Role Of The Mannose Binding Lectin In Innate Immunity

This book provides up-to-date information on the crucial interaction of pathogenic bacteria and professional phagocytes, the host cells whose purpose is to ingest, kill, and digest bacteria in defense against infection. The introductory chapters focus on the receptors used by professional phagocytes to recognize and phagocytose bacteria, and the signal transduction events that are essential for phagocytosis of bacteria. Subsequent chapters discuss specific bacterial pathogens and the strategies they use in confronting professional phagocytes. Examples include Helicobacter pylori, Streptococcus pneumoniae, and Yersinae, each of which uses distinct mechanisms to avoid being phagocytosed and killed. Contrasting examples include Listeria monocytogenes and Mycobacterium tuberculosis, which survive and replicate intracellularly, and actually cooperate with phagocytes to promote their entry into these cells. Together, the contributions in this book provide an outstanding review of current knowledge regarding the mechanisms of phagocytosis and how specific pathogenic bacteria avoid or exploit these mechanisms.

Drawing on her extensive classroom experience, the editor provides a clearly written contemporary introduction to the body's responses to disease. She brings a strong experimental/clinical focus to the study of immunology at the molecular and cellular levels, employing a range of effective pedagogical tools not found in other introductory books on the subject. A glossary, chapter summaries, and study questions using clinical cases are included.

This dissertation, "The Role of Mannose Binding Lectin in Influenza Virus Infection" by Man-to, Ling, ???, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. DOI: 10.5353/th_b4308529 Subjects: Mannose Lectins Influenza A virus Influenza - Immunological aspects

The book presents the latest findings on C-type lectin receptors, focusing on individual receptors and their signaling. In recent years there have been great advances in the understanding of the function of these receptors as a newly emerging family of pattern-recognition receptors (PRRs) for pathogen-associated molecular patterns (PAMPs) and damage-associated molecular patterns (DAMPs). Comprising four parts: ITAM-coupled Activating Receptors; HemITAM-bearing Receptors; ITIM-bearing Receptors; and Other Receptors and Related Topics, this comprehensive review covers a broad range of C-type lectin receptors. The updated information on C-type lectin receptors and their ligands provided will appeal to a wide readership, from basic immunologists to physicians and surgeons. In addition, sections on novel drug development make this a valuable resource for pharmaceutical scientists.

This dissertation, "The Role of Mannose Binding Lectin in Pandemic H1N1 Influenza Virus Infection" by Man-to, Ling, ???, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. Abstract: Mannose-binding lectin (MBL) functions as pattern recognition molecule to mediate first-line host defense against invading pathogens. Although MBL is well-known for its anti-bacterial action, its role towards virus infection is less comprehensively understood. In 2009, the pandemic H1N1 2009 (pdmH1N1)

