Diagnostic Technologies Selected Tropical Diseases

Dermatopathology of Tropical Diseases covers the pathology and clinical correlations of the most important tropical diseases. Each entity is described using brief text that summarises its epidemiology, pathogenesis and clinical features. The diagnostic process is then described and illustrated using both clinical and histopathologic images. Wherever possible, different examples are shown of the same disease, in order to illustrate as wide a variety of presentations as possible.

Global Infectious Disease Surveillance and DetectionAssessing the Challengesâ¬"Finding Solutions: Workshop SummaryNational Academies Press

Molecular Diagnostics, Third Edition, focuses on the technologies and applications that professionals need to work in, develop, and manage a clinical diagnostic laboratory. Each chapter contains an expert introduction to each subject that is next to technical details and many applications for molecular genetic testing that can be found in comprehensive reference lists at the end of each chapter. Contents are divided into three parts, technologies, application of those technologies, and related issues. The first part is dedicated to the battery of the most widely used molecular pathology techniques. New chapters have been added, including the various new technologies involved in next-generation sequencing (mutation detection, gene expression, etc.), mass spectrometry, and protein-specific methodologies. All revised chapters have been completely updated, to include not only technology innovations, but also novel diagnostic applications. As with previous editions, each of the chapters in this section includes a brief description of the technique followed by examples from the area of expertise from the selected contributor. The second part of the book attempts to integrate previously analyzed technologies into the different aspects of molecular diagnostics, such as identification of genetically modified organisms, stem cells, pharmacogenomics, modern forensic science, molecular microbiology, and genetic diagnosis. Part three focuses on various everyday issues in a diagnostic laboratory, from genetic counseling and related ethical and psychological issues, to safety and quality management. Presents a comprehensive account of all new technologies and applications used in clinical diagnostic laboratories Explores a wide range of molecular-based tests that are available to assess DNA variation and changes in gene expression Offers clear translational presentations by the top molecular pathologists, clinical chemists, and molecular geneticists in the field

This book introduces readers to the concept of 'frugal innovation' and describes novel low-cost technologies that aid in diagnosing infectious diseases. Rapidly deployable, portable, and affordable diagnostic tools have the potential to tremendously benefit populations in resource-limited settings and improve global health outcomes. Specifically, the book

includes the following features: Cutting-Edge Research: Thorough coverage of scientific advances related to frugal bioengineering that have been developed within the last few years. A few examples of technologies covered in detail include low-cost paper-based and CD-based microfluidic diagnostic systems. Industry and Non-Profit Voices: Chapters written by scientists currently working in industry and philanthropic sectors.

Covering all the major tropical diseases that present a health riskto travelers, this book is an invaluable resource for allpractitioners who encounter the post travel patient. With emphasison clinical signs, diagnosis and treatment, it is the first book tosummarize the knowledge of post travel presentations in theotherwise non-immune and non-endemic population and will aidclinicians to evaluate travelers' symptoms. The book is divided into three parts. The first is an overviewof key aspects of travel medicine; the second contains a detaileddiscussion of multiple viral, bacterial and parasitic infections.The third part provides a syndromic approach to patients withcommon travel complaints such as diarrhea, fever and respiratoryinfections. It also includes useful appendices with lists ofanti-parasitic drugs and available diagnostic tests.

Contributed articles.

Collaboration between The Lancet and Imperial College London, UK, has resulted in a new Commission, which examines how medical technology should best be used to improve health in low- and middle-income countries. The report concludes that in many cases, medical technology—almost exclusively developed in rich countries—is simply inappropriate for use in poorer nations.

Diagnostic Molecular Pathology: A Guide to Applied Molecular Testing is organized around disease types (genetic disease, infectious disease, neoplastic disease, among others). In each section, the authors provide background on disease mechanisms and describe how laboratory testing is built on knowledge of these mechanisms. Sections are dedicated to general methodologies employed in testing (to convey the concepts reflected in the methods), and specific description of how these methods can be applied and are applied to specific diseases are described. The book does not present molecular methods in isolation, but considers how other evidence (symptoms, radiology or other imaging, or other clinical tests) is used to guide the selection of molecular tests or how these other data are used in conjunction with molecular tests to make diagnoses (or otherwise contribute to clinical workup). In addition, final chapters look to the future (new technologies, new approaches) of applied molecular pathology and how discovery-based research will yield new and useful biomarkers and tests. Diagnostic Molecular Pathology: A Guide to Applied Molecular Testing contains exercises to test readers on their understanding of how molecular diagnostic tests are utilized and the value of the information that can be obtained in the context of the patient workup. Readers are directed to an ancillary website that

contains supplementary materials in the form of exercises where decision trees can be employed to simulate actual clinical decisions. Focuses on the menu of molecular diagnostic tests available in modern molecular pathology or clinical laboratories that can be applied to disease detection, diagnosis, and classification in the clinical workup of a patient Explains how molecular tests are utilized to guide the treatment of patients in personalized medicine (guided therapies) and for prognostication of disease Features an ancillary website with self-testing exercises where decision trees can be employed to simulate actual clinical decisions Highlights new technologies and approaches of applied molecular pathology and how discovery-based research will yield new and useful biomarkers and tests

