Antibiotics Sensitivity Profile Towards Staphylococcus

Methicillin-resistant Staphylococcus aureus (MRSA) is a pandemic human pathogen accounting for most of health-care associated infections throughout the world. However, in recent years, a more virulent strain of MRSA has emerged in the community defined as community-associated MRSA (CA-MRSA). These emerging strains of CA-MRSA are described to have different antibiotic susceptibility profiles, possess the SCCmec type IV element and usually produce the Panton-Valentine leukocidin (PVL) toxin. The majority of these CA-MRSA strains are associated with skin and soft tissue infections and necrotising pneumonia, with a 34% mortality rate. Identification and characterisation of MRSA isolates is mainly performed using phenotypic methods, which are time consuming. Little information exists on the prevalence and characterics of MRSA isolates including antibiotic susceptibility patterns, PVL-producing CAMRSA strains, the SCCmec types and genotypes that might be circulating in the Steve Biko Academic Hospital. Identification and characterisation of MRSA isolates based on these criteria are important in controlling possible outbreaks in the clinical setting. In this study, 97 clinical MRSA isolates from the Steve Biko Academic Hospital, South Africa were collected between April 2006 to February 2007. These isolates were analysed and characterised using multiplex PCR (M-PCR), real-time PCR as well as staphylococcal protein A (spa) and hyper-variable region (HVR) typing. The aim of this study was to determine the antibiotic profiles, prevalence of MRSA isolates, the SCCmec types and the genotypes. Antibiotic resistance determination was performed using the disk diffusion susceptibility method as guided by the CLSI. Six distinct antibiotic profiles were identified with a total of 73%, 71%, 70% and 7% of MRSA isolates resistant to clindamycin, erythromycin, gentamicin and fusidic acid, respectively. The presence of Staphylococcus aureus specific 16S rRNA, the meca and PVL genes was confirmed using a modified M-PCR assay. A total of 4% of the MRSA isolates possessed the PVL gene. Real-time PCR analysis also showed a 100% prevalence of the PVL gene in the same 4% MRSA isolates confirming the results of the first M-PCR assay. The second M-PCR was used to determine the SCCmec type prevalence and to distinguish between health-care associated MRSA (HA-MRSA) and CA-MRSA. SCCmec typing showed 67% of the isolates belonged to SCCmec type II and 14.4% SCCmec type III, both types belonging to HA-MRSA. A total of 4% of the MRSA isolates were CA-MRSA belonging to SCCmec type IVd. Genotyping results showed three distinct spa clusters whilst HVR showed six distinct clusters. Molecular-based assays proved to be useful tools to determine the prevalence and monitoring of MRSA outbreaks as well as to identify the SCCmec types, subtypes and genotypes of MRSA strains that might be circulating in the hospital. The determination of the different antibiotic profiles of MRSA can contribute to the monitoring of the antibiotic resistant profile trends in the Steve Biko Academic Hospital, thus assisting with the correct implementation of antibiotic regimens for suspected MRSA infections. In an endeavour to assess the dissemination of MRSA strains especially PVL expressing CA-MRSA strains, it is of paramount importance to continuously monitor the emergence of these strains in clinical settings. Copyright.

