

Antibiotics Classification and Visual Target Sites for Bacterial Inhibition

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Abstract

We know that cell is the structural and functional unit of the entire microorganism. Some bacterial cell is also composed of cell wall and genetic material to do. If the microorganism invade in the human body it will become a disease state for the human. So, we did find some target site of bacteria for killing or inhibit these invading bacteria's. Some of the antibiotics are specific to act on cell wall such as Penicillin's and Cephalosporin's other are also available for inhibit the growth of gram negative or gram positive bacteria' (Sulfamethoxazole, Quinolones etc). In this review the classification or target site action of the particular antibiotic are described for the accurate use of antibiotics to inhibit the growth of foreign particle in the human body.

Keywords: Antibiotics; Target sites; Cell wall

Introduction

The term antibiotic was coined from the word "antibiosis" which literally means "against life". In the past, antibiotics were considered to be organic compounds produced by one microorganism which are toxic to other microorganisms [1]. With related to this, these (Antibiotics) are the substances that can be produced or developed by the microorganism, which selectively inhibit the generation of or kill the microorganism (that are harmful for human health) at very low concentrations [2].

While some antibiotics are able to completely kill other bacteria, some are only able to inhibit their growth. Those that kill bacteria are termed bactericidal while

those that inhibit bacterial growth are termed bacteriostatic [3]. Mostly all of the antibiotics have effect through inhibition of cell wall synthesis, leakage from cell wall, inhibit protein synthesis, destruction of bacterial DNA and metabolism related to bacteria. All of the action of the antibiotics have depend upon the cell wall or cell parts of the bacteria where the antibiotics work and target the specific cell to inhibit or kill. So, cell is very specific target for about all of the antibiotics [4].

Classification of Antibiotics

Antibiotics or antimicrobial drugs are classified on many of ways i.e. they based on their chemical as well as based upon their mechanism of action.

Penicillins	1. Natural:- Penicillin G, Penicillin-VK 2. Penicillinase Resistant: - Methicillin, Nafcillin, Oxacillin and other. 3. Aminopenicillins:- Ampicillin
Fluoroquinolones	First generation:- Norfloxacin, Ofloxacin, Ciprofloxacin, Pefloxacin. Second generation:- Levofloxacin, Moxifloxacin, Lomefloxacin, Gemifloxacin, Sparfloxacin, Prulifloxacin.
Aminoglycosides	Streptomycin, Gentamycin, Kanamycin, Tobramycin, Amikacin, Sisomicin, Netilmicin.
Monobactams	Aztreonam
Carbapenems	Imipenem, Meropenem, Faropenem, Doripenem
Macrolides	Azithromycin, Clarithromycin, Dirithromycin, Erythromycin, Clindamycin, Roxythromycin.
Others	Clindamycin, Vancomycin, Linezolid, Rifampin, Tetracyclin, Trmethoprim/Sulfamethoxazole, Chloramphenicol and others [5].

Table 1: Classification of antibiotics based on structure.

Antibiotic Grouping By Mechanism	
Cell Wall Synthesis	Penicillins, Cephalosporins, Vancomycin, Beta-lactamase inhibitors, Carbapenems, Aztreonam, Polymyxin, Bacitracin
Protein Synthesis Inhibitors	Inhibit 30s Subunit:- Aminoglycosides (gentamicin). Inhibit 50s Subunit:- Macrolides, Chloramphenicol, Clindamycin, Linezolid, Streptogramins.
DNA Synthesis Inhibitors	Fluoroquinolones, Metronidazole
RNA synthesis Inhibitors	Rifampin
Mycolic Acid synthesis inhibitors	Isoniazid
Folic Acid synthesis inhibitors	Sulfonamides, Trimethoprim [6]

Table 2: Classification of antibiotics based on mechanism of action.

Antibiotics Target Site or Mode of Action

To know the target site of a specific antibiotic firstly know about the structure of the antibiotic and where it can be attached. Most of the antibiotic target through the cell of bacteria and destroy it either inhibit the growth by entering in the cell material or inhibit the formation of genetic material. The target sites of the antibiotics are as follows:

- Inhibition of cell wall synthesis
- Breakdown of cell membrane structure or function
- Inhibition of the structure and function of nucleic acids
- Inhibition of protein synthesis
- Blockage of key metabolic pathways

Sometimes it is not easy to describe the target site of the antibiotic action. It can be proposed by using some visual images to describe the clear attachments of drug to

its target site. Here the picture described the target site of antibiotics.

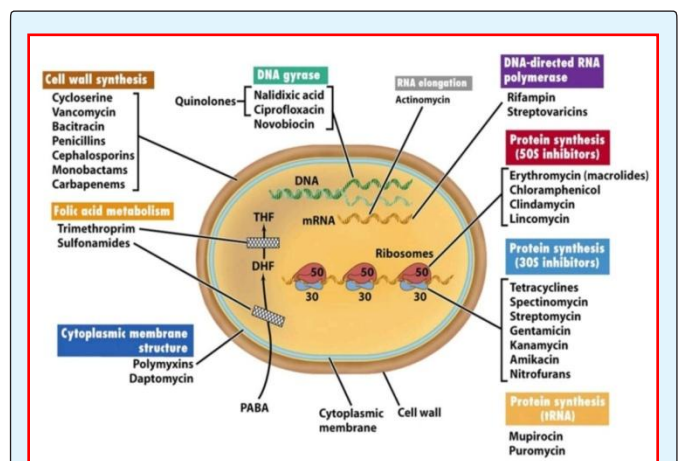


Figure 1: Antibiotics and their target site on the bacterial cell.

Discussion

The antibiotics shows high efficacy and low toxicity with low concentrations have the best antibiotic says by researcher or antibiotic guidelines. Many antibiotic are depend upon their spectrum of activity such as- Narrow or broad spectrum but the aim is to inhibit the growth of microorganism in the human body. All of us have different target sites but some of the antibiotic inhibit the bacterial growth by stepwise which belongs to bacterial cell material.

Conclusion

Antibiotics and their target site is specific to inhibit the growth of micorganism. Besides that nowadays the anibiotic resistance are spread day by day. So we need to find some more target area to target the bacterial cell which not be resist.

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