

## Antimicrobial Drug Resistance Mechanisms Of Drug Resistance Vol 1 Clinical And Epidemiological Aspects Vol 2 Infectious Disease

Antimicrobial Resistance in Agriculture: Perspective, Policy and Mitigation is a valuable industrial resource that addresses complex, multi-factorial topics regarding farm, wild, companion animals, fish, and how the environment plays an important role in amplification and transmission of resistant bugs into the human food chain. Information of phenotypical and genotypical properties of each bacterial genus associated with antimicrobial resistance, transmission dynamics from different reservoirs (food animals, poultry, fishes) and control measures with alternative therapy, such as phytobiotics and nanomaterials are provided. Researchers, scientists and practitioners will find this an essential resource on the judicious use of antibiotics in animals and humans. Explores all the genera of livestock and fish originated pathogenic bacteria associated with antimicrobial resistance Presents cutting-edge research on epigenetics, nanotechnology and intervention technologies Discusses transmission dynamics of resistance gene pools from different reservoirs, including food animals, poultry, fishes and the environment

This book gives a comprehensive overview of recent trends in infectious diseases, as well as general concepts of infections, immunopathology, diagnosis, treatment, epidemiology and etiology to current clinical recommendations in management of infectious diseases, highlighting the ongoing issues, recent advances, with future directions in diagnostic approaches and therapeutic strategies. The book focuses on various aspects and properties of infectious diseases whose deep understanding is very important for safeguarding human race from more loss of resources and economies due to pathogens. To prevent bacterial adherence, invasion and infection, antimicrobials such as antibiotics are being used and vastly researched nowadays. Several factors such as natural selection, mutations in genes, the presence of efflux pumps, impermeability of the cell wall, structural changes in enzymes and receptors, biofilm formation, and quorum sensing cause microorganisms to develop resistance against antimicrobials. Isolates that synthesize extended spectrum- $\beta$ -lactamases (ESBL), induced  $\beta$ -lactamases (IBL), carbapenamases, metallo- $\beta$ -lactamases (MBLs), and New Delhi metallo- $\beta$ -lactamases (NDM) have emerged. Determining virulence factors such as biofilms and the level of antimicrobial activities of antimicrobial agents alone and in combination with appropriate doses against microorganisms is very important for the diagnosis, inhibition, and prevention of microbial infection. The goal of this book is to provide information on all these topics.

The enormous genetic flexibility of bacteria jeopardizes the usefulness of currently available antibiotics, and requires new approaches to antibiotic discovery and development. Antimicrobial resistance can be acquired in a short time frame, both by genetic mutation and by direct transfer of resistance genes across genus and species boundaries. Understanding mechanisms of resistance is crucial to the future of antimicrobial therapy. Extensively revised, with contributions from international leaders in their fields, Bacterial Resistance to Antimicrobials, Second Edition blends scientific and practical approaches to the social, economic, and medical issues related to this growing problem. The book begins with a history of antimicrobial agents and bacterial resistance, and outlines the forces that contributed to the abuse of antibiotics and precipitated the current crisis. It goes on to describe what is known about the ecology of antibiotic resistant bacteria and reveals the inadequacies in our understanding. Emphasizing public health aspects, the editors stress that significant progress will be made only by addressing the problem only as a public, worldwide, problem. Chapters on resistance mechanisms describe the latest findings on what makes different groups of bacteria susceptible or resistant to antibiotics. They reveal the staggering diversity of bacteria and the need for a foundational understanding that will stimulate development of antibiotics capable of avoiding resistance mechanisms. Examining the success and limitations of complementary approaches, such as combining  $\beta$ -lactam antibiotics with  $\beta$ -lactamase inhibitors, the book brings together information on resistance mechanisms in different groups of bacteria to help future efforts to more effectively develop and deploy antimicrobial therapies.

