). It is an antibiotic that works by stopping the growth of bacteria.

This antibiotic treats only [bacterial infections](https://www.webmd.com/a-to-z-guides/bacterial-and-viral-infections). It will not work for [viral infections](https://www.webmd.com/a-to-z-guides/bacterial-and-viral-infections) (such as [common cold](https://www.webmd.com/cold-and-flu/default.htm), [flu](https://www.webmd.com/cold-and-flu/default.htm)). Using any antibiotic when it is not needed can cause it to not work for future infections.

Tetracycline can also be used in combination with anti-ulcer [medications](https://www.webmd.com/drugs/index-drugs.aspx) to treat certain types of [stomach](https://www.webmd.com/digestive-disorders/picture-of-the-stomach) ulcers.

## Side Effects

[**Nausea**](https://www.webmd.com/digestive-disorders/digestive-diseases-nausea-vomiting)**,**[**vomiting**](https://www.webmd.com/digestive-disorders/digestive-diseases-nausea-vomiting)**,**[**diarrhea**](https://www.webmd.com/digestive-disorders/digestive-diseases-diarrhea)**, loss of appetite,**[**mouth**](https://www.webmd.com/oral-health/anatomy-of-the-mouth)**sores,**[**black hairy tongue**](https://www.webmd.com/oral-health/guide/black-hairy-tongue)**,**[**sore throat**](https://www.webmd.com/cold-and-flu/understanding-sore-throat-basics)**,**[**dizziness**](https://www.webmd.com/first-aid/understanding-dizziness-basics)**,**[**headache**](https://www.webmd.com/migraines-headaches/migraines-headaches-basics)**, or rectal discomfort may occur. If any of these effects persist or worsen, tell your doctor or**[**pharmacist**](https://www.webmd.com/a-to-z-guides/features/pharmacists-they-do-more-than-fill-prescriptions)**promptly.**