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Opinion Article

Histopathology of Multibacillary Bacteria–*Mycobacterium Leprae*

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DESCRIPTION

Mycobacterium leprae causes leprosy, an infectious disease that affects the skin and peripheral nerves. Continuous transmission in endemic areas continues to obstruct leprosy eradication although it is difficult to detect *M. leprae* infection in asymptomatic individuals the presence of antibodies specific for phenolglycolipid-I (PGL-I) correlates with bacterial load. Despite the widespread belief that untreated *M. leprae*-infected humans are the primary source of transmission, limited evidence suggests that environmental sources may also serve as a reservoir. As a result, seropurveillance using field-friendly anti-PGL-I antibody detection tests can be used to identify those who may transmit bacteria and to study (and reduce) *M. leprae* transmission.

A tissue biopsy of various affected sites in the multibacillary form of Hansen's disease may reveal typical histopathologic changes with a large number of foam cells, *M. leprae* bacteria but are unable to digest them, allowing the organisms to multiply and use the macrophage as a mode of transportation throughout the body. This is how the bacteria cause the multiple lesions that can appear in all parts of the body in patients with leprosy. The skin and peripheral nerves are affected by leprosy; they connect the brain and spinal cord to muscles and sensory cells that detect sensations such as touch, pain, and heat. The majority of those affected have skin damage (cutaneous lesions) and problems with nerve function (peripheral neuropathy). However, the severity and extent of the problems vary greatly. The most severe form of leprosy is called multibacillary or lepromatous, and the least severe form is called paucibacillary or tuberculoid.

Multibacillary leprosy is characterised by a high number of cutaneous lesions, including both surface damage and lumps beneath the skin (nodules). The moist tissues that line body openings, such as the eyelids and the inside of the nose and mouth (mucous membranes), can also be affected, resulting in vision loss, nasal tissue destruction, or impaired speech. Internal organs and tissues have been damaged in some of those who have been affected. The nerve damage caused by multibacillary leprosy frequently results in a loss of sensation in the hands and feet. Repeated injuries that go unnoticed and untreated due to this loss of sensation can result in the body reabsorbing affected fingers or toes, resulting in the shortening or loss of these digits. Microscopy-based detection of acid-fast bacilli is recognised as the quickest, easiest, and least expensive tool for rapid identification of leprosy cases. Leprosy is diagnosed solely through the detection of skin lesions and sensory loss in many endemic areas. Although serology and PCR-based procedures have demonstrated their utility in leprosy diagnosis, bacilloscopy, which involves detecting AFB in lymph samples or a microtome section of a skin biopsy, remains the gold standard for confirming clinically suspected leprosy.

Although the detection of acid-fast bacilli in tissue smears, lymph nodes, or histological sections using various staining methods is adequate for confirming the diagnosis of more advanced leprosy, it is not sufficient for confirming the diagnosis of less severe leprosy. This method is less effective in the early stages of leprosy, when clinical manifestations are not always clearly established, and in some paucibacillary cases. Because of the low specificity and sensitivity of serological tests (primarily for PB cases), the low sensitivity of microscopy (1-3 × 104 AFB/g), and the inability of microscopy to distinguish *M. leprae* from other mycobacteria, the use of nucleic acid-based methods for detecting *M. leprae* has received considerable attention.

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