This book is a printed edition of the Special Issue Skin-Related Neglected Tropical Diseases (Skin-NTDs)—A New Challenge that was published in TropicalMed

Comprehensive and up to date, the Second Edition of Diagnostic Pathology: Infectious Disease, by Dr. Richard Kradin, is an invaluable tool for the accurate diagnosis of any infectious disease?from the common to the most challenging. The organ-based format makes it an especially useful tool for surgical pathologists' daily diagnostic and management issues. High-quality, full-color illustrations and differential diagnosis tables accompany each lesion, clearly depicting how to recognize the morphology of organisms and the spectrum of histological responses that they may cause. Addresses the most difficult diagnostic issues that practicing or trainee surgical pathologists face when handling infectious disease tissue specimens. Highlights morphological characteristics and landmarks of tissue samples for easy access to information necessary for signing out a specimen. Emphasizes the host responses critical in differential diagnosis to serve as a second opinion when non-infectious diagnoses mimic and confound the diagnosis of infection. Completely revised with the latest diagnostic support and hot topics in the field: A new chapter on novel techniques in microbiology A new chapter on eye infections New coverage of immunohistochemical staining and other molecular diagnostic techniques New discussions of human papillomavirus, a critical tool in predictive cancer screening New information on infections in the immunocompromised host and related special considerations

This report repositions a group of 17 neglected tropical diseases on the global development agenda at a time of profound transitions in the economies of endemic countries and in thinking about the overarching objectives of development. In doing so it reinvigorates the drive to prevent control eliminate or eradicate diseases that blind maim and disfigure making life miserable for more than a billion people. Undetected and untreated several almost invariably kill. The burden of these diseases is further amplified by the fact that many require chronic and costly care underscoring the economic as well as the health benefits of preventive chemotherapy and early detection and care. The report brings a new dimension to long-term thinking about the future approach to these diseases. For the first time it sets out financing needs options and targets for meeting WHO Roadmap goals by 2020 but also for reaching universal coverage of all people in need by 2030. The report makes one investment case for cost-effectiveness and a second investment case where equity is the focus. It sets targets for ending catastrophic health expenditures and as part of the drive to strengthen health systems for getting services closer to where people live.

The discovery of antibiotics in the early 20th century fundamentally transformed human and veterinary medicine. Antibiotics now save millions of lives each year in the United States and around the world. The rise of antibiotic-resistant bacterial strains, however, represents a serious threat to public health and the economy. The CDC estimates that annually at least two million illnesses and 23,000 deaths are caused by

antibiotic-resistant bacteria in the United States alone. As more strains of bacteria become resistant to an ever-larger number of antibiotics, our drug choices will become increasingly limited and expensive and, in some cases, nonexistent. If this trend continues unchecked, a wide range of modern medical procedures, from basic dental care to organ transplants, likely would be accompanied by a much greater risk of developing a difficult-to-treat or untreatable antibiotic infection. The safety of many modern medical procedures is dependent on the ability to treat bacterial infections that can arise as post-treatment complications.

Immunochromatography assays are ideal candidates for diagnosis of disease in remote areas, due to their low cost and rapid readout. Moreover, they can be stored at relatively high temperatures, and do not require electric power, specialized personnel, equipment or reagents. We use those devices to diagnose viral mosquito-borne tropical diseases that have caused major epidemics and hospitalization in the last years. By allowing mobile phone readability of the diagnosis results, we enable real-time epidemiologic data on the spread of the disease. Immunochromatography assays use capillary flow and the accumulation of ligand-coated nanoparticles to detect the presence of target proteins. We build multiplexed diagnostics that allow the detection of the four serotypes of Dengue and Zika, and validate the performance of these diagnostics by using patient samples from endemic areas from the Americas and India. Moreover, we build a multiplexed diagnostic that can detect Dengue, Zika and Chikungunya by using a low volume of patient sample. In order to provide a rapid response to epidemics, lateral flow immunoassays need to be rapidly tested and manufactured. However, years of research are necessary to identify, screen and test disease-specific antibody pairs. To provide a faster response to outbreaks, we explore cross-reactive antibodies developed against a related pathogen. To avoid nonspecific signal from the related pathogens, gold nanoparticles of different colors are combined with cross-reactive antibodies of different affinities and used in order to distinguish between the two infections as well as co-infections. In this context, I present an Ebola and Marburg diagnostic and a Dengue and Zika diagnostic. Limit of detection, as well as sensitivity/specificity are critical issues in the development of rapid diagnostics; these parameters are dependent on the nature of the ligand-target pair and binding thermodynamics when attached on a surface. In this thesis, I explore strategies to increase the sensitivity and specificity of the lateral flow devices. These new, effective, fast, reliable and inexpensive lateral flow devices represent significant improvements to field detection of disease and real-time epidemiology in situations where the lack of specialized personnel, reagents or materials challenge the suitability of the standard diagnosis methods.

