The Response of the Patient With Leprosy Toward *Mycobacterium leprae* Injected With Lepromin

A Histopathologic Study Four Hours after Injection

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The varying behavior of the human organism in the presence of *M. leprae* was first recognized by leprologists almost with the first descriptions made of the disease. In 1948, in Havana, the concept of polarity was accepted: the same bacillus produces two totally opposed types, almost two different diseases ([33]), although afterward the existence of cases with ambiguous characteristics was recognized, justly called interpolar cases ([19]).

While immunologic studies of leprosy were initiated in 1919, when Mitsuda described the different response of patients toward a suspension of dead bacilli derived from lepromatous nodules, it has been only in the last decade that immunologists have fixed their attention toward this disease, which, as has been said, constitutes a unique immunologic model in pathology. In fact the classification nowadays accepted has as its basis a fundamentally immunologic concept.

Much has been advanced in leprosy immunology that may carry us toward a more rational and logical treatment of patients, to the acquisition of an effective immunization means, and to understanding of the reactional episodes of lepromatous leprosy, but there is still a great deal to learn ([33]).

In spite of the fact that the results of recent immunologic studies are frequently contradictory, there is sufficient evidence that the lepromatous case offers a peculiar immunologic dissociation: while it preserves a very good capacity of forming antibodies (humoral immunity), it presents on the other hand, a partial impairment of cell-mediated immune response (CMI) ([5, 6, 30, 31, 36, 38, 39]).

Evidences in the sense that the delayed hypersensitivity, mediated by immunized thymus-dependent cells, is partially impaired in lepromatous leprosy, are the non-response to lepromin in these cases, the partial or contradictory response to other antigens of fungi and candida and to tuberculin ([5, 30, 31, 39]), the mild sensitivity to picric acid and to dinitrochlorobenzene ([4, 41]), the deficient blastic transformation of lymphocytes of lepromatous patients in the presence of phytohemagglutinin and streptolysin 0 ([6, 9, 21, 30, 31]), and the replacement of the paracortical area of the lymph nodes of lepromatous patients (usually rich in thymo-dependent lymphocytes) by reticulo-histiocytes, as occurs when treating an animal with antilymphocytic serum, while preserving, on the other hand, a large number of plasma cells, producers of antibodies, in the medulla of the lymph nodes ([38, 39]).

Furthermore, in lepromatous cases there exists a remarkable increase of immunoglobulins, and, by immunologic methods, antibodies are detected against group-specific antigens (mycobacteria, Poly INb of *Nocardia brasiliensis*) ([7, 8, 11, 13, 22, 28, 40]) and of autoantibodies ([2, 3, 20]), demonstrating the good capacity of the lepromatous patient to form antibodies.

The numerous studies in animals, and others performed in human beings, have fully proved that all things that may depress the CMI favor the development and multiplication of *M. leprae* (thymectomy, radiation, antilymphocytic serum), and that, in turn, it is possible to improve the resistance of the animal to leprosy or transfer the sensitivity to lepromin and to other antigens by means of lymphocytes of normal animals ([14, 15, 16, 17, 21, 22, 24, 26, 31, 36]).

It is accepted that in chronic granulomatous diseases produced by intracellular my-

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cobacteria, the immunologic mechanism of defense depends on the macrophage function ([42, 43]). Mycobacteria cannot be eliminated by antibody alone ([39]).

In accordance with these concepts, it is logical to assume that the impairment of the CMI present in the lepromatous case, favors the permanence and multiplication of the bacillus and, therefore, the lack of resistance to it. Likewise, the production of

present after 21 days, and then a real tuberculoid granuloma is formed. In 1944, Medina reported that some patients with diffuse lepromatous leprosy presented, after six hours, at the site of the integral lepromin injection, a response constituted by erythema, edema and vesiculation that resembled the early phases of Lucio's phenomenon. Afterward, in 1964, when the experiences of Medina were revised again