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Food Safety
Microbiology, Pathology, Immunology, Therapy and Prophylaxis
Bacterial Invasiveness
Ergebnisse der Mikrobiologie und Immunitätsforschung
Leptospira and Leptospirosis

ANDREA JAYVON

Deep Subsurface Microbiology Springer Science & Business Media Clostridium difficile has been recognized as the cause of a broad spectrum of enteric disease ranging from mild antibiotic-associated diarrhea to pseudomembranous colitis. This volume gives new insights into the microbiology, diagnostics and epidemiology of Clostridium difficile and describes recent strategies in treatment of diseases caused by this agent. Main parts of the volume are devoted to Clostridium difficile toxins A and B which are the major virulence factors. The molecular biology, biochemistry, pharmacology and cell biology of these toxins which are the prototypes of a new family of large clostridial cytotoxins is described in great detail. Clostridium difficile toxins act as glucosyltransferases to inactivate small GTP-

binding proteins of the Rho family which are involved in regulation of the actin cytoskeleton, cell adhesion and various signaling processes.
Immunology and Immunopathogenesis of Malaria Springer Science & Business Media
This volume has gathered some of the experts in the field to review aspects of our understanding of CMV and to offer perspectives of the current problems associated with CMV. The editors and authors hope that the chapters will lead to a better understanding of the virus that will assist in the development of new and unique antivirals, a protective vaccine, and a full understanding of CMV's involvement in human disease.
Emerging Issues, Technologies and Systems Springer Science & Business Media
Deep subsurface microbiology is a highly active and rapidly advancing research field at the interface of microbiology and the geosciences; it focuses on the detection, identification, quantification, cultivation and activity measurements of bacteria, archaea and eukaryotes that permeate the subsurface biosphere of deep marine sediments and the basaltic ocean and continental crust. The deep subsurface biosphere abounds with uncultured, only recently discovered and – at best - incompletely understood microbial populations. In spatial extent and volume, Earth's subsurface biosphere is only rivaled by the deep sea water column. So far,

no deep subsurface sediment has been found that is entirely devoid of microbial life; microbial cells and DNA remain detectable at sediment depths of more than 1 km; microbial life permeates deeply buried hydrocarbon reservoirs, and is also found several kilometers down in continental crust aquifers. Severe energy limitation, either as electron acceptor or donor shortage, and scarcity of microbially degradable organic carbon sources are among the evolutionary pressures that have shaped the genomic and physiological repertoire of the deep subsurface biosphere. Its biogeochemical role as long-term organic carbon repository, inorganic electron and energy source, and subduction recycling engine continues to be explored by current research at the interface of microbiology, geochemistry and biosphere/geosphere evolution. This Research Topic addresses some of the central research questions about deep subsurface microbiology and biogeochemistry: phylogenetic and physiological microbial diversity in the deep subsurface; microbial activity and survival strategies in severely energy-limited subsurface habitats; microbial activity as reflected in process rates and gene expression patterns; biogeographic isolation and connectivity in deep subsurface microbial communities; the ecological standing of subsurface biospheres in comparison to the surface biosphere – an

independently flourishing biosphere, or mere survivors that tolerate burial (along with organic carbon compounds), or a combination of both? Advancing these questions on Earth's deep subsurface biosphere redefines the habitat range, environmental tolerance, activity and diversity of microbial life.

Viruses and Nanotechnology Horizon Scientific Press

In recent years, plants have been increasingly explored for production of biomedicines and vaccine components. The two main advantages of plant systems are low cost and a greater potential for scalability as compared to microbial or animal systems. An additional advantage from the public health point of view is high safety compared to animal systems, which is important for vaccine production: there are no known plant pathogens capable of replicating in animals, and in humans in particular. A particular antigen or a protein has to be expressed in a plant using one of many available platforms; this antigen/protein subsequently needs to be purified or processed, and later formulated into a vaccine or a therapeutic; these need to be delivered to a human or animal body via an appropriate route. Naturally, all these vaccines and therapeutics must be subjected to regulatory approvals prior to their use. Thus, the challenge is to adapt plant-based platforms for production of cost-efficient biomedicals that can be approved by FDA

