

## BOOK REVIEW

*The Biology of the Mycobacteria. Volume 3; Clinical Aspects of Mycobacterial Disease.* Ratledge, C., Stanford, J. and Grange, J. M., eds. London: Academic Press, 1989, hard cover, black and white illustrations, 596 pp. + index, £65.

In keeping with the preceding two volumes, Volume 3 of *The Biology of the Mycobacteria* is a comprehensive summary of mycobacterial diseases written by international authorities in their fields. This volume is divided into five parts. The first three chapters make up Part I, an overview of the subject. Chapter 1 is a history of tuberculosis and leprosy. Remarkable is the rather pessimistic view of the likely benefit of the World Health Organization (WHO) multi-drug therapy (MDT) because of difficulties in undertaking MDT in terms of cost and supervision. As with dapsone monotherapy before dapsone resistance became widespread, MDT is unlikely to significantly impact on the incidence of new cases, implying that many contacts are infected before the source case is detected, treated, and rendered noninfectious. The best control measures for tuberculosis and leprosy may be socioeconomic development in a population. Economic constraints prevent the widespread adoption of highly effective short-course drug regimens for tuberculosis in the very nations that need them most.

Chapter 2 discusses the metabolism of mycobacteria in tissues, and is written by Barclay and Wheeler. The 65-kDa antigens of mycobacteria crossreact with rat joint cartilage. These antigens are related to the "common" antigens of other gram-positive and gram-negative bacteria and have been proposed as possibly being involved in the etiology of rheumatoid arthritis in humans. Phenolic glycolipid-I (PGL-I) of *Mycobacterium leprae* can scavenge hydroxyl radicals and may, therefore, play a role in protecting *M. leprae* against the antimicrobial action of macrophages. There is evidence that *M. leprae* preferentially uses 6-phosphogluconate as an unusual carbon source. Dormancy (persister state) may be an adaptive mechanism to enable mycobacteria to survive at times or under conditions when

they are deprived of nutrients. Nutrient-starved *M. tuberculosis* are able to survive for several years without nutrition *in vitro*. *M. leprae* depends on its ability to scavenge purines. Nucleotides are broken down to nucleosides and then taken up into *M. leprae*. Nucleotides cannot penetrate the bacilli. *M. leprae* cannot synthesize the purine ring but can synthesize pyrimidines. The bacilli must, therefore, scavenge purines. This chapter contains an excellent table of the biochemical and biological activities of *M. leprae* which have been used as potential drug screens.

Chapter 3 is a discussion of mycobacteria and the tissues of man by Lucas. An immunopathological spectrum must exist for nonleprosy mycobacteria, but it is impossible to define with precision. Most cases fall somewhere between the two "poles."

The next three chapters make up Part II, dealing with tuberculosis. Chapter 4, on pulmonary tuberculosis, contains a vast amount of authoritative information on the clinical manifestations of pulmonary tuberculosis. Unlike smallpox, tuberculosis has not been eradicated anywhere. There are 3 million deaths per year due to tuberculosis.

Chapter 5 outlines the varied clinical manifestations of extrapulmonary tuberculosis and Chapter 6 discusses the chemotherapy of tuberculosis, describing the variety of regimens used and the standard toxicities of the individual antituberculosis drugs.

The next three chapters deal with leprosy. Chapter 7 covers the clinical aspects of leprosy by Ganapati and Revankar. The majority of patients present to clinicians with immunoclinical problems in leprosy rather than bacteriological problems as in other chronic diseases, such as tuberculosis. Characteristically in leprosy, the pathological process continues and complications continue to appear after bacterial death until mycobacterial antigens totally disappear. In tuberculosis, once the causative agent is killed, pathology halts and complications generally do not appear.

Chapter 8 by Naafs is a masterful presentation of a very complex subject, reactions in leprosy. Both basic investigations and

clinical manifestations are covered and, in many cases interrelated.

Chapter 9 deals with the chemotherapy of leprosy by Waters. The chapter is an excellent historical review; the author shares a wealth of experience; and the chapter carefully reviews the basic and clinical studies leading to current-day recommendations regarding therapy.

Part IV covers other mycobacterial infections. Chapter 10 describes mycobacterial infections of the skin. Primary inoculation tuberculosis was common on the legs, buttocks, and soles of the feet, presumably due to street contamination with expectorated *M. tuberculosis*. This chapter provides excellent, concise coverage of *M. ulcerans*, *M. marinum*, *M. chelonae*, *M. fortuitum*, and a variety of lesser-known mycobacterial skin infections. Chapter 11 covers the deep-tissue infections due to environmental mycobacteria.

Part V consists of one chapter on the immunotherapy of mycobacterial disease by Stanford. "Tuberculin therapy" by Koch was

at times apparently effective in tuberculosis patients but was highly toxic in many, with deaths due to what would now be termed tuberculin shock. Tuberculin therapy was also tried in leprosy in 1890 with unclear results. Controlled immunotherapeutic trials were undertaken in leprosy with "antigen marianum" consisting of killed suspensions of *M. scrofulaceum*. Results varied by country. Modern immunotherapies for leprosy consist of suspensions of various mycobacteria, including *M. leprae*, *M. intracellulare* (ICRC bacilli), "*Mycobacterium w*," and *M. vaccae*.

The editors and their distinguished contributors are to be congratulated for yet another authoritative volume in this series. Together with the preceding two volumes, this book should be a part of the library of every serious student of the mycobacteria. These volumes, and perhaps a fourth which may be in the making, should be indispensable as reference works in medical libraries, in both the underdeveloped and developed countries.—RCH