



A Review on: Antibiotics Resistance

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Abstract

Antibiotics are the essential part medicines now-a-day used in human and animal health .The misuse, over use of antibiotics has raised critical problem of antibiotic resistance which may be dangerous to both animal and humans. Antimicrobial resistance is an important for the public health authorities at global level However, developing countries like India, recent hospital and some community based data showed increase in burden of antimicrobial resistance Antibiotic resistant microorganisms have been known as “nightmare bacteria” that “pose a catastrophic threat” to people in each country in the world. So, the aim of this review paper is to review on antibiotics resistance and provide the method to prevent. Antibiotic resistance is presently the greatest challenge to the effective treatment of infections globally. affects the society economically, socially Resistance adversely affects both clinical and financial therapeutic The effect ranges from failure of therapy to adverse of patient to effects Antibiotics are chemical agent which are obtained from living organism which may be used for killing of bacteria (bactericidal) or prevent the growth of bacteria Thus the harmful effects of antibiotics, the occurrence of resistance and resources of developing the resistance need to be prevented. Hence we review on mechanism of antibiotic resistance, causes of producing resistance, their effect on human and animals, methods to prevent the antibiotic resistance, role of individual in prevention of the resistance and role of pharmacist in the prevention of antibiotic resistance.

Keywords: Antibiotic, Antibiotic resistance, Bactericidal Penicillin

I. INTRODUCTION

Antibiotics are the integral part of medicine in both human and animals The continuous and over use of antibiotics produces resistance in the body for those antibiotics The body of individual fail to respond to the antibiotics Antibiotic resistance occurs when bacteria changes their way that reduces or eliminates the effectiveness of drugs, chemicals or other agent cure or prevent the infection. Resistance is defined as bacteria that are not inhibited by given of antibiotics with normal dosage schedule or fall in the concentration minimum inhibitory concentration ranges Multiple drug resistance is defined as the resistance to two or more drugs or drug classes In India the infectious disease burden is highest in the world and recent report showed the inappropriate and irrational use of antimicrobial agents against these diseases led to increase in development of antibiotic resistance. Health sector in India suffers from public finance which will result in the conditions favorable for development of drug resistance a recent study highlighted the importance of rationalizing antibiotic use to reduce antibiotic resistance in India. Antimicrobial resistance will result in difficulty in control the diseases in the country and ineffective delivery of the health care services. International agencies like World Health Organization highlighted that the antimicrobial resistance as a major public health issue, this is the big challenge to tackle the problem of health care providers. World Health Organization has proposed strategy to prevent antimicrobial resistance with the goal to minimize the morbidity and mortality due to preserve the effectiveness of antimicrobial agents in the treatment and prevention of microbial is important to tackle the biggest problem of world that is antibiotics resistance.

2.HISTORY

The first antibiotic Penicillin (discovered BY Sir Alexander Fleming), had ability to treat the bacterial infections caused by Staphylococcus and Streptococci without harming the host Antibiotic resistance first became challenging after Penicillin used extensively in the 1940s. Today more than 95% Staphylococcus auras isolates globally are resistant of Penicillin Development of antibiotic resistance was first reported in animal models in 1940 and subjectively reported among patients in the 1970s. Drug resistant strains of Mycobacterium tuberculosis are threatening to world public health concern Emergence of antibiotics resistance could be result the use and misuse of antibiotics both in humans and animals As a result it may leads increased mortality, morbidity, costs of treatment, and loss of production in animals. The misuse of antibiotics by health care providers, unskilled practitioners and drug consumers, there is less awareness on the control and prevention of antibiotic resistance. Therefore, the objectives of this review paper are: To review on antibiotic resistance.

3.ANTIBIOTIC RESISTANCE AND ITS MECHANISM OF DEVELOPMENT:

The chemical agent produced by living microorganism’s which prevent the kill the bacteria. Antibiotics substance of bacteriological origin while Antimicrobial are refers to of synthetics origin Antibiotics are used to inhibits infectious diseases in human and animals.

Table no.-Antibiotic resistance and its mechanism of development

Antimicrobial agents	Group	Mode of action
Ampicillins,augmentin	Penicillins	Inhibitor of cell wall synthesis
Ceftriaxone	Cephalosporins	Inhibitor of protein synthesis
Chloramphenicol	Chloramphenicol	Inhibitors of protein synthesis
Erythromycin Azithromycin	Macrolides	Inhibitor of protein synthesis
Gentamycin Streptomycin	Aminoglycosides	Inhibitors of protein synthesis
Nalidixicacid Ciprofloxacin	Quinolones	Inhibitors of DNA synthesis
Sulfamethazine Trimethoprim	Sulfonamides	Competitive inhibitors of folic acid synthesis.