Clinical microbiologists are engaged in the field of diagnostic microbiology to determine whether pathogenic microorganisms are present in clinical specimens collected from patients with suspected infections. If microorganisms are found, these are identified and susceptibility profiles, when indicated, are determined. During the past two decades, technical advances in the field of diagnostic microbiology have made constant and enormous progress in various areas, including bacteriology, mycology, mycobacteriology, parasitology, and virology. The diagnostic capabilities of modern clinical microbiology laboratories have improved rapidly and have expanded greatly due to a technological revolution in molecular aspects of microbiology and immunology. In particular, rapid techniques for nucleic acid amplification and characterization combined with automation and user-friendly software have significantly broadened the diagnostic arsenal for the clinical microbiologist. The conventional diagnostic model for clinical microbiology has been labor-intensive and frequently required days to weeks before test results were available. Moreover, due to the complexity and length of such testing, this service was usually directed at the hospitalized patient population. The physical structure of laboratories, staffing patterns, workflow, and turnaround time all have been influenced profoundly by these technical advances. Such changes will undoubtedly continue and lead the field of diagnostic microbiology inevitably to a truly modern discipline. Advanced Techniques in Diagnostic Microbiology provides a comprehensive and up-to-date description of advanced methods that have evolved for the diagnosis of infectious diseases in the routine clinical microbiology laboratory. The book is divided into two sections. The first presents section covers the principles and characteristics of techniques ranging from rapid antigen testing, to advanced antibody detection, to in vitro nucleic acid amplification techniques, and to nucleic acid microarray and mass spectrometry. Sufficient space is assigned to cover different nucleic acid amplification formats that are currently being used widely in the diagnostic microbiology field. Within each technique, examples are given regarding its application in the diagnostic field. Commercial product information, if available, is introduced with commentary in each chapter. If several test formats are available for a technique, objective comparisons are given to illustrate the contrasts of their advantages and disadvantages. The second applications section provides practical examples of application of these advanced techniques in several "hot" spots in the diagnostic field. A diverse team of authors presents authoritative and comprehensive information on sequence-based bacterial identification, blood and blood product screening, molecular diagnosis of sexually transmitted diseases, advances in mycobacterial diagnosis, novel and rapid emerging microorganism detection and genotyping, and future directions in the diagnostic microbiology field. We hope our readers like this technique-based approach and your feedback is highly appreciated. We want to thank the authors who devoted their time and efforts to produce their chapters. We also thank the staff at Springer Press, especially Melissa Ramondetta, who initiated the whole project. Finally, we greatly appreciate the constant encouragement of our family members through this long effort. Without their unwavering faith and full support, we would never have had the courage to commence this project. A practical and well-illustrated guide to microbiological, haematological, and blood transfusion techniques. The microbiology chapter focuses on common tropical infections. The haematology chapter deals with the investigation of anaemia and haemoglobinopathies. The blood transfusion chapter provides guidelines on the use of blood and blood substitutes, selection of donors and collection. The Fifth Edition of Antimicrobial Therapy in Veterinary Medicine, the most comprehensive reference available on veterinary antimicrobial drug use, has been thoroughly revised and updated to reflect the rapid advances in the field of antimicrobial therapy. Encompassing all aspects of antimicrobial drug use in animals, the book provides detailed coverage of virtually all types of antimicrobials relevant to animal health. Now with a new chapter on antimicrobial therapy in zoo animals, Antimicrobial Therapy in Veterinary Medicine offers a wealth of invaluable information for appropriately prescribing antimicrobial therapies and shaping public policy. Divided into four sections covering general principles of antimicrobial therapy, classes of antimicrobial agents, special considerations, and antimicrobial drug use in multiple animal species, the text is enhanced by tables, diagrams, and photographs. Antimicrobial Therapy in Veterinary Medicine is an essential resource for anyone concerned with the appropriate use of antimicrobial drugs, including veterinary practitioners, students, public health veterinarians, and industry and research scientists. The clinical microbiology laboratory is often a sentinel for the detection of drug resistant strains of microorganisms. Standardized protocols require continual scrutiny to detect emerging phenotypic resistance patterns. The timely notification of clinicians with susceptibility results can initiate the alteration of antimicrobial chemotherapy and improve patient care. It is vital that microbiology laboratories stay current with standard and emerging methods and have a solid understanding of their function in the war on infectious diseases. Antimicrobial Susceptibility Testing Protocols clearly defines the role of the clinical microbiology laboratory in integrated patient care and provides a comprehensive, up-to-date procedural manual that can be used by a wide variety of laboratory professionals. The authors provide a comprehensive, up-
to-date procedural manual including protocols for bioassay methods and molecular methods for bacterial strain typing. Divided into three sections, the text begins by introducing basic susceptibility disciplines including disk diffusion, macro and microbroth dilution, agar dilution, and the gradient method. It covers step-by-step protocols with an emphasis on optimizing the detection of resistant microorganisms. The second section describes specialized susceptibility protocols such as surveillance procedures for detection of antibiotic-resistant bacteria, serum bactericidal assays, time-kill curves, population analysis, and synergy testing. The final section is designed to be used as a reference resource. Chapters cover antibiotic development; design and use of an antibiogram; and the interactions of the clinical microbiology laboratory with the hospital pharmacy, and infectious disease and control. Unique in its scope, Antimicrobial Susceptibility Testing Protocols gives laboratory personnel an integrated resource for updated lab-based techniques and charts within the contextual role of clinical microbiology in modern medicine.

