Polymicrobial Diseases
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Edited by

Kim A. Brogden
Respiratory Diseases of Livestock Research Unit
National Animal Disease Center
Agricultural Research Service
U.S. Department of Agriculture
Ames, Iowa

Janet M. Guthmiller
Department of Periodontics
and Dows Institute for Dental Research
College of Dentistry
The University of Iowa
Iowa City, Iowa
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CONTRIBUTORS

Abelardo Araujo
Centro de Pesquisa Hospital Evandro Changas, Ministerio da Saude, Av. Brasil, 4365, Manguinhos, Cep., Rio de Janeiro 21045-900, Brazil

Lauren O. Bakaletz
Division of Molecular Medicine, College of Medicine and Public Health, The Ohio State University, and Children’s Research Institute, Columbus, OH 43205

Yves Benhamou
Service d'Hépato-Gastroentérologie, Groupe Hospitalier, Hôpital Pitié-Salpêtrière, 75651 Paris, France

Steven R. Bolin
Department of Pathobiology and Diagnostic Investigation, College of Veterinary Medicine, Michigan State University, East Lansing, MI 48824

Susan L. Brockmeier
Respiratory Diseases of Livestock Research Unit, National Animal Disease Center, USDA Agricultural Research Service, Ames, IA 50010

Kim A. Brogden
Respiratory Diseases of Livestock Research Unit, National Animal Disease Center, USDA Agricultural Research Service, Ames, IA 50010

Itzhak Brook
Department of Pediatrics, Georgetown University School of Medicine, Washington, DC 20007

Jennifer A. Conlon
Biocor Animal Health, 2720 North 84th St., Omaha, NE 68134

Vincent Di Martino
Service d'Hépato-Gastroentérologie, Groupe Hospitalier, Hôpital Pitié-Salpêtrière, 75651 Paris, France
CONTRIBUTORS

Donatella Donati
Viral Immunology Section, Neuroimmunology Branch, National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda, MD 20892, and Dipartimento di Biologia Molecolare, Sezione di Microbiologia, Università di Siena, via Laterina 8, 53100 Siena, Italy

L. Julia Douglas
Division of Infection and Immunity, Institute of Biomedical and Life Sciences, University of Glasgow, Glasgow G12 8QQ, United Kingdom

David R. Drake
Dows Institute for Dental Research and Department of Endodontics, College of Dentistry, University of Iowa, Iowa City, IA 52242

Robert S. Fujinami
Department of Neurology, University of Utah School of Medicine, Salt Lake City, UT 84132

Eduardo Gotuzzo
Alexander von Humboldt Institute of Tropical Medicine, Universidad Peruana Cayetano Heredia, Lima, Peru

Janet M. Guthmiller
Department of Periodontics and Dows Institute for Dental Research, College of Dentistry, University of Iowa, Iowa City, IA 52242

Patrick G. Halbur
Veterinary Diagnostic and Production Animal Medicine, College of Veterinary Medicine, Iowa State University, Ames, IA 50011

William W. Hall
Department of Medical Microbiology, Conway Institute of Biomolecular and Biomedical Research, University College Dublin, Belfield, Dublin 4, Ireland

Phillip E. Hay
Department of Genitourinary Medicine, St. George’s Hospital Medical School, Cranmer Terrace, London SW17 0QT, United Kingdom

Douglas C. Hodgins
Department of Pathobiology, Ontario Veterinary College, University of Guelph, Guelph, Ontario N1G 2W1, Canada

Raul E. Isturiz
Centro Medico de Caracas and Centro Medico Docente La Trinidad, Caracas, Venezuela

Steven Jacobson
Viral Immunology Section, Neuroimmunology Branch, National Institute of Neurological Disorders and Stroke, National Institutes of Health, Bethesda, MD 20892

Howard F. Jenkinson
Department of Oral and Dental Science, University of Bristol Dental School, Bristol BS1 2LY, United Kingdom

Alistair J. Lax
Oral Microbiology, Guy’s King’s and St Thomas’ Dental Institute, King’s College London, London SE1 9RT, United Kingdom
Jane E. Libbey  
Department of Neurology, University of Utah School of Medicine,  
Salt Lake City, UT 84132

Tibor Magyar  
Veterinary Medical Research Institute, Hungarian Academy of Sciences,  
H-1143 Budapest, Hungary

John A. Marshall  
Victorian Infectious Diseases Reference Laboratory, Locked Bag 815,  
Carlton South, Victoria 3053, Australia

Joseph Moussalli  
Service d’Hépato-Gastroentérologie, Groupe Hospitalier, Hôpital Pitié-Salpêtrière,  
75651 Paris, France

Robert P. Myers  
Service d’Hépato-Gastroentérologie, Groupe Hospitalier, Hôpital Pitié-Salpêtrière,  
75651 Paris, France

Karen F. Novak  
Center for Oral Health Research, Division of Periodontics, College of Dentistry,  
University of Kentucky, Lexington, KY 40536