Principles and Applications of Molecular Diagnostics serves as a comprehensive guide for clinical laboratory professionals applying molecular technology to clinical diagnosis. The first half of the book covers principles and analytical concepts in molecular diagnostics such as genomes and variants, nucleic acids isolation and amplification methods, and measurement techniques, circulating tumor cells, and plasma DNA; the second half presents clinical applications of molecular diagnostics in genetic disease, infectious disease, hematopoietic malignancies, solid tumors, prenatal diagnosis, pharmacogenetics, and identity testing. A thorough yet succinct guide to using molecular testing technology, Principles and Applications of Molecular Diagnostics is an essential resource for laboratory professionals, biologists, chemists, pharmaceutical and biotech researchers, and manufacturers of molecular diagnostics kits and instruments. Explains the principles and tools of molecular biology Describes standard and state-of-the-art molecular techniques for obtaining qualitative and quantitative results Provides a detailed description of current molecular applications used to solve diagnostics tasks

The underlying technology and the range of test parameters available are evolving rapidly. The primary advantage of POCT is the convenience of performing the test close to the patient and the speed at which test results can be obtained, compared to sending a sample to

a laboratory and waiting for results to be returned. Thus, a series of clinical applications are possible that can shorten the time for clinical decision-making about additional testing or therapy, as delays are no longer caused by preparation of clinical samples, transport, and central laboratory analysis. Tests in a POC format can now be found for many medical disciplines including endocrinology/diabetes, cardiology, nephrology, critical care, fertility, hematology/coagulation, infectious disease and microbiology, and general health screening. Point-of-care testing (POCT) enables health care personnel to perform clinical laboratory testing near the patient. The idea of conventional and POCT laboratory services presiding within a hospital seems contradictory; yet, they are, in fact, complementary: together POCT and central laboratory are important for the optimal functioning of diagnostic processes. They complement each other, provided that a dedicated POCT coordination integrates the quality assurance of POCT into the overall quality management system of the central laboratory. The motivation of the third edition of the POCT book from Luppa/Junker, which is now also available in English, is to explore and describe clinically relevant analytical techniques, organizational concepts for application and future perspectives of POCT. From descriptions of the opportunities that POCT can provide to the limitations that clinician’s must be cautioned about, this book provides an overview of the many aspects that challenge those who choose to implement POCT. Technologies, clinical applications, networking issues and quality regulations are described as well as a survey of future technologies that are on the future horizon. The editors have spent considerable efforts to update the book in general and to highlight the latest developments, e.g., novel POCT applications of nucleic acid testing for the rapid identification of infectious agents. Of particular note is also that a cross-country comparison of POCT quality rules is being described by a team of international experts in this field.

Infectious diseases are one of the major causes of death in developing countries. These diseases are caused by pathogenic organisms, such as bacteria, viruses, and parasites. Current gold standard methods of detection include cell culturing, the enzyme-linked immunosorbent assay (ELISA), and the polymerase chain reaction (PCR); however, these methods are often complex, have a long time-to-result, and require expensive equipment and trained personnel. Such limitations make it difficult for these standard diagnostics to be used in resource-poor settings. Unfortunately, it is also these developing countries that could currently benefit most from these early diagnosis assays. Therefore, there is a growing need for simple, sensitive, and efficient diagnostic methods. To this end, researchers have made efforts to design diagnostics with the aim to be viable at the point-of-care (POC). While there have been great advances in converting complicated laboratory-based assays into POC-friendly diagnostics, the ability to simplify the method while maintaining the diagnostic test's effectiveness remains a primary concern. Often, low assay sensitivity as a result of poor processing of samples in complex media or low concentration of biomarkers are the main challenges. One example of a POC-friendly diagnostic is the paper-based lateral-flow immunoassay (LFA). While the advantages of the LFA are that it is low-cost, rapid, user-friendly, and does not require laboratory equipment, the main drawback of the LFA is that it is not as sensitive as traditional laboratory tests. To address this problem, our laboratory has previously utilized aqueous two-phase systems (ATPSs) to concentrate biomarkers via partitioning into one of the two phases of an ATPS prior to its application to the LFA. Using this pre-concentration step, the detection limit of the LFA was improved 10-fold. While our lab has had much success in combining ATPSs and LFA to predictably concentrate biomarkers and improve the LFA limit of detection, this thesis expands the application of ATPSs for the development of other POC diagnostic formats. Chapter 2 describes the application of an ATPS to a paper-based spot immunoassay for detection of foodborne pathogens in food samples. We designed a spot immunoassay that utilizes a UCON-potassium phosphate salt ATPS for the pre-concentration of Escherichia coli (E. coli) O157:H7. This platform was tested with samples of O157:H7 spiked in phosphate-

