Frontiers in Antibacterial Resistance: A Tribute to Stuart B. Levy

Edited by David G. White, Michael N. Alekshun, and Patrick F. McDermot

Washington, DC: ASM Press, 2005.
598 pp., illustrated. $109.95 (hardcover).

Usually, books published by ASM Press are simple to review, because they have a single objective. Either they cover the scientific knowledge pertaining to a define topic of microbiology, or they deal with the biography of a particularly preeminent scientist. The review of *Frontiers in Antimicrobial Resistance: A Tribute to Stuart B. Levy* is more complex, because this book is unique, in that it has both of the abovementioned objectives, which are addressed concomitantly. Indeed, it first provides the reader with the most advanced, up-to-date, and comprehensive knowledge regarding the molecular basis and phenotypic consequences of bacterial resistance to antimicrobials. Second, it evidences how much the work of Stuart Levy has been important in these developments, not only in accumulating knowledge and basic scientific findings in the field, but also in bringing the scientific community, as well as the general public, to a full understanding of the consequences of the resistance phenomenon. It also addresses how Stuart Levy has been (and still is) a man of action, structuring organizations, both profit and nonprofit, with the unique goal of decreasing bacterial resistance and controlling the public health burden that is associated with it.

I will not say much about the scientific quality of the chapters that describe the mechanisms of antimicrobial resistance. They are outstanding, for a simple reason: the authors of the various chapters are, each in their own field, among those who have made the most important breakthroughs in that particular domain. For each particular field of expertise, the busy reader can jump to the specific chapter that interests him or her most and find there a comprehensive overview of the topic. I would make a special mention of the sixth section, which covers drug resistance in cancer cells. It is a field that is usually poorly understood by those who deal with antimicrobial resistance, because most often (at least in Europe), the field is, by convention, limited to antibacterial drugs. Thus, this section is, for many of us, a unique opportunity to broaden the scope of our own understanding of resistance. It also evidences how much Stuart Levy has managed to create bridges between various scientific fields.

In addition to this, the overall organization of the 7 sections of the book tells us a story. Except for the first section (which deals with tetracycline and resistance, and which has been excerpted, because the role of Stuart Levy has been so important with regard to these subjects), the 6 other sections follow a precise order that, if the sections are read in a row, helps the reader to understand how resistance has been progressing from single drug–resistance mechanisms to multiple ones and from commensal bacteria to pathogens. The organization of the sections helps the tenacious and willing reader to understand why resistance to antimicrobials is a matter that can be fully understand only with the eyes of an ecologist; why its scope is not limited to human and veterinary medicine, but also encompasses food and agriculture; and why it can be dealt with only with tools that are used to control other major environmental and sustainable-development problems. Lastly, in the 4 chapters of section 7, the reader will discover how, due in large part to the work of Stuart Levy, there may be ways to reduce the threat that bacterial resistance currently poses to public health. Those chapters include a full description of the organizational efforts of Stuart Levy, both in the development of the Alliance for the Prudent Use of Antibiotics (now a world-recognized organization) and in the development of Paratek Pharmaceuticals, which intends to open a scientific front in the fight against antimicrobial resistance.

How, then, does the book deal with its second, more personal objective, concerning Stuart Levy's kaleidoscopic contribution to progress in the field antimicrobial resistance? Well, it does so in many and subtle ways. First, it does so by including a series of formal and informal pictures of Stuart Levy, which cover a vast array of his scientific, as well as parascientific, activities over a large period of time. These pictures open the book just after Josua Lederberg, in a short but highly dedicated foreword, has reminded us of how brilliant and important were the beginnings of Stuart Levy's carrier in the field of bacterial resistance. Then, it does so by touching, in many chapters, on the historical means by which Levy was involved in so many important discoveries in the field of resistance. Lastly, it does so by turning to very personal aspects of his scientific life, both as a poet (as the reader is reminded by Julian Davies) and as a good and challenging twin (in the conclusion by his brother, Jay).

Altogether, the book is unusual, clever, challenging, and appealing. A "must" for all, whatever their age or their medical and scientific position, who care for treating infectious diseases and want to help to prolong the "antibiotic miracle."

