
Unlike Lactobacillus strains, the antimicrobial activity of Lactococcus strains has not been well studied [2, 14]. Therefore, there is an urgent need for isolating new antimicrobial and antibiotic-resistant bacteriocins formed by lactic acid bacteria and other antagonist microorganisms, as well as studying their properties and prospects for the pharmaceutical industry [29, 30]. - study the antimicrobial effect of lactic acid bacteria and other antagonist bacteriocin-producing microorganisms on pathogenic and opportunistic microflora that can cause severe infectious diseases in humans. Antibiotic resistance can develop as a result of natural selection through random mutations and/or antibiotic exposure. The choice of antimicrobial therapy is largely empirical and not devoid of toxicity, hypersensitivity, teratogenicity and/or mutagenicity. The emergence of multidrug-resistant bacteria further intensifies the clinical predicament as it directly impacts public health due to diminished potency of current antibiotics. - Abstract: Despite an array of cogent antibiotics, bacterial infections, notably those produced by nosocomial pathogens, still remain a leading factor of morbidity and mortality around the globe. They target the severely ill, hospitalized and immunocompromised patients with incapacitated immune system, who are prone to infections. The choice of antimicrobial therapy is largely empirical and not devoid of toxicity, hypersensitivity, teratogenicity and/or mutagenicity. Combining antibiotics with nanoparticles also restores their ability to destroy bacteria that have acquired resistance to them. Furthermore, nanoparticles tagged with antibiotics have been shown to increase the concentration of antibiotics at the site of bacterium-antibiotic interaction, and to facilitate binding of antibiotics to bacteria. Likewise, combining nanoparticles with antimicrobial peptides and essential oils generates genuine synergy against bacterial resistance. In this article, we aim to summarize recent studies on interactions between nanoparticles and antibiotics, as well as to discuss the potential clinical applications of these nanomaterials. The book, which is in fact based on lecture courses given by us to undergraduates at Liverpool and Manchester Universities, is therefore intended as an introduction to the biochemistry of antimicrobial action for advanced students in many disciplines. We hope that it may also be useful to established scientists who are new to this area of research. The book is concerned with a discussion of medically important antimicrobial compounds and also a number of agents that, although having no medical uses, have proved invaluable as research tools in biochemistry. Our aim has been to present the available information in a clear and concise manner. The book is divided into two main parts: Part I covers the general principles and mechanisms of action of antibiotics and antimicrobial agents, while Part II discusses specific classes of antibiotics and their applications. The book is intended for students in medical and veterinary science, as well as for researchers in the field of antimicrobial chemotherapy.