buffered saline (PBS) and milk. The ATPS was found to improve the detection limit of the spot test, yielding detection in milk at 106 colony forming units (cfu)/mL within 30 min. In Chapter 3, we extended the application of ATPSs to nucleic acid amplification tests (NAATs) by integrating an ATPS with isothermal DNA amplification. We introduced a novel system that combines thermophilic helicase-dependent amplification (tHDA) with a Triton X-100 micellar ATPS to achieve cell lysis, lysate processing, and enhanced nucleic acid amplification in a simple, one-step process. The combined one-pot system was able to detect whole cell samples containing as few as 102 cfu/mL of E. coli, making it competitive to existing gold standard NAATs. Moreover, the one-pot reaction improved the detection limit of tHDA by 105-fold, and is the first known application of ATPSs to isothermal DNA amplification. This significant improvement in the detection limit was attributed to the synergistic effects of DNA purification and concentration in the ATPS, which rendered the one-pot reaction much more effective at processing whole cell samples compared to the conventional tHDA reaction. While we successfully tested our one-pot system with E. coli as a model pathogen, our system's ease-of-use, sensitivity, and tunability underline its potential as a POC diagnostic platform to detect for a variety of infectious diseases. After demonstrating success with our one-pot reaction, we addressed two challenges that would help further drive the development of a POC NAAT. Specifically, these corresponded to the limited understanding of how to use an ATPS as a sample preparation method and the need to use liquid, test tube-based reactions for the current NAAT technology that could cause difficulties in storage and transportation for POC applications. In Chapter 4, we addressed these challenges by first developing a mathematical model for DNA partitioning to determine which design parameters should be considered for optimal nucleic acid partitioning in a chosen ATPS. Secondly, we assembled a device to perform Recombinase Polymerase Amplification (RPA) and designed an LFA to subsequently detect the amplicons on paper. After development of our model, we identified the electrostatic potential difference and the size of the DNA as potential factors that could influence DNA partitioning. Using these parameters, we determined that a Triton X-114 ATPS containing Mg(CH3COO)2 salt should be used to ensure greater partitioning into the micelle-poor phase. After verifying that our system was optimal for partitioning large genomic DNA fragments, we applied this ATPS as a genomic DNA sample pre-concentration step for the improvement of RPA. Not only did we successfully design and perform RPA on a paper matrix, but we also achieved a 10-fold improvement in the detection limit when our ATPS DNA pre-concentration method was combined with paper-based RPA and LFA. Ultimately, we hope that this increased understanding of DNA partitioning behavior in ATPSs and application of NAAT steps to paper-based formats can lead to better engineered designs to further advance the NAAT for POC use.

Test your knowledge in tropical medicine with Clinical Cases in Tropical Medicine! Boasting an easily accessible, highly templated format and full-color photographs throughout, this medical reference book is designed to help anyone in the field better identify the tropical diseases they'll encounter. As a companion product to Manson's Tropical Diseases, Clinical Cases in Tropical Medicine offers over 75 cases covering today's most prevalent diseases. It's an ideal study tool for infectious diseases fellows, doctors preparing for exams, primary care doctors with patients returning from abroad, and global health nurses and practitioners alike. Consult this title on your favorite e-reader, conduct rapid searches, and adjust font sizes for optimal readability. Stay at the forefront of tropical medicine with in-depth coverage of the latest research, including tropical neurology and AIDS- and HIV-associated diseases and treatments. Study as efficiently as possible with help from a Q&A format and succinct summary boxes. Expand your knowledge concerning rare and neglected tropical diseases, as well as how diagnosis and treatment takes place in resource-poor settings. Gain a complete understanding of tropical diseases with this companion product to Manson's Tropical Diseases, 23rd Edition (ISBN: 978-0-7020-5101-2). A reading list at the end of each case will directly refer to a corresponding

chapter in Manson's, further expediting study.

Point-of-care testing (POCT) refers to pathology testing performed in a clinical setting at the time of patient consultation, generating a rapid test result that enables informed and timely clinical action to be taken on patient care. It offers patients greater convenience and access to health services and helps to improve clinical outcomes. POCT also provides innovative solutions for the detection and management of chronic, acute and infectious diseases, in settings including family practices, Indigenous medical services, community health facilities, rural and remote areas and in developing countries, where health-care services are often geographically isolated from the nearest pathology laboratory. A Practical Guide to Global Point-of-Care Testing shows health professionals how to set up and manage POCT services under a quality-assured, sustainable, clinically and culturally effective framework, as well as understand the wide global scope and clinical applications of POCT. The book is divided into three major themes: the management of POCT services, a global perspective on the clinical use of POCT, and POCT for specific clinical settings. Chapters within each theme are written by experts and explore wide-ranging topics such as selecting and evaluating devices, POCT for diabetes, coagulation disorders, HIV, malaria and Ebola, and the use of POCT for disaster management and in extreme environments. Figures are included throughout to illustrate the concepts, principles and practice of POCT. Written for a broad range of practicing health professionals from the fields of medical science, health science, nursing, medicine, paramedic science, Indigenous health, public health, pharmacy, aged care and sports medicine, A Practical Guide to Global Point-of-Care Testing will also benefit university students studying these health-related disciplines.

The prevalence of infectious diseases is worldwide increasing. Therefore, detection methods for infectious pathogens change quickly. In the 3rd edition of Kessler ?s Molecular Diagnostics of Infectious Diseases laboratory professionalists get valueable information about the current diagnostic methods, tipps and tricks in terms of sample processing, quality control, and interpretation of the results. For clinicians the book is a valuable aid for decision-making in ordering appropriate tests as well as in assuring the necessary quality of the sample material.