The need for novel antibiotics is greater now than perhaps anytime since the pre-antibiotic era. Indeed, the recent collapse of many pharmaceutical antibacterial groups, combined with the emergence of hypervirulent and pan-antibiotic-resistant bacteria has severely compromised infection treatment options and led to dramatic increases in the incidence and severity of bacterial infections. This collection of reviews and laboratory protocols gives the reader an introduction to the causes of antibiotic resistance, the bacterial strains that pose the largest danger to humans (i.e., streptococci, pneumococci and enterococci) and the antimicrobial agents used to combat infections with these organisms. Some new avenues that are being investigated for antibiotic development are also discussed. Such developments include the discovery of agents that inhibit bacterial RNA degradation, the bacterial ribosome, and structure-based approaches to antibiotic drug discovery. Two laboratory protocols are provided to illustrate different strategies for discovering new antibiotics. One is a bacterial growth inhibition assay to identify inhibitors of bacterial growth that specifically target conditionally essential enzymes in the pathway of interest. The other protocol is used to identify inhibitors of bacterial cell-to-cell signaling. This e-book — a curated collection from eLS, WIREs, and Current Protocols — offers a fantastic introduction to the field of antibiotics and antibiotic resistance for students or interdisciplinary collaborators. Table of Contents: Introduction Antibiotics and the Evolution of Antibiotic Resistance eLS Jose L Martinez, Fernando Baquero Antimicrobials Against Streptococci, Pneumococci and Enterococci eLS Susan Donabedian, Adenike Shoyinka Techniques & Applications RNA decay: a novel therapeutic target in bacteria WIREs RNA Tess M. Eidem, Christelle M. Roux, Paul M. Dunman Antibiotics that target protein synthesis WIREs RNA Lisa S. McCoy, Yun Xie, Yitzhak Tor Methods High-Throughput Assessment of Bacterial Growth Inhibition by Optical Density Measurements Current Protocols Chemical Biology Jennifer Campbell Structure-Based Approaches to Antibiotic Drug Discovery Current Protocols Microbiology George Nicola, Ruben Abagyan Novel Approaches to Bacterial Infection Therapy by Interfering with Cell-to-Cell Signaling Current Protocols Microbiology David A. Rasko, Vanessa Sperandio

This book, written by leading international experts, provides a comprehensive, current examination of transport-mediated antimicrobial resistance. As a particularly powerful mechanism of multidrug resistance, an in-depth examination of efflux pumps is conducted with bacteria of major public health concern including Enterobacteriaceae, Acinetobacter, Neisseria, Pseudomonas, staphylococci, and mycobacteria. The content spans structural biochemistry and transport mechanisms of the major transporter families and considers individual drug efflux systems across various Gram-positive and Gram-negative species. Genomic analysis of efflux pump distribution and their contribution to clinically-relevant resistance are a major focus of the text. Moreover, interplay between drug efflux pumps and other key resistance mechanisms such as intrinsic drug impermeability, inactivation, and target alterations are discussed, as well as their molecular expression-based regulation and physiological functions beyond resistance, involving biofilms, stress response, and pathogenicity. Finally, strategies are addressed to target this drug resistance mechanism with novel antimicrobials or drug inhibitor adjuvants.

Antibiotic resistance is neither a surprising nor a new phenomenon. It is an increasingly worrisome situation, however, because resistance is growing and accelerating while the world's tools for combating it decrease in power and number. In addition, the cost of the problem—especially of multidrug resistance—in terms of money, mortality, and disability are also rising. This book summarizes a workshop on antimicrobial resistance held by the Forum on Emerging Infections. The goal of the Forum on Emerging Infections is to provide an opportunity for representatives of academia, industry, government, and professional and interest groups to examine and discuss scientific and policy dilemmas of common interest that are specifically related to research on and the prevention, detection, and management of emerging infections. Organized as a topic-by-topic synthesis of presentations and exchanges during the workshop, the book highlights lessons learned, delineates a range of pivotal issues and the problems

they raise, and proposes some simplified ideas about possible responses.