for use as vaccine components or therapeutics which will be competitive against existing vaccines and drugs. This volume attempts to address the entire spectrum of challenges facing the nascent field of plant-based biomedicals, from the selection of an appropriate production platform to specific methods of downstream processing and regulatory approval issues.
Bacterial Biofilms Springer Science & Business Media
Throughout the biological world, bacteria thrive predominantly in surface-attached, matrix-enclosed, multicellular communities or biofilms, as opposed to isolated planktonic cells. This choice of lifestyle is not trivial, as it involves major shifts in the use of genetic information and cellular energy, and has profound consequences for bacterial physiology and survival. Growth within a biofilm can thwart immune function and antibiotic therapy and thereby complicate the treatment of infectious diseases, especially chronic and foreign device-associated infections. Modern studies of many important biofilms have advanced well beyond the descriptive stage, and have begun to provide molecular details of the structural, biochemical, and genetic processes that drive biofilm formation and its dispersion. There is much diversity in the details of biofilm development among various species, but there are also commonalities. In most

species, environmental and nutritional conditions greatly influence biofilm development. Similar kinds of adhesive molecules often promote biofilm formation in diverse species. Signaling and regulatory processes that drive biofilm development are often conserved, especially among related bacteria. Knowledge of such processes holds great promise for efforts to control biofilm growth and combat biofilm-associated infections. This volume focuses on the biology of biofilms that affect human disease, although it is by no means comprehensive. It opens with chapters that provide the reader with current perspectives on biofilm development, physiology, environmental, and regulatory effects, the role of quorum sensing, and resistance/phenotypic persistence to antimicrobial agents during biofilm growth. *Hepatitis C Virus: From Molecular Virology to Antiviral Therapy* Springer Nature

Nanotechnology is a collective term describing a broad range of relatively novel topics. Scale is the main unifying theme, with nanotechnology being concerned with matter on the nanometer scale. A quintessential tenet of nanotechnology is the precise self-assembly of nanometer-sized components into ordered devices. Nanotechnology seeks to mimic what nature has achieved, with precision at the nanometer level down to the atomic level. Nanobiotechnology, a division of

nanotechnology, involves the exploitation of biomaterials, devices or methodologies in the nanoscale. In recent years a set of b- molecules has been studied and utilized. Virus particles are natural nanomaterials and have recently received attention for their tremendous potential in this field. The extensive study of viruses as pathogens has yielded detailed knowledge about their biological, genetic, and physical properties. Bacterial viruses (bacte- ophages), plant and animal eukaryotic viruses, and viruses of archaea have all been characterized in this manner. The knowledge of their replicative cycles allows manipulation and tailoring of particles, relying on the principles of self-assembly in infected hosts to build the base materials. The atomic resolution of the virion structure reveals ways in which to tailor particles for higher-order functions and assemblies.

An Armour and a Weapon for Human Fungal Pathogens

Springer Science & Business Media

Scientific research on dengue has a long and rich history. The literature has been touched by famous names in medicine- Benjamin Rush, Walter Reed, and Albert Sabin, to name a very few- and has been fertile ground for medical historians . The advances made in those early investigations are all the more remarkable for the limited tools available at the time. The demonstration of a viral etiology for dengue fever,

the recognition of mosquitoes as the vector for transmission to humans, and the existence of multiple viral variants (serotypes) with only partial cross-protection were all accomplished prior to the ability to culture and characterize the etiologic agent. Research on dengue in this period was typically driven by circumstances. Epidemics of dengue created public health crises, although these were relatively short-lived in any one location, as the population of susceptible individuals quickly shrank. Military considerations became as a major driving force for research. With the introduction of large numbers of non-immune individuals into endemic areas, dengue could cripple military readiness, taking more soldiers out of action than hostile fire. Dengue and dengue hemorrhagic fever, which assumed pandemic proportions during the latter half of the last century, have shown no indication of slowing their growth during this first decade of the twenty-first century. Challenges remain in understanding the basic mechanisms of viral replication and disease pathogenesis, in clinical management of patients, and in control of dengue viral transmission. Nevertheless, new tools and insights have led to major recent scientific advances. As the first candidate vaccines enter large-scale efficacy trials, there is reason to hope that we may soon "turn the corner" on this disease.