Getting the right diagnosis is a key aspect of health care - it provides an explanation of a patient's health problem and informs subsequent health care decisions. The diagnostic process is a complex, collaborative activity that involves clinical reasoning and information gathering to determine a patient's health problem. According to Improving Diagnosis in Health Care, diagnostic errors-inaccurate or delayed diagnoses-persist throughout all settings of care and continue to harm an unacceptable number of patients. It is likely that most people will experience at least one diagnostic error in their lifetime, sometimes with devastating consequences. Diagnostic errors may cause harm to patients by preventing or delaying appropriate treatment, providing unnecessary or harmful treatment, or resulting in psychological or financial repercussions. The committee concluded that improving the diagnostic process is not only possible, but also represents a moral, professional, and public health imperative. Improving Diagnosis in Health Care a continuation of the landmark Institute of Medicine reports To Err Is Human (2000) and Crossing the Quality Chasm (2001) finds that diagnosis-and, in particular, the occurrence of diagnostic errorsâ€"has been largely unappreciated in efforts to improve the quality and safety of health care. Without a dedicated focus on improving diagnosis, diagnostic errors will likely worsen as the delivery of health care and the diagnostic process continue to increase in complexity. Just as the diagnostic process is a collaborative activity, improving diagnosis will require collaboration and a widespread commitment to change among health care professionals, health care organizations, patients and their families, researchers, and policy makers. The recommendations of Improving Diagnosis in Health Care contribute to the growing momentum for change in this crucial area of health care quality and safety.

Advances in Animal Disease Diagnosis: Infectious animal diseases caused by pathogenic microorganisms such as bacteria, fungi, and

viruses threaten the health and well-being of wildlife, livestock and human populations, limit productivity and significantly increase economic losses to each sector. Pathogen de-tection is an important step for the diagnosis and successful treatment of animal diseases as well as control management in farm and field conditions. The conventional techniques employed to diagnose pathogens in livestock species are time-consuming and sometimes give inconclusive results. On the contrary, molecular techniques have the potential to diag-nose known pathogens/conditions quickly, reliably, and unequivocally as well as for novel pathogen detection. New advances in diagnostics and vaccine design using genomics have developed powerful new methods that have also set the stage for the enhanced diagnosis, surveillance, and control of infectious diseases. High-throughput sequencing (HTS), for ex-ample, uses the latest DNA sequencing platforms in the detection, identification, and detailed analysis of both pathogen and host genomes. This book will explore some key opportunities in the context of animal health, such as the detection of new microorganisms and the development of improved diagnosis of emerging or re-emerging diseases and other clinical conditions, viz. biosensors, nanotools, and omics technologies. Features • Details comprehensive knowledge on the latest molecular techniques for animal disease diagnosis and management • Examines how DNA-based diagnostic techniques will assist international efforts to control the introduction of exotic diseases into new geographic areas • Describes the latest molecular assays for the rapid and accurate detection of pathogens • Helps in working towards meeting the global challenge for sustainable food production and the eradication of poverty • With new biotechnological developments, this fully updated book is a treasure trove of the latest information in animal and medical science

Tropical diseases affect millions of people throughout the world and particularly in the developing countries. The millennium development goals had specifically targeted HIV/AIDS and Malaria for substantial reduction as well as Tuberculosis while many other tropical diseases have been neglected. The new sustainable development goals have not made such distinction and have targeted all diseases for elimination for the improvement of the quality of life of human beings on earth. The present book was developed to provide an update on issues relevant to the treatment of selected tropical diseases such as tuberculosis, malaria, leishmaniasis, schistosomiasis and ectoparasites such as chiggers which are widely distributed throughout the world. The control of these infections has been hampered by the development of drug resistance and the lack of the development of new and more effective drugs. The understanding of the biochemical processes underlying drug activity is therefore essential for the potential elimination of these infections.

Diagnostic Molecular Biology describes the fundamentals of molecular biology in a clear, concise manner to aid in the comprehension of this complex subject. Each technique described in this book is explained within its conceptual framework to enhance understanding. The targeted approach covers the principles of molecular biology including the basic knowledge of nucleic acids, proteins, and genomes as well as the basic techniques and instrumentations that are often used in the field of molecular biology with detailed procedures and explanations. This book also covers the applications of the principles and techniques currently employed in the clinical laboratory. • Provides an understanding of which techniques are used in diagnosis at the molecular level • Explains the basic principles of molecular biology and their application in the clinical diagnosis of diseases • Places protocols in context with practical applications

Molecular Advancements in Tropical Diseases Drug Discovery presents in-depth knowledge relating to the detection of infection, epidemiology, drugs against various tropical diseases, new target sites for drug discovery and multidrug resistance issues using bioinformatics tools and approaches. The book's chapters are written by experts in their respective fields so that each disease is covered in a rational manner and with a solid foundation on existing facts and prospective research ideas. Updates knowledge about tropical diseases with

recent advancements in the field Presents an overview of new research covering detection, infection, epidemiology and risk factors of the most common tropical diseases using bioinformatics tools Encompasses a detailed description of developments in drug discovery, new drugs and their molecular mechanisms of action