Staphylococcus was first recognized as a human pathogen in 1880 and was named for its grape cluster-like appearance. In 1884, Staphylococcus aureus was identified and named for its vibrant golden color, which was later found to be the result of golden toxin production. Here, experts examine in-depth patterns of S. aureus colonization and exposures in humans, mammals, and birds that have led to the development of various clinical diseases. The mode of transmission of S. aureus and different methods for its detection in different samples are defined. Conventional antibiotic options to treat this aggressive, multifaceted, and readily adaptable pathogen are becoming limited. Alternative, novel chemotherapeutics to target S. aureus are discussed in the pages within, including herbal medicines, bee products, and modes of delivery.

The increasing resistance of bacteria to antibiotics, and pests to pesticides, threatens to undo some of the most remarkable advances made in public health and agriculture during the past century. Though the potential consequences of increased antibiotic and pesticide resistance are far reaching, regulatory efforts to address the problem are at a very early stage. Battling Resistance to Antibiotics and Pesticides moves such discussions forward by presenting cutting edge research and the first comprehensive application of economic tools to analyze how antibiotics and pesticides should be used to maximize their value to society. Lakminarayan and his contributors explore lessons from past experiences with resistance, especially in agriculture. They consider what incentives would be ideal for the individuals who prescribe or apply antibiotics and pesticides, and what would be ideal for the firms engaged in developing and producing these products. The chapters in this groundbreaking book reflect the fact that efforts to combat resistance will require contributions from a broad range of scholars and professionals, representing a broad range of expertise. The analysis demonstrates that, for all these participants, an understanding of economic issues is an essential complement to knowledge of medical or biological factors. The book provides economists with an overview of relevant scientific issues, as well as a variety of analytical approaches to studying the economics of resistance. It offers policymakers detailed analyses of the multiple dimensions of resistance and discusses the future strategies to combat and manage resistance. For professionals in medicine, public health, and agriculture, the book translates the economic approaches into usable guidance for daily practice and decisionmaking.

Provides comprehensive coverage of all gram-positive pathogens, including genome data. Appeals to clinicians, infectious disease specialists, and instructors and students seeking a single reference source on gram-positive bacteria.

The new guidelines are meant to protect public health, help evaluate development projects near freshwater and recreational sites and assess potential health aspects of recreational projects. Pet-to-Man Travelling Staphylococci: A World in Progress explores Staphylococci, a dangerous pathogen that affects both humans and animals with a wide range of infection states. This bacteria can spread rapidly as a commensal organism in both humans and pets, and is an agent of disease. Staphylococci are potentially highly virulent pathogens which require urgent medical attention. In addition, Staphylococci remain a threat within hospital environments, where they can quickly spread across a patient population. This book explores the organisms’ resistance to many compounds used to treat them, treatment failure and multidrug resistant staphylococci, amongst other related topics. Focuses not only on man and animal staphylococcal diseases, but on the role of shared household in man-to-pet (and vice versa) transmission Underlines the importance of professional exposure to mammals (i.e. veterinary and farm personnel) in the establishment of shared colonization’s and related diseases Highlights the impact of shared staphylococci and virulence determinants in human and veterinary pathology Sheds light on the way staphylococci may be recognized in clinical laboratories

