

Leprosy—Research at the Forschungsinstitut Borstel

E. Freerksen¹

Diverse standpoints determine leprosy-research at the Forschungsinstitut Borstel: The bacteriology of mycobacteria has been of great significance in our scientific work for more than two decades. We have been seriously engaged in *in vitro* cultivation of different mycobacterial species, including those problems related to taxonomy and identification.

Among the big mass of known mycobacteria there are more strains which are pathogenic for men than originally supposed. This is why the commonly used word "tuberculosis" is no longer applicable to all diseases caused by mycobacteria of any kind in men and animals. It has today a precisely limited meaning.

Mycobacteriosis is the most comprehensive term. Some of these mycobacterioses (produced by *M. kansasii*, *avium*, *Battey*, *scrofulaceum*, *ulcerans*) have demonstrated their resistance to the commonly employed antituberculous drugs. On the basis of experimental therapy these mycobacterioses are today treatable.

On the other hand, we have studied problems of sensitization induced by mycobacterial metabolic products. Tuberculin was prepared from human or bovine strains and sensitins from other mycobacteria.

From that standpoint of immunology we have investigated the possibilities of protection and also the influence of components of food on mycobacterial diseases, on sensitization, and on the therapeutic activity of antimycobacterial drugs.

Leprosy is not a tropical disease, because it may occur all over the world. In former times it was widespread; today it is restricted to special areas. As *M. leprae* is its

causative germ, leprosy belongs to the mycobacterioses. All mycobacterioses are similar diseases in certain respects, because the macroorganism reacts to the invasion of mycobacteria after the same special biologic pattern. On the other hand, they are dissimilar, because this pattern will be modified in a specific manner by the originally inducing germs.

Today we can differentiate the mycobacterial species, as well as the diseases caused by them. The difficulties presented by cultivation have been solved with regard to most mycobacterial species during the past decades. From this point of view, however, *M. leprae* is seemingly beyond our ability, but this does not imply insolubility. This fact holds us back in working out an effective chemotherapy of leprosy and a specific vaccination, and implies an inability to make a decision about the infectiousness of this germ and its reservoir.

In this volume we will read papers regarding the cultivation of *M. leprae* from many laboratories. In Borstel R. Bönicke (microbiological department) and his co-workers have studied these questions. Mrs. Rosenfeld (department for experimental biology and medicine) and her team studied analogic models for experimental therapy and vaccination research, turning to use the new findings in the investigation of the so-called atypical mycobacteria: mycobacteria show a remarkably differentiated sensitivity to diverse "mycobacteriostatics". Special strains, sensitive to DDS, offer a real analogy to *M. leprae*. This is why we have chosen those strains which are virulent for the commonly used laboratory animals and submitted them to experimental therapy and vaccination.

In consequence of these investigations the conviction may be reached that drugs

¹ E. Freerksen, M.D., Ph.D., Director of the Forschungsinstitut Borstel and Professor for Experimental Medicine at the University of Kiel, Germany.

Opening Presentations

active against DDS-sensitive strains will show a therapeutic activity against *M. leprae*. As a result, we can possibly replace DDS therapy by applying more active substances which—as in tuberculosis—can be combined with other drugs. In this sense Rifampicin and certain sulfonamides play an important role.

Analogy experiments were also made with "atypical" mycobacteria for the purpose of inducing immunity against mycobacterial infection; autologous vaccination against autologous infections proved to be the most effective. In accord with those facts, we are in a fair way of developing a specific vaccine from avirulent "atypical" mycobacteria against leprosy.

Of all mycobacterial infections it is characteristic that they sensitize macroorganisms. This is true for leprosy and is of great importance in its diagnosis, because, as commonly applied in tuberculosis, skin-tests with sensitins can be made. This is why we have reason to expect some new results with the "simultan-test", as being worked out in preliminary experiments.

Sensitization, seen as an immunologic reaction system, is of pathogenic importance and belongs to the combined symptoms of the clinical picture of leprosy. Under these aspects we have made analogy experiments with immuno-suppressive substances. Finally, for our leprosy research we took into consideration problems we have been engaged in for a long while, such as the specific effect of components of food and—partly in connection with it—immuno-stimulation.

Through the excellent cooperation with the Deutsches Aussätzigen-Hilfswerk we can work in a leprosarium. This enables us to take material for bacteriologic as well as for pathologic examination (E. Fasske). This double-tracked leprosy research (clinic in a leprosy country/laboratory work in Borstel) has manifested its quality. This is why this way of research is to be extended and intensified. It would imply extreme divergence from our responsibility if we devoted our endeavors to thoughtless illusionism in a field where millions of people now, as previously, are suffering. It would be irresponsible, as well, if we lose our way by unproductive pessimism. For the work to be done no illusionism is suitable; on the contrary we must take courage, after all, to direct our efforts toward a widely set aim. It is a case of necessity to invest all resources and results of research (also now and then unconventionally) in the fight against leprosy and the misery brought with it.

Finally, for me it is a lucky chance to have contacted again one of my oldest friends, Professor E. R. Long from Washington. Only a few people know that he was able to manage it decisively nearly 20 years ago so that a Forschungsinstitut Borstel exists today. His mind, characterized by humanity, loyalty, objectivity and courage, removed all obstacles regarding the situation and conditions of that period. As co-editor of this Colloquium Prof. Long is stepping forward on the way he once started.