A note on antimicrobial agents.

Gavvala Priyanka*

Department of Biotechnology, Osmania University, Hyderabad, Telangana, India

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Commentary

The discovery of the first selective antimicrobial agent, about 40 years ago, marked an important milestone in the history of medicine and human health. Subsequent development of antibacterial therapies focused primarily on the search for active ingredients that were effective against the microbial species that were less susceptible to the drugs used at the time. These powerful new drugs have been shown to save lives when used in the treatment of some severe infections and reduce the burden of illness when used prophylactically in certain clinical situations. Because Antibiotic 1 is isolated from microorganisms, strains of some microbial species have developed as expected their ability to inactivate or become impermeable to them. These strains developed resistance to these antibiotics. Resistance to synthetic antibacterial agents results from variations normally exhibited by individual microorganisms within the species. Therefore, the result of increased use of antibiotics was an increased prevalence of resistant strains as a result of the selection process. In certain places, such as hospitals, contact between people promoted the spread of these resistant strains.

As a result, researchers sought an effective drug against strains of widespread resistance. The expansion of the range of antibacterial agents, especially antibiotics, has almost always provided an alternative. However, if resistance to the infected organism is not immediately recognized, control of the infection may be delayed, and physicians say that the drug is more toxic, more expensive, and less effective than the drug of choice if the infected organism is not resistant may have to be used.

Finland (1979) and Stollerman (1978) investigated trends in antibiotic resistance patterns of several clinically important pathogens. The prevalence of multiple antibiotic-resistant *Staphylococcus aureus* increased until 1960, after which it decreased in association with changes in phage type. Recently, multidrug-resistant strains of *Streptococcus pneumoniae* have been discovered in many countries. In addition, strains of *Haemophilus influenza* that produce β-lactamase, and occasionally chloramphenicol-resistant strains, and strains of gonorrhoea that produce plasmid-mediated β-lactamase have also been observed. Other changes have been pointed out by Finland (1979).

Differences in resistance to specific human pathogens are often indicated by outbreaks in different geographic areas (Finland 1979), different hospitals, or regions. The Commission has not been able to find an equivalent assessment of trends in antibiotic resistance that may have occurred in major livestock pathogens over the last 30 years.

The most important distinguish between the effect of an antimicrobial agent on a single antibacterial sensitive strain of a microorganism and the effect on a heterogeneous mixture of species or strains. When an antibiotic comes into contact with a growing susceptible microorganism, it usually prevents the microorganism from growing or being killed further. When susceptible strains form part of the entire microbial flora exposed to the drug, compensatory growth of more resistant or insensitive strains generally occurs following elimination of susceptible strains. Such changes in the composition of the intestinal flora may promote infection by pathogens.

Another important aspect in assessing potential effects on human health is the "qualitative" and quantitative changes in resistance to sustained selection pressure exerted by sub therapeutic antibiotics in the diet. Is the possibility, So far, most studies have focused on quantitative change. Qualitative changes may lead to the development of new combinations of resistance genes in combination with genes of other traits.

***Correspondence to:**

Gavvala Priyanka

Department of Biotechnology

Osmania University

Hyderabad

Telangana

India

E-mail: priyankagavvala151315@gmail.com