Current Topics in

Microbiology and Immunology Springer Science & Business Media Antigen presentation is central to the immune response, and is instrumental in ensuring that the response mounted is that best suited to the eradication of the particular microbe faced. In this volume, experts in the field provide state-of-the-art descriptions of the antigen presentation pathways. How do viruses disrupt these critical pathways, and to what effect? Do all tissues present antigen in the same way? If not, why? What are the consequences of dysfunctional antigen presentation, seen in certain genetic disorders? This book considers not only the molecular details, but also their relevance to the whole organism.

Current Topics and Applications Springer Science & Business Media Malaria is still a major global health problem, killing more than 1 million people every year. Almost all of these deaths are caused by Plasmodium falciparum, one of the four species of malaria parasites infecting humans. This high burden of mortality falls heavily on Sub-Saharan Africa, where over 90% of these deaths are thought to occur, and 5% of children die before the age of 5 years. The death toll from malaria is still growing, with malaria-specific mortality in young African children estimated to have doubled during the last twenty years. This increase has been associated with drug resistance of the parasite,

spread of insecticide resistant mosquitoes, poverty, social and political upheaval, and lack of effective vaccines. This collection of reviews addresses many of these important issues of malarial immunity and immunopathology. They are of interest not only to malariologists, but hopefully also to the broader immunological community. Strong interactions with, and feedback from immunologists working in other infectious diseases and in basic immunology will help us to move the field of malaria immunology and therapeutic intervention forward more quickly. *Volume 80* Springer Science & Business Media The processes involved in herpesvirus replication, latency, and oncogenic transformation, have, in general, been rather poorly defined. A primary reason for this is the size and complexity of the herpesvirus genome. Undoubtedly, a better understanding of the functions of the viral genome in infected and transformed cells will be achieved through studies with temperature-sensitive (ts) mutants of herpesviruses since, theoretically, any essential gene function can be affected by mutants of this type. A. The Herpesviruses A consideration of the genetic analysis of members of the herpesvirus group necessitates a description, albeit brief, of the properties of the group and, most importantly, of their genetic material. The

herpesviruses comprise a group of relatively large (100-150 nm), enveloped viruses. The envelope surrounds an icosahedral capsid enclosing a core which contains double stranded DNA (ROIZMAN, 1969). The group is thus defined on the basis of a common virion morphology. In addition to a common structure, members of the group share a number of biological properties such as a similar replicative cycle, the ability to cause latent and chronic infections, and the ability to induce antigenic modifications of infected cell membranes. Several herpes viruses have been associated recently with malignancies in man and animals (KLEIN, 1972). Herpesviruses are ubiquitous and have been described in over 30 different species (HUNT and MELENDEZ, 1969; WILDY, 1971; FARLEY et al. , 1972; KAZAMA and SCHORNSTEIN, 1972; NAHMIAS et al. , 1972; ROlZMAN et al. , 1973). Their widespread occurrence in nature suggests a common ancestor.

Current Research Topics in Applied Microbiology and Microbial Biotechnology Springer

Phenomena as diverse as tuberculin sensitivity, delayed sensitivity to soluble proteins other than tuberculin, contact allergy, homograft rejection, experimental autoallergies, and the response to many microorganisms, have been classified as members of the class of immune reactions known as delayed or cellular hypersensitivity.

Similarities in time course, histology, and absence of detectable circulating immunoglobulins characterize these cell-mediated immune reactions in vivo. The state of delayed or cellular hypersensitivity can be transferred from one animal to another by means of sensitized living lymphoid cells (CHASE, 1945; LANDSTEINER and CHASE, 1942; MITCHISON, 1954). The responsible cell has been described by GOWANS (1965) as a small lymphocyte. Passive transfer has also been achieved in the human with extracts of sensitized cells (LAWRENCE, 1959). The in vivo characteristic of delayed hypersensitivity from which the class derives its name is the delayed skin reaction. When an antigen is injected intradermally into a previously immunized animal, the typical delayed reaction begins to appear after 4 hours, reaches a peak at 24 hours, and fades after 48 hours. It is grossly characterized by induration, erythyma, and occasionally necrosis. The histology of the delayed reaction has been studied by numerous investigators (COHEN et al. , 1967; GELL and HINDE, 1951; KOSUNEN, 1966; KOSUNEN et al. , 1963; MCCLUSKEY et al. , 1963; WAKSMAN, 1960; WAKSMAN, 1962). Initially dilatation of the capillaries with exudation of fluid and cells occurs.

