

# The Mycobacteria: A Sourcebook (In Two Parts, Part B)

Tuberculosis: Pathogenesis, Protection, and Control  
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## Chapter 21

### Proteins and Antigens of *Mycobacterium tuberculosis*

Åse Bengård Andersen and Patrick Brennan

The proteins of the causative agent of tuberculosis, *Mycobacterium tuberculosis*, have been a major research topic almost since the days of the discovery of the organism by Robert Koch in 1882 (Koch, 1882). Looking back, it appears that there was, and still is, a general tendency to approach the topic from at least two angles: (i) basic research aimed at improving knowledge of the physiology of the bacteria, identifying metabolic pathways and enzyme systems, etc., and (ii) research aimed at understanding the interaction of the individual mycobacterial components with the immune systems of human beings or animal models. The goals of these latter efforts are to identify antigens that may be important in conferring protection against tuberculosis. The search for improved diagnostic reagents such as improved skin test reagents and/or serological markers is another aspect of such studies.

Obviously, each protein of *M. tuberculosis*, like proteins of any other organism, serves different functions. Regardless of whether a given protein is looked upon as a

more or less potent antigen by the immunologist, in every case it serves a distinct and sometimes indispensable function in the bacterium.

The reasons for the division in approach are diverse: one is that laboratory techniques are subject to influence by the "trends of the time." Clearly, classic biochemistry and physiology were put somewhat in the background when molecular biology and modern immunology made their entry into mycobacteriology in the mid-1980s. The possibilities and achievements already attained with recombinant DNA techniques are astonishing and provide tools that are indispensable in modern research. However, it is important for the two lines of research to meet and, one hopes, to merge. Much effort has been devoted to the study of the nutritional requirements of mycobacteria in order to provide better support of bacteria in clinical specimens. Many of the important and fundamental biochemical studies on the growth and metabolism of mycobacteria date from several decades ago, and a good deal of information is available. However, in comparison to what is known about the physiology of and gene expression in *Escherichia coli*, the data concerning mycobacteria seem scarce. The slow generation time

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and Cultures of *M. bovis* BCG mc (leuD<sup>Tn</sup>; a kanamycin-resistant, . The mycobacteria: a sourcebook, part B. New York, N.Y: Marcel Dekker, Inc.,:

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