Antibiotics and antibiotic resistance have most commonly been viewed in the context of human use and effects. However, both have co-existed in nature for millennia. Recently the roles of antibiotics and antibiotic resistance genes have started to be discussed in terms of functions other than bacterial inhibition and protection. This special topic will focus on both the traditional role of antibiotics as warfare mechanisms and their alternative roles and uses within nature such as antibiotics as signals or communication mechanisms, antibiotic selection at low concentrations, the non-specific role of resistance mechanisms in nature: e.g. efflux pumps, evolution of antibiotic resistance and the role of persisters in natural antibiotic resistance.

Drug Discovery Targeting Drug-Resistant Bacteria explores the status and possible future of developments in fighting drug-resistant bacteria. The book covers the majority of microbial diseases and the drugs targeting them. In addition, it discusses the potential targeting strategies and innovative approaches to address drug resistance. It brings together academic and industrial experts working on discovering and developing drugs targeting drug-resistant (DR) bacterial pathogens. New drugs active against drug-resistant pathogens are discussed, along with new strategies being used to discover molecules acting via new modes of action. In addition, alternative therapies such as peptides and phages are included. Pharmaceutical scientists, microbiologists, medical professionals, pathologists, researchers in the field of drug discovery, infectious diseases and microbial drug discovery both in academia and in industrial settings will find this book helpful. Written by scientists with extensive industrial experience in drug discovery Provides a balanced view of the field, including its challenges and future directions Includes a special chapter on the identification and development of drugs against pathogens which exhibit the potential to be used as weapons of war

Most of the antibiotics now in use have been discovered more or less by chance, and their mechanisms of action have only been elucidated after their discovery. To meet the medical need for next-generation antibiotics, a more rational approach to antibiotic development is clearly needed. Opening with a general introduction about antimicrobial drugs, their targets and the problem of antibiotic resistance, this reference systematically covers currently known antibiotic classes, their molecular mechanisms and the targets on which they act. Novel targets such as cell signaling networks, riboswitches and bacterial chaperones are covered here, alongside the latest information on the molecular mechanisms of current blockbuster antibiotics. With its broad overview of current and future antibacterial drug development, this unique reference is essential reading for anyone involved in the development and therapeutic application of novel antibiotics. Now in paperback, the second edition of the Oxford Textbook of Critical Care addresses all aspects of adult intensive care management. Taking a unique problem-orientated approach, this is a key resource for clinical issues in the intensive care unit.

The two volumes included in Antimicrobial Drug Resistance, Second Edition is an updated, comprehensive and multidisciplinary reference covering the area of antimicrobial drug resistance in bacteria, fungi, viruses, and parasites from basic science, clinical, and epidemiological perspectives. This newly revised compendium reviews the most current research and development on drug resistance while still providing the information in the accessible format of the first edition. The first volume, Antimicrobial Drug Resistance: Mechanisms of Drug Resistance, is dedicated to the biological basis of drug resistance and effective avenues for drug development. With the emergence of more drug-resistant organisms, the approach to dealing with the drug resistance problem must include the research of different aspects of the mechanisms of bacterial resistance and the dissemination of resistance genes as well as research utilizing new genomic information. These approaches will permit the design of novel strategies to develop new antibiotics and preserve the effectiveness of those currently available. The second volume, Antimicrobial Drug Resistance: Clinical and Epidemiological Aspects, is devoted to the clinical aspects of drug resistance. Although there is evidence that restricted use of a specific antibiotic can be followed by a decrease in drug resistance to that agent, drug resistance control is not easily achieved. Thus, the infectious diseases physician requires input from the clinical microbiologist, antimicrobial stewardship personnel, and infection control specialist to make informed choices for the effective management of various strains of drug-resistant pathogens in individual patients. This 2-volume set is an important reference for students in microbiology, infectious diseases physicians, medical students, basic scientists, drug development researchers, microbiologists, epidemiologists, and public health practitioners.

