Editorials

GROWING POINTS IN LEPROSY RESEARCH

The four papers on "Growing Points of Leprosy Research" in this number of the Review are in line with the more recent policy of the Editorial Board to include, from time to time, invited papers on a particular aspect of leprosy. It was very encouraging that there was a plethora of research topics to choose from, since nowadays progress in all fields of clinical medicine is dependent upon the contributions made by a wide range of biochemical disciplines involved in basic and applied research. The full impact of multi-disciplinary approaches to the field of leprosy research was epitomized at the 10th International Leprosy Congress, Bergen, where, for the first time, there was an almost equal balance between contributions from the more clinical and the more laboratory aspects of leprosy. In order to appreciate and assess the basis on which some of the research efforts are being made and their likelihood of advancing our knowledge of leprosy, this number of the Review also includes the full reports of all the Expert Committees at Bergen.

In the past the field of leprosy has been advanced entirely by a few dedicated, but isolated, workers. Their isolation and the lack of interest by other biochemical disciplines, together with the inability to culture *Myco. leprae in vitro* or *in vivo* had severely restricted progress. Dr Robert Cochrane, for many years closely associated with LEPRA, made a determined effort to stimulate and bring together all the biochemical disciplines which might help to solve the various leprosy problems. Above all, it was his hope that the introduction of "new blood" would bring leprosy into the general stream of clinical medicine and end for all time its isolation. The four contributors to this special number on "Growing Points of Leprosy Research" fully endorse Cochrane's philosophy and objectives, since they represent repectively, biology, epidemiology, immunology and pharmacology and have only recently applied their expertise to the field of leprosy.

The first animal model for studying human leprosy was established in 1960 when Shepard showed that *Myco. leprae* multiplied when inoculated into the mouse footpad. This discovery heralded a new era in leprosy research which has greatly enhanced our knowledge of leprosy. The mouse model, or any other animal model, will continue to play an essential role in leprosy research until it is discovered how to grow *Myco. leprae in vitro*. Therefore, other animal species have been studied and in 1971 Kirchheimer and Storrs reported the successful transmission of *Myco. leprae* to the nine-banded armadillo. In the ensuing three years their intensive studies have fully established the armadillo as an important model for the study of leprosy. In this number Eleanor Storrs, as an authority on the biology and reproductive-physiology of the nine-banded armadillo, presents a resumé of the special features of this mammal together with the latest

information on the type and incidence of leprosy in this animal species. In summary, the results establish the armadillo as another animal model for studying leprosy in which a relatively high proportion of individuals develop progressive, lepromatous type leprosy. Thus the armadillo is the first natural animal host to manifest lepromatous type leprosy, in the mouse this can only be achieved by prior artificial obliteration of their immunological competence. While it is too early to anticipate the full impact of the armadillo in leprosy research, it is already clear that it will be the model of choice for providing a rich source of *Myco. leprae* in the laboratory. The armadillo will never replace the mouse model, but will be complementary, and hopefully, the armadillo will add still further to advances made with the mouse model.

Ellard presents a detailed review and carefully argued case in support of the relevance to man of the experimental chemotherapeutic data based on the mouse footpad model. Ellard justifies his case in drawing attention to similarities between the chemotherapy of leprosy and tuberculosis and the important role that experimental studies on *Myco. tuberculosis* have had on the successful evolution in the chemotherapy of tuberculosis. It is on this basis that he concludes that the chemotherapy of leprosy is at last beginning to be place on an objective bacteriological and pharmacological basis. In drawing attention to the similarities between the chemotherapy of tuberculosis and lepromatous type leprosy, the leprologist is led to ponder over three important problems. (1) While in tuberculosis there are many regimens that when supervised can cure the patient, such regimens fail when applied to routine services in the field in developing countries, because patients fail to take regular treatment—can we be sure that lepromatous leprosy is more difficult to treat with dapsone than tuberculosis with known curative regimens?—do the many failures in mass treatment with dapsone arise because the patients fail to take the drug? (2) Because in tuberculosis it has been fully established that combined therapy is essential in order to avoid more or less universal development of drug resistance with monotherapy, are we any longer justified in giving monotherapy (dapsone) to patients with lepromatous leprosy, since we now know that dapsone resistance does not occur in a significant nimber of lepromatous patients given monotherapy? (3) Since it has now also been fully established that both in man and in the mouse rifampicin is as yet the only bactericidal drug against *Myco. leprae*, if there are no special immunological defects in patients with lepromatous leprosy as compared with patients with fulminating pulmorary tuberculosis, is it now imperative that trials with rifampicin plus dapsone should be undertaken for a limited period of time, and then treatment withdrawn in order to establish once and for all whether the inclusion of a bactericidal drug can significantly shorten the course of chemotherapy in patients with lepromatous leprosy?

Many new methods are now available for measuring the cell-mediated type of immune responses associated with leprosy, which have been brilliantly exploited and applied by Godal. A clear exposition of the lymphocyte transformation and the leucocyte migration inhibition tests is presented by Godal in this issue. Because of the specificity of these tests for *Myco. leprae*, they provide for the first time a means of identifying those who have been infected with *Myco. leprae*. The importance of this new tool for advancing our knowledge of the epidemiology of leprosy is clearly defined in Meade's paper. In fact the preliminary observations of Godal, and their implications, exemplify the need for epidemiologists to exploit new technical developments and progress in other

disciplines referred to by Meade. In this context Meade stresses the importance of the re-awakened interest in the nose as a likely source of infection in leprosy, particularly in view of the new information on the survival up to two days of *Myco. leprae* outside the body. The latter important finding was worked out, again using the mouse model. All these new findings, together with those of Godal, are likely to throw new light on the transmission and epidemiology of leprosy.

These growing points in leprosy offer good prospects for better control and treatment of leprosy. The four papers chosen show clearly the important role that research is playing and underlines the reason why LEPRA decided to support research generously.

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