influenza A virus caused more than 18,000 deaths worldwide and is still circulating in human community as a seasonal strain. In this study, the role of MBL in pdmH1N1 infection was investigated. Using in vitro microtiter capture assay, MBL was found to bind to pdmH1N1 virus via its carbohydrate recognition domain. Under transmission electron microscope (TEM), MBL was clearly visible on the surface of pdmH1N1 virus. By infecting C57B6/J wild-type (WT) and MBL knockout (KO) mice with a sub-lethal dose of pdmH1N1 virus, WT mice displayed greater weight loss and more severe lung damage than MBL KO mice. Using flow cytometry-based profiling analysis of the lung homogenates isolated from infected mice, a variety of proinflammatory cytokines and chemokines were found to be significantly up-regulated. These results indicate that the presence of MBL can cause excess proinflammatory cytokine production and result in a more severe pdmH1N1 infection. To provide physiologically relevant insight into the immunomodulating role of MBL, the investigation was further extended to the use of human cell line model. Infection of A549 cells, which is a human lung epithelial cell line, with MBL-bound pdmH1N1 virus elevated the production of MCP1, RANTES and IL-8 significantly more than unbound pdmH1N1 infection. The increased production of chemokines also enhanced recruitment of monocytes as demonstrated by transwell migration assay. Interestingly, MBL did not affect viral entry or replication kinetics. TEM and confocal imaging revealed the presence of MBL-bound pdmH1N1 inside infected A549 cells, suggesting that the endocytosed MBL may interact with intracellular components to promote the release of cytokines and chemokines. To this end, expressions of Toll-like receptors were examined (TLR3, TLR7, TLR8 and TLR9) and found that TLR3 expression was dramatically enhanced upon pdmH1N1 infection. Interestingly, in MBL-bound pdmH1N1 infection, TLR3 mRNA and protein expression was significantly higher than unbound pdmH1N1 infection in A549 cells. In addition, the NF-?B signaling was further activated in the presence of MBL-bound pdmH1N1. A novel physical interaction between MBL and TLR3 was also delineated as evidenced by MBL's capability to bind to TLR3 in vitro; and their colocalization in the endosomes of the infected A549 cells. In summary, MBL can bind to pdmH1N1 virus but fails to inhibit its infection in human lung epithelial cell line. Upon pdmH1N1 infection, MBL is internalized with the virus into the cell, where it may associate with TLR3 to further amplify the NF-?B signaling and augment the cytokine production in the human lung epithelial cells. The present findings advocate the adverse immunomodulating role of MBL during pdmH1N1 infection. DOI: 10.5353/th_b5060559 Subjects: Influenza A virus Mannose H1N1 influenza - Immunological aspects Lectins

Molecular Regulation of Endocytosis is a compilation of scientific "short stories" about the entry of external substances into cells. As one can see from the chapters, endocytosis regulates diverse processes such as homeostasis of the cell, signal transduction, entry of pathogens and viruses. In addition to the experimental techniques embedded in each chapter, entire chapters are dedicated to experimental approaches that will be useful to all scientists and their model systems. For those more clinically oriented, the final chapters look to the future and ways of utilizing endocytic pathways for therapeutic purposes.

Lessons in Immunity: From Single-cell Organisms to Mammals stems from the activity of the Italian Association of Developmental and Comparative Immunobiology (IADCI), represented by the editors. This book is presented as a series of short overviews that report on the current state of various relevant fields of immunobiology from an evolutionary perspective. The overviews are written by authors directly involved in the research, and most are members of the IADCI or have otherwise been involved in the related research for their respective overview. This publication offers scientists and teachers an easy and updated reference tool. Provides simple and updated reviews on the immunobiology of a wide

spectrum of organisms, considered in an evolutionary context Focuses on both cells and humoral components of a variety of non-classical model organisms Offers in a single volume many contributions which can help with understanding the evolution of immune responses and the main adaptations in animal phyla Presents a valuable holistic cross-sectional approach for teaching immunology and its applications