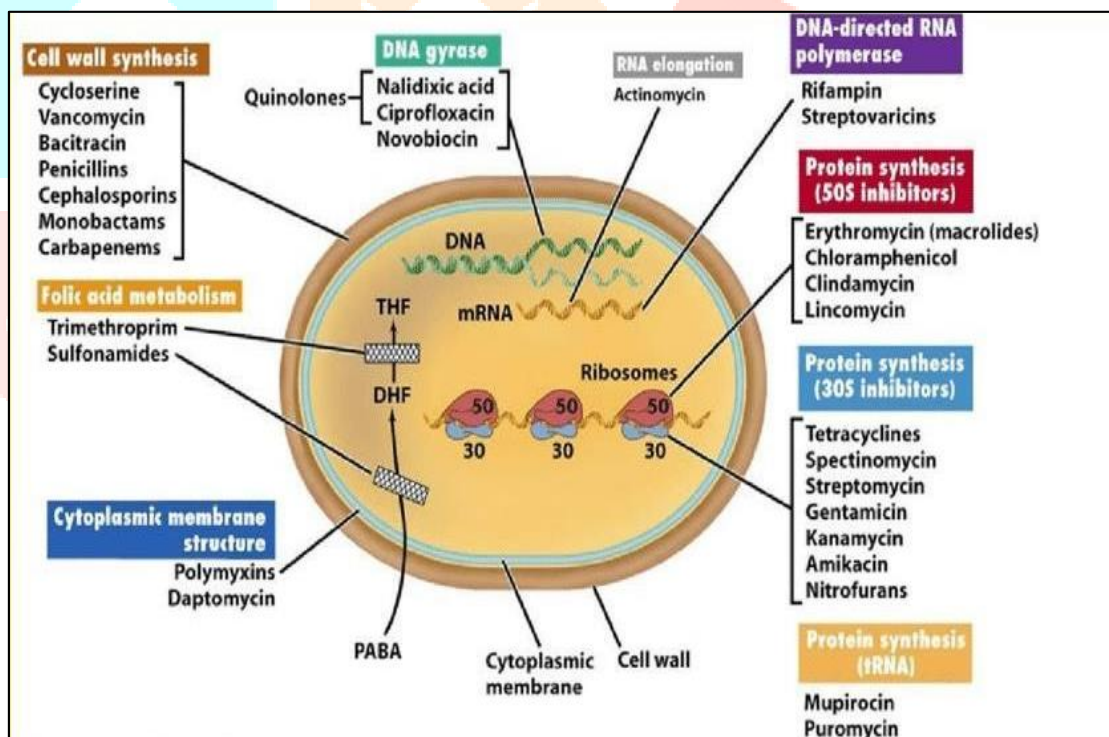


Figure 1: Mechanism of action of antibiotics

3.1 Antibiotic Resistance : Antibiotic resistance is the ability of microorganisms to survive and reproduce the presence of antibiotic dose. There is always population of resistant bacterial cells that multiply at higher concentrations in insufficient antibiotic concentration which kill the subpopulation so that micro-organisms survives in the environment. Resistance to an antibiotic may be an inherent property of the microorganism or acquired resistance result from mutation or from transfer of an extra chromosomal genetic material followed by selection of resistant organisms during therapy.

3.2 Mechanism of antibiotic resistance :

There are various ways in which antibiotic acts by destroy or inning the growth of microorganisms and there are also various mechanism by which the resistance occurs which includes time of exposure to the antibiotics. Resistance genes transferred between organisms via mobile genetic elements (MGEs) is common and clinically more important in multi-drug resistance to the Gram-negative bacteria than resistance arises through the mutation.