Nanotechnology and Nanomaterials in the Treatment of Life-threatening Diseases takes a scientific approach to nanotechnology and nanomaterials applications in medicine, while also explaining the core biological principles for an audience of biomedical engineers, materials scientists, pharmacologists, and medical diagnostic technicians. The book is structured by major disease groups, offering a practical, application-based focus for scientists, engineers, and clinicians alike. The spectrum of medical applications is explored, from diagnostics and imaging to drug delivery, monitoring, therapies, and disease prevention. It also focuses specifically on the synthesis of nanomaterials and their potential health risks (particularly toxicity). Nanomedicine — the application of nanomaterials and devices for addressing medical problems — has demonstrated great potential for enabling improved diagnosis, treatment, and monitoring of many serious illnesses, including cancer, cardiovascular and neurological disorders, HIV/AIDS, and diabetes, as well as many types of inflammatory and infectious diseases. Gain an understanding of how nanotechnologies and nanomaterials can be deployed in the fight against the major life-threatening diseases: cancer, neurological disorders (including Alzheimer's and Parkinson's), cardiovascular diseases, and HIV/AIDS Discover the latest developments in nanomedicine, from therapies and drug delivery to diagnostics and disease prevention The authors cover the health risks of nanomaterials as well as their benefits, considering toxicity and potential carcinogens

Early detection is essential to the control of emerging, reemerging, and novel infectious diseases, whether naturally occurring or intentionally introduced. Containing the spread of such diseases in a profoundly interconnected world requires active vigilance for signs of an outbreak, rapid recognition of its presence, and diagnosis of its microbial cause, in addition to strategies and resources for an appropriate and efficient response. Although these actions are often viewed in terms of human public health, they also challenge the plant and animal health communities. Surveillance, defined as "the continual scrutiny of all aspects of occurrence and spread of a disease that are pertinent to effective control", involves the "systematic collection, analysis, interpretation, and dissemination of health data." Disease detection and diagnosis is the act of discovering a novel, emerging, or reemerging disease or disease event and identifying its cause. Diagnosis is "the cornerstone of effective disease control and prevention efforts, including surveillance." Disease surveillance and detection relies heavily on the astute individual: the clinician, veterinarian, plant pathologist, farmer, livestock manager, or agricultural extension agent who notices something unusual, atypical, or suspicious and brings this discovery in a timely way to the attention of an appropriate representative of human public health, veterinary medicine, or agriculture. Most developed countries have the ability to detect and diagnose human, animal, and plant diseases. Global Infectious Disease Surveillance and Detection: Assessing the Challenges -- Finding Solutions, Workshop Summary is part of a 10 book series and summarizes the recommendations and presentations of the workshop.

Infectious diseases are the leading cause of death globally, particularly among children and young adults. The spread of new pathogens and the threat of antimicrobial resistance pose particular challenges in combating these diseases. Major Infectious Diseases identifies feasible, cost-effective packages of interventions and strategies across delivery platforms to prevent and treat HIV/AIDS, other sexually transmitted infections, tuberculosis, malaria, adult febrile illness, viral hepatitis, and neglected tropical diseases. The volume emphasizes the need to effectively address emerging antimicrobial resistance, strengthen health systems, and increase access to care. The attainable goals are to reduce incidence, develop innovative approaches, and optimize existing tools in resource-constrained settings.

Infectious Diseases: Selected Entries from the Encyclopedia of Sustainability Science and Technology presents authoritative, peer-reviewed contributions from leading experts on a wide range of major infectious diseases of global importance. Infectious diseases account for more than 17 million deaths each year worldwide. While modern medicine and technology have diminished the threat of many of these pathogens in high-income countries, the ever present threats of re-emerging infections, population mobility, natural disasters, and pathogen genetic variability are but some of the reasons for the dynamic threat of this broad category of risks to human health. An indispensable resource for students and scientists, the volume also covers some of the new technologies currently under development for infectious disease prevention, treatment, and eradication. The greater part of the infectious disease burden remains in the tropics, where low and middle-income countries lack the resources, infrastructure, and health systems to mount or sustain control efforts. Many contributions describe the efforts of the scientific research community and international donor agencies to achieve the integrated goals of vigilant surveillance, improved and cost-effective diagnostics, and treatment for sustainable disease control.

This report evaluates the changing global public health landscape; assesses progress towards the 2020 targets; and considers the possible core elements of a strategic vision to integrating neglected tropical diseases into the 2030 Agenda of the Sustainable Development Goals. Advances have been made through expanded interventions delivered through five public health approaches: innovative and intensified disease management; preventive chemotherapy; vector ecology and management; veterinary public health services; and the provision of safe water, sanitation and hygiene. In 2015 alone nearly one billion people were treated for at least one disease and significant gains were achieved in relieving the symptoms and consequences of diseases for which effective tools are scarce; important reductions were achieved in the number of new cases of sleeping sickness, of visceral leishmaniasis in South-East Asia and also of Buruli ulcer. The report also considers vector control strategies and discusses the importance of the draft WHO Global Vector Control Response 2017-2030. It argues that veterinary public health requires a multifaceted approach across the human-animal interface as well as a multisectoral program of work to protect and improve the physical, mental and social well-being of humans, including veterinary, water, sanitation and hygiene. Integration of activities and interventions into broader health systems is crucial, and despite challenges, has the potential to accelerate progress towards universal health coverage while advancing the 2030 Agenda. In short, this report drives the message home that "no one must be left behind."