Medical Microbiology Illustrated presents a detailed description of epidemiology, and the biology of micro-organisms. It discusses the pathogenicity and virulence of microbial agents. It addresses the intrinsic susceptibility or immunity to antimicrobial agents. Some of the topics covered in the book are the types of gram-positive cocci; diverse group of aerobic gram-positive bacilli; classification and clinical importance of erysipelothrix rhusiopathiae; pathogenesis of mycobacterial infection; classification of parasitic infections which manifest with fever; collection of blood for culture and control of substances hazardous to health. The classification and clinical importance of neisseriaceae is fully covered. The definition and pathogenicity of haemophilus are discussed in detail. The text describes in depth the classification and clinical importance of spiral bacteria. The isolation and identification of fungi are completely presented. A chapter is devoted to the laboratory and serological diagnosis of systemic fungal infections. The book can provide useful information to microbiologists, physicians, laboratory scientists, students, and researchers.

Years of using, misusing, and overusing antibiotics and other antimicrobial drugs has led to the emergence of multidrug-resistant ‘superbugs.’ The IOM's Forum on Microbial Threats held a public workshop April 6-7 to discuss the nature and sources of drug-resistant pathogens, the implications for global health, and the strategies to lessen the current and future impact of these superbugs.

Various antiseptic agents, such as chlorhexidine, are used for different applications, e.g. in healthcare, veterinary medicine, animal production and household products, including cosmetics. However, not all antiseptic agents provide significant health benefits, especially in some products used in human medicine (alcohol-based hand rubs, antimicrobial soaps). While some products (antimicrobial soaps, surface disinfectants, instrument disinfectants, wound antiseptics) may contain one or more biocidal agents with a comparable antimicrobial efficacy but large differences in their potential for microbial adaptation and tolerance. An increased bacterial resistance has been described for various antimicrobial agents, sometimes including a cross-resistance to antibiotics. The book is the first comprehensive resource reference on antiseptic agents, including their efficacy, natural and acquired resistance, adaptation, and cross-resistance. It also discusses their and appropriate use in terms of a balance between their efficacy and the risk of acquired bacterial resistance / tolerance. Focusing on human and veterinary medicine and household products, it helps readers make informed decisions concerning against antiseptic products based on their composition. The book contributes to reduce any unnecessary selection pressure towards emerging pathogens and to keep the powerful antiseptic agents for all those applications that have a clear benefit (e.g. reduction of healthcare-
associated infection).
Prosthetic Joint InfectionsSpringer

This text provides a guide to understanding the mechanisms involved in the pathogenesis of muscoskeletal sepsis. It covers areas such as bone, cartilage, soft tissue, and biomaterial interaction in the face of infection.

Current Progress in Biological Research presents new insights into key topics from different areas of the biological sciences. Some of the topics covered in the book are antibiotic susceptibility, genomic rearrangement, historical biogeography, biogeographic patterns, endemism and the use of microorganisms for pest control. The book is an interesting collection of 16 original research articles written by respected experts in their fields. It is hoped that readers will be stimulated and challenged by the contents of this book.

This book Periprosthetic Joint Infection is a portable guide to the practical management of surgical site infections following orthopedic procedures. It designed to help answer clinician's questions regarding the prevention and treatment of periprosthetic infections. It organized for rapid review, featuring evidence reviews, pitfalls, Rothman Institute Current Practices and Controversies. The guide is being included in the course materials for the 29th Annual Current Concepts in Joint Replacement® (CCJR) meeting thanks to a generous educational grant from 3M Health Care.

This book features 121 case studies intended to provide an approach to the diagnosis and treatment of pediatric infectious diseases. Brief clinical scenarios are followed by discussions and supplemented with tables and photographs. The author considers infections caused by a wide spectrum of viral, bacterial, fungal, and parasitic infectious agents, as well as those affecting specific anatomic sites. The author addresses both common and those presenting a greater challenge in diagnosis. Discussions focus on principles of management, as opposed to details, and place emphasis on determining risk factors and on clinical evaluation, not on performing non-discriminating laboratory tests. The introductory chapter addresses general principles for the diagnosis and management of infectious diseases. The appendix contains extensive tables and lists pertaining to infectious agents and their epidemiology. The book is illustrated with high-quality color photographs and radiographs. Its readability provides an engaging way to study pediatric infectious diseases.

