Review Article

Antibiotic Resistance: Mechanism and Prevention

Fayaz Shafiya*, Singh Shubham[1], Sharma Tanya

* Mewar University,Gangrar,Chittorgarh, (Rajasthan)312901

[1]Deen dayal rustogi college of pharmacy, gurgram.(H.R)-India.

Antimicrobial resistance is a serious problem in global public health, and it affects our ability to prevent and control infections effectively. This occurs when bacteria and other microorganisms find a way to evade the effects of antimicrobial agents, such as those that would normally kill them or prevent them from reproducing. This means that the effectiveness of standard treatments is reduced, and infections become chronic, more likely to be transmitted, and associated with increased morbidity and mortality. Antimicrobial resistance (AMR) is a growing problem, and its main drivers are: Bacteria use a variety of different molecular mechanisms to evade antibiotics. This includes enzymatic degradation, target modifications, increased excretion of antibiotics from the cell, reduced permeability of the bacterial cell membrane, and biofilm development. Bacteria also use a process known as horizontal gene transfer, whereby bacteria can share resistance genes through a process known as conjugation, transformation, and transduction. Antibiotic resistance has critical and far-reaching effects, and its clinical effects include increased costs and length of stay in hospitals, increased mortality, and a great impact from an economic perspective, especially on healthcare and society in general. Antibiotic resistance also has a critical impact from a public health perspective, especially on the success of major medical procedures such as surgery, organ transplants, and chemotherapy.

Keywords

Antibiotic Resistance, Antimicrobial Resistance (AMR), Bacterial Mutation, Drug Resistance Mechanisms, Beta-lactamase, Efflux Pump, Biofilm Formation, Horizontal Gene Transfer, Multidrug Resistance (MDR).

www.pharmaerudition.org Feb. 2026, 15(4), 66-78