Diversity, Distribution and Ecological Functioning

Springer Science & Business Media

In the last few years the major effect that RNAi has had in invertebrate

systems is beginning to take hold in mammalian systems through both single gene knockdown experiments and genome-scale screens. In the next decade, there will no doubt be both notable successes and failures as we attempt to apply this genetic tool to various biological problems. Through the introduction of RNAi, mammalian systems have finally gained admittance to the pantheon of model genetic systems.

Current Topics in Microbiology and Immunology Springer

The proper physiological functioning of most eukaryotic cells requires their assembly into multi-cellular tissues that form organized organ systems. Cells of the immune system develop in bone marrow and lymphoid organs, but as the cells mature they leave these organs and circulate as single cells. Antigen receptors (TCRs) of T cells search for membrane MHC proteins that are bound to peptides derived from infectious pathogens or cellular transformations. The detection of such speci?c peptide–MHC antigens initiates T cell activation, adhesion, and immune-effectors functions. Studies of normal and transformed T cell lines and of T cells from transgenic mice led to comprehensive understanding of the mole- lar basis of antigen-receptor recognition and signaling. In spite of these remarkable genetic and biochemical advances, other key physiological mechanisms that par-cipate in sensing and

decoding the immune context to induce the appropriate cellular immune responses remain unresolved. TCR recognition is tightly regulated to trigger sensitive but balanced T cell responses that result in the effective elimination of the pathogens while minimizing collateral damage to the host. The sensitivity of TCR recognition has to be properly tempered to prevent unintended activation by self-peptide–MHC complexes that cause autoimmune diseases. It is likely that once the TCR is engaged by a peptide– MHC and TCR signaling begins, additional regulatory mechanisms, involving other receptors, would increase the ?delity of the response.

The Fungal Cell Wall

Springer

Workshops on the mechanisms of B cell neoplasia have been organized alternatively in Bethesda and Basel since 1983. Prog ress in our understanding of the development and responses of B lymphocytes is presented and discussed with the aim and hope to understand what might go wrong when B lymphocytes are transformed into malignant cells. Such knowledge might lead to better diagnosis, prevention and even cure of these terri ble diseases. The presentations at the Bethesda workshops are published as papers in volumes of Current Topics in Microbiol ogy and Immunology, while the presentations and

discussions in Basel were transcribed and published in Editions Roche. For the first time, a Basel workshop (held 4th-6th October 1998) that has been recorded and, in part, transcribed is being published as papers and discussions within Current Topics. This volume is the latest of a long series which documents the excitements of ground-breaking discoveries as well as the frustrations of our inability to fully understand the mechanisms leading to B cell neoplasia. The papers at the workshop are presented when possible in the sequence in which they were given. However, to facilitate the organization and reading of the book and to highlight gen eral topics and themes, the papers are organized into five sec tions: I B Cell and Plasma Cell Development II Chemokines and Chemokine Receptors III Chromosomal Translocations, DNA Rearrangements and Somatic Hypermutations IV Biology of Lymphomagenesis, B-CLL, Autoimmunity V Myeloma, Plasmacytomas and Related Subjects.