Target pattern recognition in innate immunity is responsible for the immediate, usually protective, responses shown against invading microorganisms, and it is the principal feature of self and non-self recognition by virtue of the recognition of structures on the microbial pathogens, which are not found on host cells. This is an area that has been very actively researched, over approximately the past 12 years, and therefore this volume provides a timely comprehensive, and up to date, summary of the types and range of cell surface, intracellular, and secreted, host proteins involved in the recognition of microbial products, and of the protective mechanisms triggered as a result of the recognition events. The Toll-like receptors, first described in Drosophila and now well-characterised on human cells, provide an excellent demonstration of the wide range of different microbial products recognised by this family of receptors and of the signalling pathways which are triggered thus leading to induction of inflammatory cytokines and the activation of genes producing antimicrobial products. In addition, several cell surface proteins involved in target pattern recognition have been described on the surfaces of macrophages (macrophage mannose receptor and macrophage scavenger receptors), and on dendritic cells (DEC205), and to be involved with the uptake and clearance of whole microorganisms and polyanioic ligands. Pattern recognition is also utilised by intracellular receptors, with NOD-like receptors in the cytosol recognizing microbial molecules and activating the production of inflammatory cytokines or pathways that induce the production of inflammatory molecules. Secreted proteins, such as the pentraxins, which includes the acute phase reacting, C-reactive protein (CRP) and serum amyloid protein (SAP), and the collectins (mannan binding lectin, lung surfactant protein A and D) and ficolins can also readily recruit killing and clearance systems. Indeed, the serum complement system, which is one of the major defence systems in the bloodstream, is efficiently activated by CR P on its binding to the phosphocholine groups of microbial phospholipids—and the subsequent interaction of the bound CR P with C1q—to give classical pathway activation, or MBL, or ficolin, binding to arrays of mannose or N-acetyl-glucosamine residues, respectively, on the surfaces of microorganisms—to give lectin pathway activation. Also, in addition to the activation and clearance events associated with complement activation by some of the secreted pattern recognition receptors, it is accepted that all these pattern recognition receptors can generally accelerate the uptake and clearance of microbes via phagocytic cells. In view of the growing interest in the cross-talk between innate and adaptive immunity, a thorough understanding of the initial recognition and triggering events, mediated via innate immune receptors, as addressed in this

volume, is clearly very useful in helping to also fully understand the mechanisms of activation and control of the adaptive immune system—and to allow a full assessment of the relative roles played by innate immunity and adaptive immunity against a particular infection in higher organisms.

This volume highlights the recent advances in the basic mechanisms of apoptosis and the application of that knowledge to understanding the impact of defective apoptosis or defective clearance of apoptotic cells on the immune function and the expression of

A comprehensive overview of clinically important infections of the urinary tract Urinary tract infections (UTIs) continue to rank among the most common infectious diseases of humans, despite remarkable progress in the ability to detect and treat them. Recurrent UTIs are a continuing problem and represent a clear threat as antibiotic-resistant organisms and infection-prone populations grow. Urinary Tract Infections: Molecular Pathogenesis and Clinical Management brings the scientific community up to date on the research related to these infections that has occurred in the nearly two decades since the first edition. The editors have assembled a team of leading experts to cover critical topics in these main areas: clinical aspects of urinary tract infections, including anatomy, diagnosis, and management, featuring chapters on the vaginal microbiome as well as asymptomatic bacteriuria, prostatitis, and urosepsis the origins and virulence mechanisms of the bacteria responsible for most UTIs, including uropathogenic Escherichia coli, Proteus mirabilis, and Klebsiella pneumoniae the host immune response to UTIs, the rise of antibiotic-resistant strains, and the future of therapeutics This essential reference serves as both a resource and a stimulus for future research endeavors for anyone with an interest in understanding these important infections, from the classroom to the laboratory and the clinic.

In the post genomic era, understanding of the innate immune system is enriched by findings on the specificity of innate immune reactions as well as to novel functions that do not strictly correlate with immunological defense and surveillance, immune modulation or inflammation. This volume covers natural killer cells, mast cells, phagocytes, toll-like receptors, complement, host defense in plants and invertebrates, evasion strategies of microorganisms, pathophysiology, protein structures, design of therapeutics, and experimental approaches.

Macrophages are the sentinels of the immune system whose role has evolved beyond providing aseptic conditions to homeostasis, immune regulation, development, and behaviour. These cells have varied ontogenetic origins which reflects in their phenotypic and functional heterogeneity. Macrophage functions are fine-tuned by exogenous and endogenous signals and once tweaked, the information is included in their genetic makeup, albeit not indefinitely. Subversion of the macrophage functions is the hallmark of many pathogenic organisms and modulation of macrophage activity is pivotal to many therapeutic strategies. Fascinating and rapid developments in this field have necessitated the maintenance of

currency of knowledge. This book provides a current account of information on varied topics in macrophage biology. Literature surveys have been presented in a captivating and lucid language. The contributing authors have also provided brief accounts of their own research. Every chapter provides a future perspective of what more could be achieved in the context of the current knowledge. The book will be of interest to students and researchers in microbiology, immunobiology, translational research, pathology, and related fields.

