

## Drug Resistance: Challenges and Updates

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### Mini Review

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### Abstract

Use of antibiotics increased dramatically in last two decades. To cure most of the diseases broad spectrum antibiotics given. Human society and healthcare is going in wrong direction. One way the pharmaceutical companies are making huge money from it. The other way around is the overuse of these antibiotics, by patients knowing or unknowingly, not only making pathogens adapted but also the normal flora organisms becoming pathogens in coming future? Present article highlight the issues and possible solution of the present scenario.

**Keywords:** Target Site; Methicillin Resistance; *Staphylococcus Aureus*;  $\beta$ -lactamases

### Introduction

Discovery of antibiotics long time ago was one of the bench marks for human mankind. At that point of time, a large number of diseases were at peak and leading cause morbidity and mortality. Gradually time passes and vaccines came into the picture. These vaccines also played a vital role in the cure of certain diseases. If you have a look in big picture, tremendous developments has taken place in pharmaceutical industries. Ride up from first generation of antibiotics to fifth generation of antibiotics and so on, the list is quite long. Every drug has its pros and cons. When the antibiotic prescribed to the patient by consultant. First question arises is that the antibiotic required or not. Then is it required for five days course or not. What are the side effects of that antibiotic? Some of the patients are taking antibiotics without consulting the physician. Some are taking expiry dated antibiotics. The current status is that the balance is disrupted due to drug overuse. The time has come to stop this otherwise will be too late. It is a multifactorial condition. So how to sort out this major problem?

### Drug Resistance Mechanisms

Pathogens are adapting to the drugs quite fast [1-5]. The main reason behind is the overuse of antibiotics. These pathogens developed unique mechanisms of resistance. These mechanisms broadly classified into three main types.

1. Alteration of target site: Alteration in target site leads to lower affinity for the antibiotic.
2. Alteration in uptake or increased exit of antibiotic: Altering entry, for example by decreasing the permeability of the cell wall. Pumping the drug out of the cell (Efflux mechanism).
3. Enzyme production by pathogen leads to drug inactivation Bacteria become resistance to  $\beta$ -lactam antibiotics by three mechanisms:
  - Prevention of the interaction between antibiotic and the target (PBP) penicillin binding proteins,
  - Modification of the binding of the antibiotic to the PBP

- Hydrolysis of the antibiotic by  $\beta$ -lactamases. Genes for drug resistance are also found on plasmids or chromosome.

These genes produce new or altered proteins. Popular example is methicillin resistance *Staphylococcus aureus* (MRSA) present in hospital settings. Nowadays vancomycin resistance in *Staphylococcus aureus* strains is also increasing [1-5].

### Natural Medicine

A large number of medicinal plants/ herbs are there for the cure of diseases. Traditionally, old people used to treat those diseases by using medicinal herbs. The issue is the slow healing process. Nowadays people want immediate cure from all type of diseases. In ayurveda, for all type of ailments specific herb and method of use explained in a descriptive manner.

### Rules and Regulations

According to the current scenario. Global authorities such as WHO (World health organization) and FDA (Food and drug administration) must intervene and come out with guidelines, which fit with realistic situations in developed and developing countries.

### Awareness Programs

Awareness programs to be conducted to underprivileged and poor people regarding the use in developing countries.

### Wise Use

Physician should write the antibiotic when seriously required. The patients also use drugs by strictly following the prescription and not to over use the drug.

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