This Open Access volume provides in-depth analysis of the wide range of ethical issues associated with drug-resistant infectious diseases. Antimicrobial resistance (AMR) is widely recognized to be one of the greatest threats to global public health in coming decades; and it has thus become a major topic of discussion among leading bioethicists and scholars from related disciplines including economics, epidemiology, law, and political theory. Topics covered in this volume include responsible use of antimicrobials; control of multi-resistant hospital-acquired infections; privacy and data collection; antibiotic use in childhood and at the end of life; agricultural and veterinary sources of resistance; resistant HIV, tuberculosis, and malaria; mandatory treatment; and trade-offs between current and future generations. As the first book focused on ethical issues associated with drug resistance, it makes a timely contribution to debates regarding practice and policy that are of crucial importance to global public health in the 21st century.

This book is a compilation of past and recent knowledge in the field of emerging drug resistance. The book covers major aspects of drug resistance in bacteria, fungi, malaria, and cancer. Human survival on earth is constantly threatened by disease and syndrome. From the early days, the aim of research in medicine was to find therapeutic agents that can improve the quality of human life. Although humans are dependent on natural compounds from early days their dependence of drugs increased excessively in last century. The advances in chemistry and biology have helped researchers to identify the drugs that have improved treatment of many diseases. The primary factor for treatment of these diseases is dependent on the efficacy of drugs available. The development of resistance to these drugs is one of the major hindrances. Although there are number of books available on this topic, "drug resistance" biology across kingdoms has never been discussed in a coherent way.

This book is a thorough, practical review of the challenges facing clinicians treating skin microbes and how to combat these therapeutic dilemmas. It expresses the critical public health concern of antimicrobial resistance and shows how microorganisms are developing the ability to halt the progress of antimicrobials like antibiotics, antivirals, and antifungals. Chapters are grouped together in five sections for ease of use. The first three sections of the book convey foundational information on the mechanisms of antibiotics, antivirals, and antifungals resistance, as well as the implications of lack of vaccination. The fourth section then turns to the specifics of drug resistance for protozoan and helminth infections focusing primarily on initial and

subsequent resistance to treatment. The book closes with a discussion on the potential solutions of innovative therapy including new delivery mechanisms, broad-spectrum antibiotics, phytocompounds, and biofilms. Chapters feature magnified, microscopic photos for identifying structures as they appear on the skin. Part of the Updates in Clinical Dermatology series, *Overcoming Antimicrobial Resistance of the Skin* is an important resource relevant during the COVID-19 pandemic, and is written for all medical healthcare professionals.

The resistance topic is timely given current events. The emergence of mysterious new diseases, such as SARS, and the looming threat of bioterrorist attacks remind us of how vulnerable we can be to infectious agents. With advances in medical technologies, we have tamed many former microbial foes, yet with few new antimicrobial agents and vaccines in the pipeline, and rapidly increasing drug resistance among infectious microbes, we teeter on the brink of losing the upperhand in our ongoing struggle against these foes, old and new. *The Resistance Phenomenon in Microbes and Infectious Disease Vectors* examines our understanding of the relationships among microbes, disease vectors, and human hosts, and explores possible new strategies for meeting the challenge of resistance.

This first edition of *Antimicrobial Drug Resistance* grew out of a desire by the editors and authors to have a comprehensive resource of information on antimicrobial drug resistance that encompassed the current information available for bacteria, fungi, protozoa and viruses. We believe that this information will be of value to clinicians, epidemiologists, microbiologists, virologists, parasitologists, public health authorities, medical students and fellows in training. We have endeavored to provide this information in a style which would be accessible to the broad community of persons who are concerned with the impact of drug resistance in our clinics and across the broader global communities. *Antimicrobial Drug Resistance* is divided into Volume 1 which has sections covering a general overview of drug resistance and mechanisms of drug resistance first for classes of drugs and then by individual microbial agents including bacteria, fungi, protozoa and viruses. Volume 2 addresses clinical, epidemiologic and public health aspects of drug resistance along with an overview of the conduct and interpretation of specific drug resistance assays. Together, these two volumes offer a comprehensive source of information on drug resistance issues by the experts in each topic.