In the last decade there has been a great expansion in our knowledge of the existence, nature and functions of mammalian carbohydrate binding proteins. This book covers the structures and postulated functions for the major classes of mammalian carbohydrate binding proteins. These include intracellular lectins involved in diverse functions such as protein synthesis quality control, targetting of lysosomal enzymes and in the secretory pathway. In addition, several chapters are devoted to other major families of lectins that are found at the cell surface or in extracellular fluids which are involved in various recognition functions such as cell-cell interactions in inflammation and recognition of pathogen carbohydrates in host defence.

Structural Glycobiology covers the experimental, theoretical, and alternative technologies used in the study of the structural basis for the diverse biological roles of carbohydrates. The book overviews the application of specialized technologies to the study of carbohydrates in biology, reviews relevant and current research in the field, and is illustrated throughout by specific examples of how research investigations have yielded key structural and associated biological data on carbohydrates and glycolipids. In particular, the book focuses on: X-ray crystallography and small-angle scattering, NMR, and cryo-electron microscopy techniques Theoretical (modeling-based) approaches, such as molecular mechanics, molecular dynamics, free energy calculations, and carbohydrate docking Alternative techniques for yielding structural information on carbohydrates from complex biological samples Carbohydrates in medicine, specifically in areas that have been directly impacted by our understanding of the structural role of carbohydrates in immune recognition: cancer, organ transplantation, and infection

The topic of this book, Collectins, is a family of proteins whose major function is in innate immunity, where Collectins act as pattern recognition receptors (PRRs). In general they recognize targets such as microbial surfaces and apoptotic cells, and once bound to a target, Collectins promote the clearance of microorganisms and damaged host tissue. New cell-surface proteins and glycoproteins, which act as Collectin receptors, are currently being identified. Some Collectins, particularly MBL, activate the complement system, which enhances the ability of antibodies to fight pathogens, via three MBL-associated proteases, the MASPs. Additionally, recent research has begun to show wider-ranging activities of Collectins, such as: · Their role in metabolism, and therefore their involvement in lifestyle diseases such as obesity and

cardiovascular disease. · Their ability to modulate the adaptive immune response, as well as to recognize and trigger apoptosis of cancer cells, which makes them effective in the annihilation of cancer cells with multiple mutations. · The regulation of their expression by gonadal steroid hormones implicates them with critical roles in both male and female fertility. · Altered levels of Collectins have been associated with various autoimmune diseases. This book brings together current knowledge of the structure, functions and biological activities of Collectins, to describe their integral role in human health.

With the increase in volume, velocity and variety of information, researchers can find it difficult to keep up to date with the literature in their field. This invaluable volume contains analysed, evaluated and distilled information on the latest in carbohydrate research. The discovery and synthesis of novel carbohydrates and mimetics with diverse applications continues to be a major challenge for carbohydrate chemists. The understanding of the structure and function of carbohydrates and glycoconjugates remains vital in medicine and molecular biology. This volume collates modern carbohydrate research from theory to application and demonstrates the importance of carbohydrates in new lead generation. It is of benefit to any researcher who wishes to learn about the latest developments in the carbohydrate field.

Urinary tract infections (UTI) continue to be under the most common bacterial infections worldwide. Diagnostic and treatment have substantial financial burden on society. In the USA, UTIs are responsible for more than 7 million physician visits annually and about 15% of all community-prescribed antibiotics in the USA are dispensed for UTIs. About 50% of women will experience at least one UTI episode during lifetime, about 1 million emergency department visits due to UTI in the USA alone, resulting in more than 100 000 hospital admissions annually, most often for pyelonephritis. Moreover, UTIs are also the leading cause of hospital-acquired infections, accounting for approximately 40% of all such cases. The majority of these cases are catheter-associated. Therefore, nosocomial UTIs comprise perhaps the largest institutional reservoir for nosocomial antibiotic-resistant pathogens. Beside the economic impact, UTIs affect also significantly the quality of life of the affected population. The aim of this book is to highlight problematic aspects and recent advances in the field of UTIs. The book is divided in three parts.