Thierry Poinard  
Service d’Hépato-Gastroentérologie, Groupe Hospitalier, Hôpital Pitié-Salpêtrière,  
75651 Paris, France

Vlad Ratziu  
Service d’Hépato-Gastroentérologie, Groupe Hospitalier, Hôpital Pitié-Salpêtrière,  
75651 Paris, France

Noreen Sheehy  
Department of Medical Microbiology, Conway Institute of Biomolecular  
and Biomedical Research, University College Dublin, Belfield,  
Dublin 4, Ireland

Patricia E. Shewen  
Department of Pathobiology, Ontario Veterinary College, University of Guelph,  
Guelph, Ontario N1G 2W1, Canada

Jørgen Slots  
School of Dentistry, MC 0641, University of Southern California,  
Los Angeles, CA 90089-0641

Harry Smith  
Medical School, University of Birmingham, Birmingham B15 2TT,  
United Kingdom

David R. Soll  
Department of the Biological Sciences, University of Iowa, Iowa City,  
IA 52242

Clive Sweet  
School of Biosciences, University of Birmingham, Birmingham B15 2TT,  
United Kingdom
CONTRIBUTORS

Marie Hélène Tainturier
Service d’Hépato-Gastroentérologie, Groupe Hospitalier, Hôpital Pitié-Salpêtrière, 75651 Paris, France

Hidehiro Takahashi
Department of Pathology, National Institute of Infectious Diseases, Tokyo, Japan

Eileen L. Thacker
Veterinary Medical Research Institute, Iowa State University, Ames, IA 50011
The veterinary, medical, and dental literature is filled with reports of diseases involving more than one etiologic agent. These have come to be known as polymicrobial diseases. Polymicrobial diseases in animals and humans are more common than generally realized, and many perceived “single-etiologic-agent diseases,” when examined closely, contain polymicrobial etiologies. These include respiratory diseases, gastroenteritis, conjunctivitis, keratitis, hepatitis, Lyme disease, multiple sclerosis, genital infections, intra-abdominal infections, and pertussis.

Polymicrobial Diseases is a collection of chapters from investigators researching a variety of diseases with multiple etiologies. These diseases can be categorized as those originating from polyviral infections, polybacterial infections, viral and bacterial infections, and polymicrobial mycotic infections, and those that result in immunosuppression. The book begins with a section on an integrated view of polymicrobial diseases in animals and humans, including a representative list of these diseases, the etiologic agents, and the underlying mechanisms of pathogenesis (chapter 1). Also included in this section is a chapter on the in vitro methods for the study of polymicrobial diseases (chapter 2). Section II contains information on polyviral infections in animals (chapter 3), infections with multiple hepatotropic viruses (chapter 4), multiple retroviral infections (chapter 5), and viruses associated with multiple sclerosis (chapter 6). Section III discusses polybacterial infections, including bacterial vaginosis (chapter 7), periodontal disease (chapter 8), abscesses (chapter 9), and atrophic rhinitis in swine (chapter 10). Section IV comprises polymicrobial diseases involving viruses and bacteria. These are infections seen in respiratory diseases in humans (chapter 11) and animals (chapters 12 and 13), otitis media (chapter 14), and intestinal disorders (chapter 15). The emerging role of viruses in periodontal disease is also discussed (chapter 16). Section V discusses polymicrobial infections involving fungi (chapter 17) and Candida interactions with bacterial biofilms (chapter 18). Section VI focuses on polymicrobial diseases that result
from microbe-induced immunosuppression (chapter 19), which often allows other microbes to become established (chapter 20). In conclusion, section VII summarizes the state of polymicrobial infections in animals and humans (chapter 21).

Polymicrobial infections share underlying mechanisms of pathogenesis, and these are presented in chapter 1. First, stress, physiologic abnormalities, and metabolic disease favor the colonization of multiple organisms. Second, alterations induced in the mucosa by one organism favor the colonization of others. Third, synergistic triggering of proinflammatory cytokines increases the severity of disease, reactivates latent infections, or favors the colonization of other microorganisms. Fourth, sharing of determinants among organisms allows activities that organisms do not possess individually. Finally, suppression of the immune system by one organism allows the colonization of others.

We hope that Polymicrobial Diseases will stimulate great interest and spur discussion among its readers and draw together investigators from various fields to assess the mechanisms underlying the pathogenesis of these complex infections. This book provides an overview of our current knowledge of mixed infections in both animals and humans, and we believe that it will serve as a useful reference in this area. The emphasis is on identifying polymicrobial diseases, understanding the complex etiology of these diseases, recognizing difficulties in establishing methods for their study, identifying mechanisms of disease pathogenesis, and assessing appropriate methods of treatment. In some instances, the mechanisms of disease are not well known; in others, the mechanisms of pathogenesis have been under intense investigation. Our intent is to present another edition of this book dealing with the specific mechanisms of polymicrobial infection, host response to infection, predisposition and/or risk factors for the diseases, and pathogenesis of polymicrobial disease.

KIM A. BROGDEN
JANET M. GUTHMILLER
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