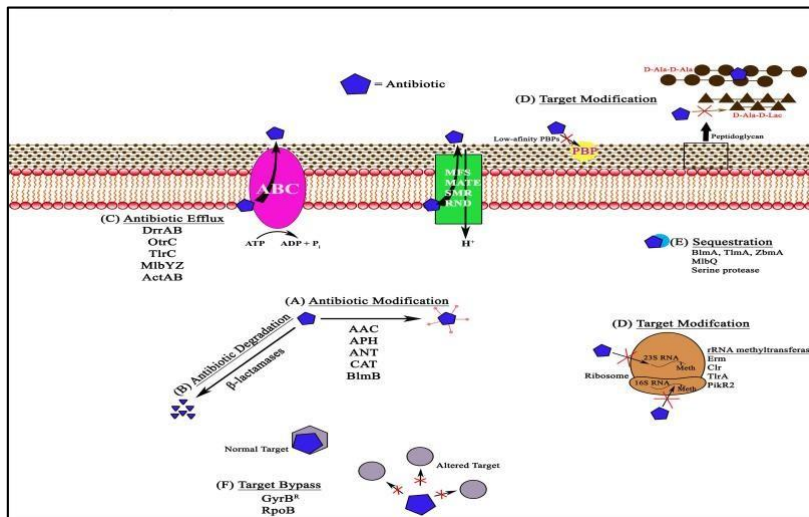


Figure 2: Mechanism of antibiotic resistance

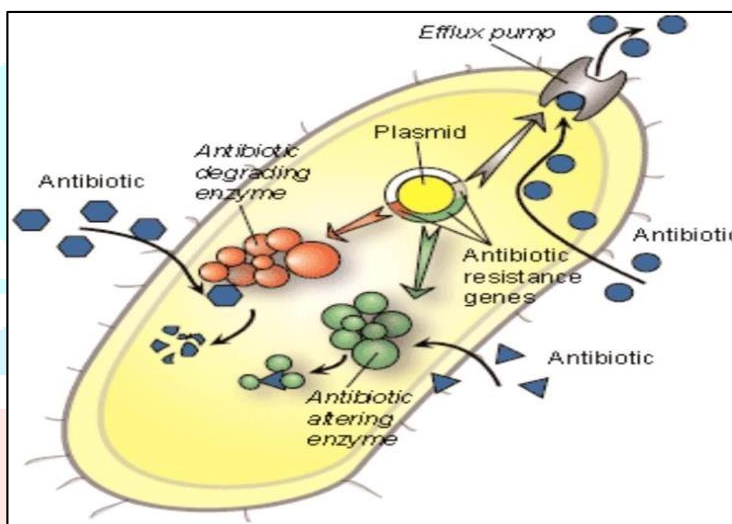


Figure 3: Resistance mechanism of bacteria

The target molecule change slightly the effectiveness of a drug may be reduced For example, tetracycline block the transfer RNA access site by binding to it.

Efflux or transport of antibiotic: Antibiotic inactivation: The enzymes present in the body causes the inactivation of antibiotic. Example: beta lactamase enzyme causes breakdown of Beta ring penicillin which causes inactivation

Reduced membrane permeability: The permeability of cell membrane also affect the entrance of the drug into cell

Modification of target site: If Another mechanism by which microorganisms can become resistant to antibiotics is by utilizing an efflux pump.

4.IMPACT OF RESISTANCE ON PUBLIC HEALTH AND ECONOMY:

Due to the selection pressure caused by antibiotic use, a large pool of resistant genes has been creating and this antibiotic resistance places an increased burden on society which causes high morbidity, mortality and cost. Patient infected with drug resistant organisms are facing to ineffective therapy, longer duration of therapy, need of treatment with broad spectrum more harmful and costly.

4.1 The fetch of treatment is increasing due to

The use second line antibiotics which are more expensive

The fetch of testing and diagnosis

4.2 STRATEGIES TO REDUCE THE IN APPROPRIATE USE OF ANTIBIOTICS:

Providing education and information about the consequences of antibiotic use is not sufficient, the awareness regarding the resistance is essential to overcome this problem.

This problem can overcomes by development of materials to support change,

Implementation of effective techniques for effective overcome

Development of supportive techniques in health organizations

5. CONCLUSION:

The antibiotic resistance has been universally identified as public health and necessary to plan an action to overcome antibiotic resistance should be developed. Improving the quality, not just the quantity of medication will require public and professional education towards rational use of antibiotics. The use, misuse and over use of antibiotics contributed favorable conditions for the emergence of antibiotic resistant bacteria. Factors which contribute to development Sub-therapeutic doses, non-laboratory oriented antibiotic therapy, use of ineffective drugs and poor storage of drugs. These all coupled with rapid spread of resistant bacteria consequently, may lead to increased mortality, morbidity, costs, and loss of production in animals. These all can cause infections with more difficult to treat.

There are various guidelines in both human and veterinary medicines for responsible use of antibiotics, vaccination, competitive exclusions and rational use and the control of antibiotic resistance.

Good diagnostic tests, promotion and evaluation of medical and veterinary practice guidelines, restriction of antibiotic use in food and animals, development of novel antibiotics are required. Patients, providers and health professionals must make a serious commitment to pattern of use of antibiotics. There is need to improve prescription practices and to strengthen research to identify cost-effective strategies for controlling resistance. Based on above conclusion following recommendations can be provided:

- Awareness regarding the rational use of antibiotics should be conducted.
- The use of antibiotics as growth promoters in food and animals should be avoided
- Narrow spectrum antibiotics should be preferred over broad spectrum antibiotics when antibiotic therapy conducted.

Research needs to be developed to reduce the antibiotic resistance.

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