Antimicrobial resistance (AMR) is a biological mechanism whereby a microorganism evolves over time to develop the ability to become resistant to antimicrobial therapies such as antibiotics. The drivers of and potential solutions to AMR are complex, often spanning multiple sectors. The internationally recognized response to AMR advocates for a 'One Health' approach, which requires policies to be developed and implemented across human, animal, and environmental health.

*Antimicrobial Resistance and Food Safety: Methods and Techniques* introduces antimicrobial resistant food-borne pathogens, their surveillance and epidemiology, emerging resistance and resistant pathogens. This analysis is followed by a systematic presentation of currently applied methodology and technology, including advanced technologies for detection, intervention, and information technologies. This reference can be used as a practical guide for scientists, food engineers, and regulatory personnel as well as students in food safety, food microbiology, or food science. Includes analysis of all major pathogens of concern Provides many case studies and examples of fundamental research findings Presents recent advances in methodologies and analytical software Demonstrates risk assessment using information technologies in foodborne pathogens

*Antibiotic Resistance: Mechanisms and New Antimicrobial Approaches* discusses up-to-date knowledge in mechanisms of antibiotic resistance and all recent advances in fighting microbial resistance such as the applications of nanotechnology, plant products, bacteriophages, marine products, algae, insect-derived products, and other alternative methods that can be applied to fight bacterial infections.

Understanding fundamental mechanisms of antibiotic resistance is a key step in the discovery of effective methods to cope with resistance. This book also discusses methods used to fight antibiotic-resistant infection based on a deep understanding of the mechanisms involved in the development of the resistance. Discusses methods used to fight antibiotic-resistant infection based on a deep understanding of mechanisms involved in the development of the resistance Provides information on modern methods used to fight antibiotic resistance Covers a wide range of alternative methods to fight bacterial resistance, offering the most complete information available Discusses both newly emerging trends and traditionally applied methods to fight antibiotic resistant infections in light of recent scientific developments Offers the most up-to-date information in fighting antibiotic resistance Includes involvement of contributors all across the world, presenting questions of interest to readers of both developed and developing countries *Antimicrobial Resistance in Bacteria of Animal Origin* comprehensively examines the current research on antimicrobial resistance in the main veterinary and zoonotic pathogens, including resistance to disinfectants and metals used in agriculture.

This book summarizes the emerging trends in the field of antibiotic resistance of various gram-negative and gram-positive bacterial species. The ability of different species of bacteria to resist the antimicrobial agent has become a global problem. As such, the book provides a comprehensive overview of the advances in our understanding of the origin and mechanism of resistance, discusses the modern concept of the biochemical and genetic basis of antibacterial resistance and highlights the clinical and economic implications of the increased prevalence of antimicrobial resistant pathogens and their ecotoxic effects. It also reviews various strategies to curtail the emergence and examines a number of innovative therapeutic approaches, such as CRISPR, phage therapy, nanoparticles and natural antimicrobials, to combat the spread of resistance.

*Antimicrobial Drug Resistance Mechanisms of Drug Resistance, Volume 1* Springer

*Technological Challenges in Antibiotic Discovery and Development* is the summary of a workshop convened by the Chemical Sciences Roundtable in September 2013 to explore the current state of antibiotic discovery and examine the technology available to facilitate development. Through formal presentations and panel discussions, participants from academia, industry, federal research agencies discussed the technical challenges present and the incentives and disincentives industry faces in antibiotic development, and identified novel approaches to antibiotic discovery. Antibiotic resistance is a serious and growing problem in modern medicine and it is emerging as a pre-eminent public health threat. Each year in the United States alone, at least two million acquire serious infections with bacteria that are resistant to one or more antibiotics, and at least 23,000 people die annually as a direct result of these antibiotic-resistant infections. In addition to the toll on human life, antibiotic-resistant infections add considerable and avoidable costs to the already overburdened U.S. health care system. This report explores the challenges in overcoming antibiotic resistance, screening for new antibiotics, and delivering them to the sites of infection in the body. The report also discusses a path forward to develop the next generation of potent antimicrobial compounds capable of once again tilting the battle against microbial pathogens in favor of humans. *Technological Challenges in Antibiotic Discovery and Development* gives a broad view of the landscape of antibiotic development and the technological challenges and barriers to be overcome.