Staphylococcus aureus is one of the leading causes of hospital acquired infections. The ability of S. aureus to acquire resistance to a diverse range of antimicrobial compounds, results in limited treatment options, particularly in methicillin-resistant S. aureus. A mechanism by which S. aureus develops reduced susceptibility to antimicrobials is through the formation of small colony variants (SCVs). Reduced antimicrobial susceptibility in S. aureus SCVs is not related to ‘classical’ mechanisms of resistance, but occurs as a direct result of the development of the SCV phenotype. S. aureus SCVs are frequently associated with defects in the bacterial electron transport chain and these defects are responsible for the characteristics associated with the SCV phenotype. This study aimed to investigate and characterise the selection of S. aureus SCVs in the presence of various antibiotics and also to examine their biofilm forming capabilities. Four members of the aminoglycoside family of antibiotics were shown to select for S. aureus SCVs. In addition, a broad range (X 0.25 MIC - X 4 MIC) of aminoglycoside concentrations were shown to select for S. aureus SCVs. Characterisation of these isolates revealed that differences in aminoglycoside resistance were present. The presence of two of the aminoglycoside family of antibiotics were also shown to select for S. aureus SCVs. Tetracycline selected S. aureus SCVs show attenuated catalase, coagulase and hemolysis activity and reduced production of extracellular DNAse and lipase and reduced susceptibility to various antimicrobial agents. As SCVs have been linked to persistent and recurrent infections their ability to form biofilms was also investigated. A range of S. aureus SCVs isolated from various backgrounds were shown to form greater biofilms in comparison to parent strains, which was attributed to increased production of polysaccharide intracellular adhesin. In addition S. aureus SCV biofilms displayed a more pronounced reduction in antimicrobial susceptibility, which was attributed to a reduction in antimicrobial penetration through SCV biofilms. Limited discovery of novel antibiotics in recent years and the observation that S. aureus SCVs can be selected for by various antimicrobial compounds highlights the need for novel antimicrobial compounds. Accordingly, an investigation into the susceptibility of S. aureus to various plant compounds was undertaken. Both S. aureus SCVs and parent strains showed susceptibility to five plant antimicrobials tested, of which SCVs were more susceptible to cinnamon bark, green tea and oregano. Resistance to these plant antimicrobials could not be induced and synergistic relationships between certain plant antimicrobials and antibiotics were demonstrated.

Finally, formation of SCVs in bacterial species other than S. aureus was examined. Gentamicin induced SCV selection in Escherichia coli, Pseudomonas aeruginosa and S. epidermidis as well as chloramphenicol and ciprofloxacin in E. coli and tetracycline in S. epidermidis. SCVs from these bacterial species shared common characteristics associated with the SCV phenotype including altered growth and biochemical profiles, auxotrophy for compounds involved in electron transport, reduction in expression of virulence factors and reduced antimicrobial susceptibility. Additionally all S. epidermidis showed an increased capacity to form biofilms. The ability of certain antibiotics to select for SCVs and their increased capacity to form biofilms suggest that SCV is an important adaptation to aid survival and persistence in times of stress. Reduced susceptibility to commonly used antibiotics in SCVs signifies that the development of new antimicrobial compounds is required. Harnessing naturally occurring plant antimicrobials and their synergistic relationship with antibiotics may offer a novel approach to treating antibiotic resistant infections whilst overcoming antibiotic selection for SCVs.

With the launch of its first electronic edition, The Prokaryotes, the definitive reference on the biology of bacteria, enters an exciting new era of information delivery. Subscription-based access is available. The electronic version begins with an online implementation of the content found in the printed reference work, The Prokaryotes, Second Edition. The content is being fully updated over a five-year period until the work is completely revised. Thereafter, material will be continuously added to reflect developments in bacteriology. This online version features information retrieval functions and multimedia components.