Genomic and Personalized Medicine, Second Edition — winner of a 2013 Highly Commended BMA Medical Book Award for Medicine — is a major discussion of the structure, history, and applications of the field, as it emerges from the campus and lab into clinical action. As with the first edition, leading experts review the development of the new science, the current opportunities for genome-based analysis in healthcare, and the potential of genomic medicine in future healthcare. The inclusion of the latest information on diagnostic testing, population screening, disease susceptability, and pharmacogenomics makes this work an ideal companion for the many stakeholders of genomic and personalized

medicine. With advancing knowledge of the genome across and outside protein-coding regions of DNA, new comprehension of genomic variation and frequencies across populations, the elucidation of advanced strategic approaches to genomic study, and above all in the elaboration of next-generation sequencing, genomic medicine has begun to achieve the much-vaunted transformative health outcomes of the Human Genome Project, almost a decade after its official completion in April 2003. Highly Commended 2013 BMA Medical Book Award for Medicine More than 100 chapters, from leading researchers, review the many impacts of genomic discoveries in clinical action, including 63 chapters new to this edition Discusses state-of-the-art genome technologies, including population screening, novel diagnostics, and gene-based therapeutics Wide and inclusive discussion encompasses the formidable ethical, legal, regulatory and social challenges related to the evolving practice of genomic medicine Clearly and beautifully illustrated with 280 color figures, and many thousands of references for further reading and deeper analysis

The Complement FactsBook contains entries on all components of the Complement System, including C1q and Lectins, C3 Family, Serine Proteases, Serum Regulators of Complement Activation, Cell Surface Proteins, and Terminal Pathway Proteins. Domain Structure diagrams are incorporated to clearly illustrate the relationships between all the complement proteins, both within families and between families. The FactsBook also includes the cDNA sequences, marked with intron/exon boundaries, which will facilitate genetic studies. Key Features * Includes the cDNA sequences, marked with intron/exon boundaries, facilitating genetic studies * Presents detailed structural information including cDNA and gene structure for all proteins * Introduces complement function, simply described for each function * Data is as up-to-date as possible, including unpublished work from many contributors * Incorporates domain structures diagrams, which beautifully illustrate the relationship between all the complement proteins, both within, and between, families * Each chapter has been written by an expert in the field * Data is as up-to-date as possible, including unpublished work from many contributors Entries provide information on: * Alternative nomenclature * Physiochemical properties * Structure and function * Tissue distribution and regulation expression * Protein sequence/modules * Chromosomal location * Genomic structure * Database accession numbers * Deficiency and polymorphic variants * Key references

This dissertation, "The Role of Monocyte-derived Dendritic Cells and Mannose-binding Lectin in Innate Immunity Against Apoptotic Cells and Candida Albicans" by Wai-kee, Eddie, Ip, ???, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. DOI: 10.5353/th_b3124426 Subjects: Dendritic cells Lectins Candida albicans