Strategies for providing optimal care to this high-risk patient group The immunocompromised patient population is increasing throughout the world. Major advances in transplantation techniques have expanded access to lifesaving therapies and improved outcomes in these high-risk populations. An understanding of the biology of these infections, host conditions, and the limitations of technologies used to detect and quantify such pathogens is critical to optimal care. This new edition of Diagnostic Microbiology of the Immunocompromised Host covers all aspects of state-of-the-art diagnostics for infectious complications in the immunocompromised patient. Editors Randall Hayden, Karen Carroll, Yi-Wei Tang and Donna Wolk, assembled the contributions of a team of preeminent authors to discuss a broad range of topics, including relevant aspects of host biology, antineoplastic, and transplantation techniques and the basis of immunosuppressive conditions ranging from diabetes to age-related immunosuppression approaches, interpretations, and limitations of laboratory diagnosis of infections by a wide range of specific etiologic agents laboratory diagnosis of infections of specific organ systems, such as respiratory tract infections, gastrointestinal tract infections, and central nervous system infections special topics such as prosthetic devices and catheters, healthcare acquired infections, and morphologic considerations (anatomic pathology) future diagnostic technologies and their potential impact on the field Diagnostic Microbiology of the Immunocompromised Host is a resource for laboratory medicine specialists, pathologists, technologists, students, and

clinical care professionals who are involved or interested in the care of the immunocompromised host.

"One Health" is defined as an approach to achieve better health outcomes for humans, animals, and the environment through collaborative and interdisciplinary efforts. The One Health framework is increasingly being applied to the management, control, and even elimination of neglected tropical diseases (NTDs), a set of infectious diseases that, collectively, affect more than one billion people across almost 150 countries. NTDs are some of the most common infections in the world; they cause substantial morbidity and mortality, particularly in regions with little access to medical care and other resources. Although there is increasing recognition of the major public health threat presented by NTDs, the ecological complexities of their transmission continue to pose challenges for their control and elimination. Some NTDs are zoonotic, meaning that they can be transmitted between humans and animals and, as such, present obstacles for public health and veterinary services in addition to concerns for wildlife conservation. Vector-borne NTDs necessitate measures that integrate consideration of the environment into public health strategies in order to sustainably reduce disease transmission. This book presents a collection of papers that explore various aspects of how the One Health concept is being applied to NTD control around the world, from genomics and diagnostic tools to improved surveillance and disease management. Encompassing research from Central America, the Caribbean, Asia, and sub-Saharan Africa, the collection emphasizes the diversity of NTDs as well as the critical importance of multisectoral collaboration for their control and elimination.

Applications of Nanobiotechnology for Neglected Tropical Diseases describes recent advances in nanobiotechnology that can be applied to reducing the global disease burden of neglected tropical diseases (NTDs). The book explores the application of nanotechnology on the development of safe, effective, and reliable tools to prevent, diagnose, and treat NTDs. Furthermore, Applications of Nanobiotechnology for Neglected Tropical Diseases includes multidisciplinary content, combining knowledge from biochemistry, medicinal chemistry, material sciences, pharmacology, and pharmaceutics. The book is divided into three main parts, each outlining one major type of approach: (1) nano-based approaches for prevention, (2) nano-diagnostics and detection, and (3) nanotherapeutics. Each part contains chapters that delve into the different applications of the type of approach being presented in that part. A discussion of other approaches against NTD follows these three parts. This book is remarkable in its ability to encompass and thoroughly explain the latest techniques in nanobiotechnology, from basic research to patient-oriented investigation. Offers a broad overview of nanobiotechnology applied to the prevention, diagnostics, and treatment of NTDs Presents cutting-edge recent advances in nanobiotechnology, focusing on diseases reported by the World Health Organization’s NTDs Roadmap (e.g., leishmaniasis, malaria, schistosomiasis, filariasis, etc.) Provides a deep discussion about ground-breaking approaches designed to meet the medical needs of patients suffering from NTDs Gives examples of multidisciplinary investigations into NTDs, from research labs to clinics

A comprehensive resource describing innovative technologies and digital health tools that can revolutionize the delivery of health care in low- to middle-income countries, particularly in remote rural impoverished communities Revolutionizing Tropical Medicine offers an up-to-date guide for healthcare and other professionals working in low-resource countries where access to health care facilities for diagnosis and treatment is challenging. Rather than suggesting the expensive solution of building new bricks and mortar clinics and hospitals and increasing the number of doctors and nurses in these deprived areas, the authors propose a complete change of mindset. They outline a number of ideas for improving healthcare including rapid diagnostic testing for