Why Antibiotic Resistance? The use of antibiotics in human and veterinary medicine may have consequences beyond their intended applications. The “One Health” concept recognizes that the health of humans is connected to the health of animals and the environment. Progress in molecular genetics is facilitating the rapid evaluation of the essentiality of these targets on a genomic scale. In 2015, a group of researchers established the International Congress on Antibiotic Resistance (IC2AR). The primary objective of this meeting is to bring together scientists involved in antibiotic resistance prevention and control. The IC2AR conducted its inaugural world congress in January 2015 at Caparica (Portugal). Antibiotic resistance presents a significant challenge to scientists in the field of infectious diseases. The full knowledge of how antibiotics resistance is evolving and being transmitted between hosts in different ecosystems is taking on great importance. Necessary action includes research to define the scope of the problem including its various sources. This eBook comprises a series of original research and review articles dealing with the epidemiology of resistance in animal and zoonotic pathogens, mobile elements containing resistance genes, the omics of antimicrobial resistance, emerging antimicrobial resistance mechanisms, control of resistant infections, establishing antimicrobial use and resistance surveillance systems, and alternatives strategies to overcome the problem of antimicrobial resistance worldwide. Gilberto Igrejas, José Luis Capelo and Patricia Poeta Scientific Committee of IC2AR, February 20th, 2017

This book outlines the most updated clinical guidelines that are vital for the prevention infections and care of patients with joint infections following a replacement surgery, one of the highest volume medical
interventions globally. Sections address the diagnosis, management approaches and prevention of prosthetic joint infections. Written by experts in the field, this text provides a brief overview of the literature and current recommendations in each of the specified areas. Given the rapidly evolving state-of-play in this clinical area, this compendium grows increasingly important to clinicians in their management decisions. Prosthetic Joint Infections is a valuable resource for infectious disease specialists, epidemiologists, surgeons, and orthopedic specialists who may work with patients with prosthetic joint infections.

Staphylococcus aureus are an important medical infectious agent that causes a wide range of pathogenesis starting from colonization of the skin and mucosal surface to severe pathogenic effects such as septicemia. The mortality and morbidity from this pathogen are challenging issues for the healthcare premises. Methicillin Resistant Staphylococcus aureus strains (MRSA) are causing severe infections due to the genes that are resistant to several antibiotics including methicillin, amoxicillin, and others. Recently, there have been several reports related to failure of treatment plans caused by MRSA that led to Vancomycin Intermediate Staphylococcus aureus strains (VISA) or, in sporadic cases, resistance to the drug of choice. This book highlights the new areas for the treatment of MRSA using natural products. The implementation of specific products produced by this organism can help the scientist to obtain a new window for treatments such as anticancer chemotherapy, antioxidants, etc.

The discovery of antibiotics was considered a milestone in health sciences and became the mainstay of antimicrobial therapy to treat and control bacterial infections. However, its utility has subsequently become limited, due to the emergence and spread of antimicrobial resistance among different bacterial species, which has emerged as a global threat. The development and spread of antimicrobial resistance have been attributed to many factors, including indiscriminate use of antibiotics in the healthcare and livestock industries. The present scenario of antibiotic resistance urgently requires interventions in terms of development of newer antimicrobial alternatives, evaluation of antibiotic formulations, and formulation of stringent policies to curb indiscriminate use of antimicrobials. This book highlights the importance and development of antimicrobial resistance in zoonotic, environmental and food bacteria, including the significance of candidate alternative therapies.

Abstract: Methicillin-resistant Staphylococcus aureus (MRSA) is a significant cause of healthcare- and community-acquired infections. The emergence and spread of MRSA strains resistant to commonly prescribed antibiotics has made such infections one of the most challenging issues of the antimicrobial susceptibility profile. Medical factors such as a history of hospitalization or previous MRSA infections affect patients' risk of developing an MRSA infection. Prior work in social epidemiology suggests that social factors likely influence which patients may contract resistant strains. I develop a theoretical framework in which MRSA resistance changes the effect of individual and community level social factors such as gender, age, race, and residence location on the phenotype of antibiotic resistance.