This book elaborates on drug delivery targeting via intracellular delivery, specifically through the Receptor Mediated Endocytosis (RME) approach, due to the involvement of cellular receptors in various grave diseases. Targeted delivery relies on two basic

approaches, passive and active targeting. While passive targeting approaches have shown great promise, the improved selectivity achieved with active targeting approaches has resulted in significantly higher efficacy. Interestingly there are numerous strategies for active targeting, many of which are already highlighted in , Targeted Drug Delivery: Concepts and Applications. Nevertheless an exciting and practical strategy for active targeting, which could enable high intracellular delivery, is through exploitation of RME. Cells in the body express receptors to enable various physiological and biochemical processes. As a result, many of these receptors are overexpressed in pathological conditions, or newer receptors expressed due to defective cellular functioning. RME is based on exploitation of such receptors to achieve intracellular delivery. While targeted delivery can have manifold applications, in this book we focus on two major and challenging therapeutic areas; i) Cancer and ii) Infectious Diseases. Targeted Intracellular Drug Delivery by Receptor Medicated Endocytosis discusses the major receptors that are useful for targeted delivery for these afflictions. A major section of this book is dedicated to details regarding their occurrence and location, the recognition domain of the receptor, structure activity relationship of substrate /ligand for selective binding, ligands explored, antagonists for ligand binding and relevance of these aspects for therapy of cancer and infectious diseases. These facets are elucidated with the help of specific examples from academic research and also emphasize commercial products, wherever relevant. In vitro cellular models relied on for assessing receptor mediated cellular targeting and in vivo models depicting clinical efficacy are focused on in a separate section. Finally, we briefly discuss the regulatory and toxicity issues that may be associated specifically with the RME approach of intracellular drug delivery.

The Evolution of the Immune System: Conservation and Diversification is the first book of its kind that prompts a new perspective when describing and considering the evolution of the immune system. Its unique approach summarizes, updates, and provides new insights on the different immune receptors, soluble factors, and immune cell effectors. Helps the reader gain a modern idea of the evolution of the immune systems in pluricellular organisms Provides a complete overview of the most studied and hot topics in comparative and evolutionary immunology Reflects the organisation of the immune system (cell-based, humoral [innate], humoral [adaptive]) without introducing further and misleading levels of organization Brings concepts and ideas on the evolution of the immune system to a wide readership

Written in the same engaging conversational style as the acclaimed first edition, Primer to The Immune Response, 2nd Edition is a fully updated and invaluable resource for college and university students in life sciences, medicine and other health professions who need a concise but comprehensive introduction to immunology. The authors bring clarity and readability to their audience, offering a complete survey of the most fundamental concepts in basic and clinical immunology while conveying the subject’s fascinating appeal. The content of this new edition has been completely updated to include current information on all aspects of basic and clinical immunology. The superbly drawn figures are now in full color, complemented by full color plates throughout the book. The text is further enhanced by the inclusion of numerous tables, special topic boxes and brief notes that provide interesting insights. At the end of each chapter, a self-test quiz allows students to monitor their mastery of major concepts, while a set of

conceptual questions prompts them to extrapolate further and extend their critical thinking. Moreover, as part of the Academic Cell line of textbooks, Primer to The Immune Response, 2nd Edition contains research passages that shine a spotlight on current experimental work reported in Cell Press articles. These articles also form the basis of case studies that are found in the associated online study guide and are designed to reinforce clinical connections. Complete yet concise coverage of the basic and clinical principles of immunology Engaging conversational writing style that is to the point and very readable Over 200 clear, elegant color illustrations Comprehensive glossary and list of abbreviations

The Role of Mannose Binding Lectin (MBL) in Infection and InflammationThe Complement FactsBookAcademic Press

The Third Aegean Conferences Workshop on Complement-Associated Diseases, Animal Models, and Therapeutics convened to discuss progress in complement research as it pertains to human disease pathogenesis and therapeutics. The rapid pace of research and new experimental approaches allow an integrated view of the in vivo biology of the complement system. This book collects writings on the functions of complement, pathophysiology, protein structures, design of complement inhibitors, and complement assays discussed at the conference.

Completely updated and revised, Clinical Tuberculosis continues to provide the TB practitioner-whether in public health, laboratory science or clinical practice-with a synoptic and definitive account of the latest methods of diagnosis, treatment and control of this challenging and debilitating disease.New in the Fifth Edition:Gamma interferon-based