infectious and non-infectious diseases at a point-of-care facility, together with low cost portable imaging devices. In addition, the authors recommend a change in the way in which health care is delivered. This approach requires task-shifting within the healthcare provision system so that nurses, laboratory technicians, pharmacists and others are trained in the newly available technologies, thus enabling faster and more appropriate triage for people requiring medical treatment. This text: Describes the current burden of communicable and non-communicable diseases in low- to middle-income countries throughout the world Describes the major advances in healthcare outcomes in low-to middle-income countries derived from implementation of the United Nations/World Health Organisation's 2000 Millennium Development Goals Provides a review of inexpensive rapid diagnostic point-of-care tests for infectious diseases in low-resource countries, particularly for people living in remote rural areas Provides a review of other rapid point-of-care services for assessing hematological function, biochemical function, renal function, hepatic function and status including hepatitis, acid-base balance, sickle cell disease, severe acute malnutrition and spirometry Explores the use of low-cost portable imaging devices for use in remote rural areas including a novel method of examining the optic fundus using a smartphone and the extensive value of portable ultrasound scanning when x-ray facilities are not available Describes the use of telemedicine in the clinical management of both children and adults in remote rural settings Looks to the future of clinical management in remote impoverished rural settings using nucleic acid identification of pathogens, the use of nanoparticles for water purification, the use of drones, the use of pulse oximetry and the use of near-infrared spectroscopy Finally, it assesses the potential for future healthcare improvement in impoverished areas and how the United Nations/World Health Organization 2015 Sustainable Development Goals are approaching this. Written for physicians, infectious disease specialists, pathologists, radiologists, nurses, pharmacists and other health care workers, as well as government healthcare managers, Revolutionizing Tropical Medicine is a new up-to-date essential and realistic guide to treating and diagnosing patients in low-resource tropical countries based on new technologies.

Advances in Cell and Molecular Diagnostics brings the scientific advances in the translation and validation of cellular and molecular discoveries in medicine into the clinical diagnostic setting. It enumerates the description and application of technological advances in the field of cellular and molecular diagnostic medicine, providing an overview of specialized fields, such as biomarker, genetic marker, screening, DNA-profiling, NGS, cytogenetics, transcriptome, cancer biomarkers, prostate specific antigen, and biomarker toxicologies. In addition, it presents novel discoveries and clinical pathologic correlations, including studies in oncology, infectious diseases, inherited diseases, predisposition to disease, and the description or polymorphisms linked to disease states. This book is a valuable resource for oncologists, practitioners and several members of the biomedical field who are interested in understanding how to apply cutting-edge technologies into diagnostics and healthcare. Encompasses the current scientific advances in the translation and validation of cellular and molecular discoveries into the clinical diagnostic setting Explains the application of cellular and molecular diagnostics methodologies in clinical trials Focuses on translating preclinical tests to the bedside in order to help readers apply the most recent technologies to healthcare

Presenting the latest molecular diagnostic techniques in one comprehensive volume The molecular diagnostics landscape has changed dramatically since the last edition of Molecular Microbiology: Diagnostic Principles and Practice in 2011. With the spread of molecular testing and the development of new technologies and their opportunities, laboratory professionals and physicians more than ever need a resource to help them navigate this rapidly evolving field. Editors David Persing and Fred Tenover have brought together a team of experienced researchers and diagnosticians to update this third edition comprehensively, to present the latest developments in molecular diagnostics in the support of clinical care and of basic and clinical research, including next-generation sequencing and whole-genome analysis. These updates are provided in an easy-to-read format and supported by a broad range of practical advice, such as determining the appropriate type and quantity of a specimen, releasing and concentrating the targets, and eliminating inhibitors. Molecular Microbiology: Diagnostic Principles and Practice Presents the latest basic scientific theory underlying molecular diagnostics Offers tested and proven applications of molecular diagnostics for the diagnosis of infectious diseases, including point-of-care testing Illustrates and summarizes key concepts and techniques with detailed figures and tables Discusses emerging technologies, including the use of molecular typing methods for real-time tracking of infectious outbreaks and antibiotic resistance Advises on the latest quality control and quality assurance measures Explores the increasing opportunities and capabilities of information technology Molecular Microbiology: Diagnostic Principles and Practice is a textbook for molecular diagnostics courses that can also be used by anyone involved with diagnostic test selection and interpretation. It is also a useful reference for laboratories and as a continuing education resource for physicians.

This publication is intended to contribute to prevention and control of the morbidity and mortality associated with dengue and to serve as an authoritative reference source for health workers and researchers. These guidelines are not intended to replace national guidelines but to assist in the development of national or regional guidelines. They are expected to remain valid for five years (until 2014), although developments in research could change their validity.--Publisher's description

"Neglected tropical diseases (NTDs) blight the lives of a billion people worldwide and threaten the health of millions more. These ancient companions of poverty weaken impoverished populations, frustrate the achievement of health in the Millennium Development Goals and impede global health and economies has convinced governments, donors, the pharmaceutical industry and other agencies, including nongovernmental organizations (NGOs), to invest in preventing and controlling this diverse group of diseases. Global efforts to control "hidden" diseases, such as dracunculiasis (guinea-worm disease), leprosy, gains including the imminent eradication of dracunculiasis. Since 1989 (when most endemic countries began reporting monthly from each endemic village), the number of new dracunculiasis cases has fallen from 892 055 in 12 endemic countries to 3190 in 4 countries in 2009, a decrease of more than 99%. The World Health Organization (WHO) recommends five public-health strategies for the prevention and control of NTDs: preventive chemotherapy; intensified case-management; vector control; the provision of safe water, sanitation and hygiene; and veterinary public health (that is, applying veterinary sciences to ensure the health and well-being of humans). Although one approach and delivered locally." - p. vii