Using data on 798 cases from Ohio hospitals, I perform logistic regression to identify social and medical factors significantly associated with having a resistant MRSA strain (p<0.05). Patients ages 45-59 years and patients age?60 years have increased odds of having a resistant MRSA strain compared to patients younger than 45 years (OR=2.12, 95% CI=1.03-4.39 and OR=3.27, 95% CI=1.64-6.45, respectively). After adjusting for medical risk factors associated with having a resistant strain, patient age>76 years (OR=2.44 95% CI=1.20-5.00) remains significantly associated with odds of having a resistant MRSA strain. In conclusion, prevention and treatment efforts targeting resistant MRSA strains should focus on populations of older adults and those with these medical risk factors.

Pneumonia is an inflammatory disease of the air sacs and surrounding interstitium caused by infectious agents or by endogenous inflammatory tissue disorder termed interstitial pneumonia. The present book covers contemporary topics of community, hospital, and health care-related bacterial and viral pneumonia in the setting of drug resistance, environmental exposures, climate change, hormonal influences, and gender. The topic of interstitial pneumonia is brought under the lens of an immune-related connective tissue disease.

Staphylococcus spp. and Streptococcus spp. have not only got pathogenic isolates, but also non-pathogenic isolates. Staphylococcus spp. and Streptococcus spp. that are Gram positive cocci are the main pathogens in several infections. Virulence factors such as usual and unusual surface proteins encoded by resistance genes are the main causes of pathogenesis. Multidrug-resistant pathogens that are the main causes of morbidity and mortality worldwide have the ability to synthesize a number of destructive enzymes encoded by resistance genes such as ß-lactamases. Resistant pathogens such as methicillin-resistant Staphylococcus aureus (MRSA), Streptococcus pneumoniae, Group A, and Group B Streptococcus have emerged throughout the world. To eliminate these resistant pathogens that cause untreatable, acute, and chronic infections, different new antimicrobials must be developed and used. The goal of this book is to provide the latest information about the above topics.

Perfect your lab skills with the gold standard in microbiology! Serving as both the #1 bench reference for practicing microbiologists and as a favorite text for students in clinical laboratory science programs, Bailey & Scott’s Diagnostic Microbiology, 14th Edition covers all the topical information and critical thinking practice you need for effective laboratory testing. This new edition also features hundreds step-by-step procedures, updated visuals, new case studies, and new material on the latest trends and equipment in clinical microbiology — including automation, automated streaking, MALDI-TOF, and incubator microscopes. It's everything you need to get quality lab results in class and in clinical practice! More than 800 detailed, full-color illustrations aid comprehension and help in visualizing concepts. Expanded sections on parasitology, mycology, and virology eliminate the need to purchase separate books on this material. General and Species boxes in the organism chapters highlight the important topics that will be discussed in the chapter. Case studies provide the opportunity to apply information to a variety of diagnostic scenarios, and help improve decision-making and critical thinking skills. Hands-on procedures include step-by-step instructions, full-color photos, and expected results. A glossary of terms is found at the back of the book for quick reference. Learning objectives begin each chapter, offering a measurable outcome to achieve by completing the material. Learning resources on the Evolve companion website enhance learning with review questions and procedures. NEW! Coverage of automation, automated streaking, MALDI-TOF, and incubator microscopes keeps you in the know on these progressing topics. NEW! Updated images provide a more vivid look into book content and reflect the latest procedures. NEW! Thoroughly reviewed and updated chapters equip you with the most current information. NEW! Significant lab manual improvements provide an excellent learning resource at no extra cost. NEW! 10 extra case studies on the Evolve companion website offer more opportunities to improve critical thinking skills.