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Probiotics and Prebiotics: Scientific Aspects

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Probiotics are defined as dietary supplements of living bacteria belonging to the normal gut flora, and prebiotics are defined as dietary supplements of substrates preferentially fermented by certain gut bacteria. Both are traditionally understood to confer a health benefit to the host, and this is the premise of *Probiotics and Prebiotics: Scientific Aspects,* a companion to 2 previously published volumes, which focuses on recent progress of modern probiotic and prebiotic research and challenges the uncritical acceptance of the concept that use of probiotics or prebiotics results, by itself, in the promotion of health. This volume covers a wide spectrum of developments in basic research in the field, which range from molecular tools (such as the genome-wide analysis of bacteria in the gut or other microenvironments) to the taxonomy and ecological composition of lactobacilli and bifidobacteria, the genetics and biochemistry of lactobacilli polysaccharides, and the multifaceted interplay between commensal and probiotic bacteria, pro- and anti-inflammatory cytokines, toll-like receptors, apoptosis, and the modulation of mucosal immune response in experimental animals and clinical models of inflammatory bowel disease. Furthermore, one chapter reviews the potential clinical and industrial applications of genetically modified probiotics, and another chapter discusses the composition of the endogenous gut flora of formula-fed infants. This latter chapter suggests the innovative perspective of shifting the bacterial composition of gut microflora in formula-fed infants towards that of breast-fed infants through the use of prebiotics, which may be a promising tool for improving the quality of infant milk formulae. There is also a comprehensive overview of the physiologic role of lactobacilli in the vaginal ecosystem, along with a review of bacterial vaginosis and of the rational use of lactobacilli as therapeutic agents for the treatment and prevention of urinary and genital infections, including the sexual transmission of HIV.

This book will be useful to microbiologists, gastroenterologists, experts in clinical nutrition, pediatricians, and infectious disease experts. All chapters are clearly written and informative, and they provide useful bibliographies for more in-depth exploration of these areas. I have also appreciated the decision to invite mostly younger scientists to contribute the results of their own recent or current work.

However, the book also has some drawbacks. It does not provide exhaustive and updated information, but instead includes only a few highlights about recent clinical studies that have been designed to investigate the clinical application of probiotic bacteria for the treatment of ulcerative colitis and Crohn disease. The results of those studies have been controversial, however, and it is still unclear which subset of those patients may benefit from probiotic therapy and which preparations of probiotic bacteria (e.g., 1 strain or many different strains) should be screened for this purpose. If we regard the book from the perspective of clinicians, we would note that no mention is made of other important advances in medical research involving probiotic bacteria. Results of those studies are now paving the way towards the building of a well-reasoned and evidence-based probiotic therapy for many different inflammatory and noninflammatory disorders (including hyperoxaluria, urinary stones, radiation colitis, infectious diarrhea, allergies, irritable bowel syndrome, nonalcoholic fatty liver disease, and diabetes). In addition, this book does not provide any information about whether probiotic therapy is truly harmless to the single patient (e.g., in terms of the risk of bacterial translocation and overwhelming sepsis or endocarditis) and to the community (e.g., in terms of risk of spreading antibiotic resistance among bacterial populations that make up the endogenous digestive flora).

I do believe that those risks should not be regarded as negligible. Even so, I would recommend this book as a selection of informative, basic articles on current developments in the field. Probiotic and prebiotic research has impressively advanced during the last decade as the result of multidisciplinary and molecular investigations, therapeutic trials, industrial commitment, and also the underlying (but still unresolved) conflicts of interest between the food and pharmaceutical industries and the academic scientists and clinicians. It is clearly "another thing" since Metchnikoff's time.

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New Books Received

Baughman RP. Sarcoidosis. New York: Taylor & Francis Group, 2006. 840 pp. $199.95 (cloth). ISBN: 0-8247-5926-5.

Detrick B, Hamilton RG, Folds JD. Manual of Molecular and Clinical Laboratory Immunology, 7th ed. Washington, DC: American Society for Microbiology Press, 2006. 1374 pp. $179.95 (cloth). ISBN: 1-55581-364-X.

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