Mechanisms of B Cell Neoplasia 1998 Current Topics in Microbiology and ImmunologyErgebnisse der Mikrobiologie und Immunitätsforschung Bacterial plasmids are circular double-stranded DNA molecules that are physi cally separate from the bacterial chromosome. They are replicated and stably inherited in the extrachromosomal (autonomous) state. The plasmids of entero

bacteria can be divided into two distinct groups according to their size: (i) small plasmids with MW of less than 10 Mdal, and (ii) large plasmids with MW ranging from 50-100 Mdal. These two groups differ strikingly in their copy numbers per cell (multiplicity). Whereas most small plasmids are multicopy plasmids (20-100 copies per cell), large plasmids are normally present at a multiplicity similar to the number of chromosomal genome equivalents (oligo copy plasmids). Furthermore, large plasmids can promote the transfer of DNA by conjugation and are therefore classified as conjugative plasmids. Since this property depends on the presence of the tra operon, a 15-20 Mdal segment of DNA (Helmuth and Achtman, 1975), small plasmids are necessarily nonconju gative. Because of their inability to mediate DNA transfer, small plasmids have often been designated as "nontransmissible. " This is clearly a misnomer since nonconjugative plasmids can in general be mobilized for conjugal transfer by a conjugative plasmid present in the same cell. Plasmids can further be classified with respect to their ability to continue replication in the absence of de novo protein synthesis (stable replication).

Ergebnisse der Mikrobiologie und Immunitätsforschung
Springer Science & Business Media
This volume reviews the unique and common features of rhabdoviruses,

which have a very wide host range and are associated with human diseases and also infect domestic livestock and agricultural plants, causing enormous economic loss.
Springer
This book illustrates, that the fungal cell wall is critical for the biology and ecology of all fungi and especially for human fungal pathogens. Readers will learn, that the composition of the fungal cell wall is a unique structure, which cannot be found in the human host. Consequently, the chapters outline, how the immune systems of both animals and humans have evolved to recognize conserved and unique elements of the fungal cell wall. As an application example, the authors also show, that the three-dimensional structures of the cell wall are excellent targets for the development of antifungal agents and chemotherapeutic strategies. With the combination of biological findings and medical outlooks, this volume is a fascinating read for scientists, clinicians and biomedical students.
Ergebnisse der Mikrobiologie und Immunitätsforschung
Frontiers Media SA
Hepatitis C virus (HCV), a major causative agent of chronic liver disease, is spread throughout the world and around 170 million people are persistently infected. In this volume, world-leading experts in the field of HCV research have compiled the most recent scientific advances to provide a comprehensive and very

timely overview of the various facets of HCV. The book starts with a discussion of the possible origin of HCV and its spread among the human population. The focus of the subsequent chapters is on available cell culture and in vivo models before shifting to the molecular and cellular principles underlying the viral replication cycle. These chapters are complemented by insightful descriptions of the innate and adaptive immune responses to HCV as well as the virus-associated pathogenesis. Finally, the development of antiviral therapies, which is closely linked with progress in basic research, and the implementation of those therapies into present and future daily clinical practice are highlighted.

Between Pathogenicity and Commensalism

Springer

This volume offers a comprehensive overview of basic and applied aspects of Staphylococcus aureus, which is one of the most important human pathogens. It includes sixteen chapters that address the microbiology and immunology of S. aureus, the pathology of its key manifestations, and the current standard of care. Further, it reviews cutting-edge advances in alternative therapeutic and prophylactic approaches to antibiotics. All chapters were written by respected experts in the field – presenting recent findings on a diverse range of aspects, they are nonetheless interlinked. As such, the book is a must-read for all

researchers, clinicians and technicians engaged in basic or applied science work involving S. aureus.
Clostridium difficile
Springer Science & Business Media
The interplay between tumors and their immunologic microenvironment is complex, difficult to decipher, but its understanding is of seminal importance for the development of novel prognostic markers and therapeutic strategies. The present review discusses tumor-immune interactions in several human cancers that illustrate various aspects of this complexity and proposes an integrated scheme of the impact of local immune reactions on clinical outcome. Current active immunotherapy trials have shown durable tumor regressions in a fraction of patients. However, clinical efficacy of current vaccines is limited, possibly because tumors skew the immune system by means of myeloid-derived suppressor cells, inflammatory type 2 T cells and regulatory T cells (Tregs), all of which prevent the generation of effector cells. To improve the clinical efficacy of cancer vaccines in patients with metastatic disease, we need to design novel and improved strategies that can boost adaptive immunity to cancer, help overcome Tregs and allow the breakdown of the immunosuppressive tumor microenvironment.