This book seeks to fill in the current technology gap with a specific collection of technologies developed for the study of protein function at a proteome scale. Chapters explore topics from protein functions to other aspects of protein analysis, especially in post-translational modification, as most proteomes use this mechanism in some capacity to carry out their unique role in cellular regulation. By comparing functional proteomes, this presents a bridge to other levels of system biology research including genomics and metabolomics in order to provide readers with a relatively complete picture for how one might study the biological system of their interest. Written in the highly successful Molecular Biology series format, chapters include introductions to their respective topics, lists of the necessary materials and reagents, step-by-step, readily reproducible laboratory protocols, and tips on troubleshooting and avoiding known pitfalls. Authoritative and cutting-edge, Functional Proteomics: Methods and Protocols collects these novel technologies in the hope that new frontiers in biological research will be created, important drug targets can be identified, and clinically validated biomarkers and diagnostic tests can be further developed.

Microbiology and Molecular Diagnosis in Pathology: A Comprehensive Review for Board Preparation, Certification and Clinical Practice reviews all aspects of microbiology and molecular diagnostics essential to successfully passing the American Board of Pathology exam. This review book will also serve as a first resource for residents who want to become familiar with the diagnostic aspects of microbiology and molecular methods, as well as a refresher course for practicing pathologists. Opening chapters discuss issues of laboratory management, including quality control, biosafety, regulations, and proper handling.
and reporting of laboratory specimens. Review chapters give a quick overview of specific clinical infections as well as different types of bacteria, viruses, fungal infections, and infections caused by parasites. Following these, coverage focuses on diagnostic tools and specific tests: media for clinical microbiology, specific stains and tests for microbial identifications, susceptibility testing and use of antimicrobial agents, tests for detecting antibodies, antigens, and microbial infections. Two final chapters offer overviews on molecular diagnostics principles and methods as well as the application of molecular diagnostics in clinical practice. Takes a practical and easy-to-read approach to understanding microbiology at an appropriate level for both board preparation as well as a professional refresher course. Covers all important clinical information found in larger textbooks in a more succinct and easy-to-understand manner. Covers essential concepts in microbiology in such a way that residents, fellows, and clinicians understand the methods and tests without having to become specialists in the field. Offers a quick overview of specific clinical infections as well as different types of bacteria, viruses, fungal infections, and infections caused by parasites.

Antibiotic resistance has become a worldwide health issue, globally recognized as the first priority by WHO. Many forms of resistance can spread with remarkable speed and cross international boundaries. World health leaders are devoting efforts to the problem by planning strategies for monitoring the effectiveness of public health interventions and detecting new trends and threats. This volume focuses on the problem from different perspectives, taking into consideration geographical dissemination (soil and water), human medicine (methicillin-resistant Staphylococcus aureus and Klebsiella pneumonaeia) and veterinary (Enterococcus spp.) impact and molecular analysis. The purpose of this volume is to provide a useful tool for control and prevention and to discuss useful epidemiological data concerning ways of obtaining an accurate picture of resistance in different communities.

This book examines biofilms in nature. Organized into four parts, this book addresses biofilms in wastewater treatment, inhibition of biofilm formation, biofilms and infection, and ecology of biofilms. It is designed for clinicians, researchers, and industry professionals in the fields of microbiology, biotechnology, ecology, and medicine as well as graduate and postgraduate students.

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 judicial 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.


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 or 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/) 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://www.who.int/drugresistance/amr_global_action_plan/en/; 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.

Staphylococcus aureus S. aureus is a growing issue both within hospitals and community because of its virulence determinants and the continuing emergence of new strains resistant to antimicrobics. In this book, we present the state of the art of S. aureus virulence mechanisms and antibiotic-resistance profiles, providing an unprecedented and comprehensive collection of up-to-date research about the evolution, dissemination, and mechanisms of different staphyloccocal antimicrobial resistance patterns alongside bacterial virulence determinants and their impact in the medical field. We include several review chapters to allow readers to better understand the mechanisms of methicillin resistance, glycopeptide resistance, and horizontal gene transfer and the effects of alterations in S. aureus membranes and cell walls on drug resistance. In addition, we include chapters dedicated to unveiling S. aureus pathogenicity with the most current research available on S. aureus exfoliative toxins, enterotoxins, surface proteins, biofilm, and defensive responses of S. aureus to antibiotic treatment.

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