Summary report published as technical document with reference number: WHO/HSE/PED/AIP/2014.2.

Tackling the realities of the antimicrobial resistance (AMR) situation today is no longer uncommon. Many battles have been fought in the past since the discovery of antibiotics between man and microbes. In the tussle of new antibiotic modifications, the transmission of resistant genes, both vertically and horizontally unveils yet another resistant attribute for the microbe, for it only

to be faced with a more powerful, wide spectrum antibiotic; the cycle continues-and the winner is yet to be known. This book aims to provide some insight into various molecular mechanisms, agricultural mitigation methods, and the One Health applications to maybe, just maybe, tip the scales towards us.

Antimicrobial resistance develops when micro-organisms evolve different mechanisms to protect themselves from the effects of antimicrobials. Such micro-organisms that develop antimicrobial resistance are difficult to treat and require higher doses or alternative medications that are more toxic to them. When micro-organisms are resistant to multiple antimicrobials, then, they are called multidrug resistant. All classes of microbes, i.e. bacteria, fungi, protozoa, viruses, can develop resistance. The bacteria that are resistant to a wide range of antibiotics are known as extensively drug resistant or superbugs. Antibiotic resistance can be spontaneous as a result of random mutations or can be caused by extensive use of anti-microbials which encourage the selection of mutants that are resistant to them. This book is a valuable compilation of topics, ranging from the basic to the most complex advancements in the field of antibiotic resistance. It covers in detail some existent theories and innovative concepts revolving around antibiotic resistance. This book is a vital tool for all researching and studying this field.

AN AUTHORITATIVE SURVEY OF CURRENT RESEARCH INTO CLINICALLY USEFUL CONVENTIONAL AND NONCONVENTIONAL ANTIBIOTIC THERAPEUTICS Pharmaceutically-active antibiotics revolutionized the treatment of infectious diseases, leading to decreased mortality and increased life expectancy. However, recent years have seen an alarming rise in the number and frequency of antibiotic-resistant "Superbugs." The Centers for Disease Control and Prevention (CDC) estimates that over two million antibiotic-resistant infections occur in the United States annually, resulting in approximately 23,000 deaths. Despite the danger to public health, a minimal number of new antibiotic drugs are currently in development or in clinical trials by major pharmaceutical companies. To prevent reverting back to the pre-antibiotic era—when diseases caused by parasites or infections were virtually untreatable and frequently resulted in death—new and innovative approaches are needed to combat the increasing resistance of pathogenic bacteria to antibiotics. *Bacterial Resistance to Antibiotics – From Molecules to Man* examines the current state and future direction of research into developing clinically-useful next-generation novel antibiotics. An internationally-recognized team of experts cover topics including glycopeptide antibiotic resistance, anti-tuberculosis agents, anti-virulence therapies, tetracyclines, the molecular and structural determinants of resistance, and more. Presents a multidisciplinary approach for the optimization of novel antibiotics for maximum potency, minimal toxicity, and appropriated degradability Highlights critical aspects that may relieve the problematic medical situation of antibiotic resistance Includes an overview of the genetic and molecular mechanisms of antibiotic resistance Addresses contemporary issues of global public health and longevity Includes full references, author remarks, and color illustrations, graphs, and charts *Bacterial Resistance to Antibiotics – From Molecules to Man* is a valuable source of up-to-date information for medical practitioners, researchers, academics, and professionals in public health, pharmaceuticals, microbiology, and related fields.

Dr. Joshua Lederberg - scientist, Nobel laureate, visionary thinker, and friend of the Forum on Microbial Threats - died on February 2, 2008. It was in his honor that the Institute of Medicine's Forum on Microbial Threats convened a public workshop on May 20-21, 2008, to examine Dr. Lederberg's scientific and policy contributions to the marketplace of ideas in the life sciences, medicine, and public policy. The resulting workshop summary, *Microbial Evolution and Co-Adaptation*, demonstrates the extent to which conceptual and technological developments have, within a few short years, advanced our collective understanding of the microbiome, microbial genetics, microbial communities, and microbe-host-environment interactions.

Avoiding infection has always been expensive. Some human populations escaped tropical infections by migrating into cold climates but then had to procure fuel, warm clothing, durable housing, and crops from a short growing season. Waterborne infections were averted by owning your own well or supporting a community reservoir. Everyone got vaccines in rich countries, while people in others got them later if at all. Antimicrobial agents seemed at first to be an exception. They did not need to be delivered through a cold chain and to everyone, as vaccines did. They had to be given only to infected patients and often then as relatively cheap injectables or pills off a shelf for only a few days to get astonishing cures. Antimicrobials not only were better than most other innovations but also reached more of the world's people sooner. The problem appeared later. After each new antimicrobial became widely used, genes expressing resistance to it began to emerge and spread through bacterial populations. Patients infected with bacteria expressing such resistance genes then failed treatment and remained infected or died. Growing resistance to antimicrobial agents began to take away more and more of the cures that the agents had brought.

Antibiotics represent one of the most successful forms of therapy in medicine. But the efficiency of antibiotics is compromised by the growing number of antibiotic-resistant pathogens.

Antibiotic resistance, which is implicated in elevated morbidity and mortality rates as well as in the increased treatment costs, is considered to be one of the major global public health threats ([www.who.int/drugresistance/en/](http://www.who.int/drugresistance/en/)) and the magnitude of the problem recently prompted a number of international and national bodies to take actions to protect the public

([http://ec.europa.eu/dgs/health\\_consumer/docs/road-map-amr\\_en.pdf](http://ec.europa.eu/dgs/health_consumer/docs/road-map-amr_en.pdf); [http://www.who.int/drugresistance/amr\\_global\\_action\\_plan/en/](http://www.who.int/drugresistance/amr_global_action_plan/en/);

[http://www.whitehouse.gov/sites/default/files/docs/carb\\_national\\_strategy.pdf](http://www.whitehouse.gov/sites/default/files/docs/carb_national_strategy.pdf)). Understanding the mechanisms by which bacteria successfully defend themselves against the antibiotic assault represent the main theme of this eBook published as a Research Topic in *Frontiers in Microbiology*, section of Antimicrobials, Resistance, and Chemotherapy. The articles in the eBook update the reader on various aspects and mechanisms of antibiotic resistance. A better understanding of these mechanisms should facilitate the development of means to potentiate the efficacy and increase the lifespan of antibiotics while minimizing the emergence of antibiotic resistance among pathogens.

This book presents a thorough and authoritative overview of the multifaceted field of antibiotic science – offering guidance to translate research into tools for prevention, diagnosis, and treatment of infectious diseases. Provides readers with knowledge about the broad field of drug resistance Offers guidance to translate research into tools for prevention, diagnosis, and treatment of infectious diseases Links strategies to analyze microbes to the development of new drugs, socioeconomic impacts to therapeutic strategies, and public policies to antibiotic-resistance-prevention strategies

The genus *Salmonella* comprises an important number of bacterial species able to colonize and infect numerous animal species and humans. Although more than a hundred years passed since its discovery, *Salmonella* still represents a redoubtable and successful microorganism, difficult to deal with. Whether we discuss about typhoid fever or food poisoning, the public health and financial consequences are practically incalculable. The costs attributable to *Salmonella* contamination of meat, eggs, and vegetables are also very high worldwide. Antimicrobial resistance in *Salmonella* isolates is an emerging threat

