



DRUG INFORMATION ALERT

Leprosy in the Southwest? The Armadillo Link

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Approximately 150 cases of leprosy are diagnosed in Americans each year, with most of these cases occurring in Texas and Louisiana. Traveling or working abroad accounts for two-thirds of the cases, but causes for the remaining one-third of cases have remained a mystery, as these patients have no history of foreign travel or contact with a local infected source. Recently, however, researchers have potentially identified an unexpected reservoir for this infection – the armadillo.¹⁻³ A new study published in the *New England Journal of Medicine* has recognized an association between armadillos infected with leprosy and humans diagnosed with leprosy.⁴ In this cohort study, Truman et al⁴ utilized several genetic markers to identify *Mycobacterium leprae* strains from 33 wild armadillos and 50 United States (U.S.) outpatients who attended a Louisiana leprosy clinic. These investigators found a never-before-seen strain of *M. leprae* in 28 of the 33 armadillos and 26 of 29 patients with no history of foreign travel/residence. Human samples came from frozen tissue and researchers were able to obtain a history of armadillo contact for 15 of these patients: 7 reported no contact with armadillos, 8 remembered having armadillo contact, and 1 of the 8 armadillo-contact patients reported frequently hunting, cooking, and eating armadillo. Although specific causality remains difficult to determine, these results imply that armadillos serve as a source of infection for leprosy.

Acknowledged since Biblical times, leprosy (also known as Hansen's disease) is a deforming infectious disease of the skin and peripheral nerves caused by the slow-growing, acid-fast bacillus, *M. leprae*.⁵ The disease is primarily characterized by peripheral nerve damage and hypopigmented skin lesions accompanied by sensory loss and diminished hair growth within the lesions, but may also present with additional morbidity including painless traumatic and burn injuries, secondary bacterial infections, and muscle atrophy. The organism grows best at 27°C to 33°C and cannot thrive at human core body temperature, which explains its preference for cooler areas of the body (e.g., skin, nerve segments close to skin, and mucous membranes of the upper respiratory tract); the organism has not yet been cultured in artificial media. *M. leprae* has been documented to grow in some animal species, including the armadillo, which has an optimal core body temperature (34°C) and life span that promotes *M. leprae* survival and growth. Leprosy has also been discovered in a chimpanzee, sooty mangabey monkeys, and a cynomolgus macaque. Identified

worldwide, leprosy is most likely transmitted through nasal/respiratory mucosa and occasionally skin-to-skin from patients possessing large numbers of bacilli.⁵⁻⁷ A few cases have occurred following contact with armadillos, especially in the south, where exposure to armadillos is common.⁸⁻¹⁰

While a connection between the armadillo and human leprosy has been introduced, the risk of acquiring leprosy is not increased based on these findings, as most humans (> 95%) are resistant to infection with *M. leprae*. However, early identification and treatment of the disease may minimize peripheral nerve involvement. Unfortunately, symptoms may not manifest for several years and health care providers may not suspect leprosy as a component of the differential diagnosis, which delays treatment. A multidrug therapy regimen is used to treat leprosy, incorporating a two- or three-drug regimen based on the number of skin lesions present: paucibacillary (PB) leprosy is defined as five or fewer skin lesions without bacilli present in the skin smear, and multibacillary (MB) leprosy is defined as six or more skin lesions with a skin smear that may or may not be positive. Treatment for PB leprosy includes dapsone 100 mg and rifampin 600 mg, while dapsone, rifampin, and clofazimine 50 mg are used to manage MB leprosy. In the U.S., dapsone and rifampin are given daily for 6 months for PB leprosy, and dapsone, rifampin, and clofazimine are given daily for 2 years for MB leprosy. Clofazimine can no longer be obtained in U.S. pharmacies but must be requested from the National Hansen's Disease Program, a division of the Department of Health and Human Services [225-578-9861 (phone) or 225-578-9856 (FAX)]. Other antimicrobials used occasionally to manage leprosy in select cases include some fluoroquinolones (e.g., levofloxacin, moxifloxacin, ofloxacin), clarithromycin, and minocycline. Leprosy patients managed with effective antimicrobial therapy quickly become noninfectious.^{5, 11}

Because *M. leprae* is not a vigorous pathogen, brief contact with armadillos is not likely to infect humans (e.g., moving armadillo road kill). Direct contact with armadillo meat, though, does increase chances of *M. leprae* transmission to humans. Therefore, handling or consuming armadillo meat should be avoided, as well as touching/purchasing souvenirs made of armadillo carcasses.^{1, 3}

Leprosy did not exist in the New World until European settlers arrived. Armadillos somehow contracted the disease, and now, approximately 15% of armadillos are *M. leprae* carriers. Lack of diversity in strain types suggests lack of interspecies *M. leprae* transmission, but inter-armadillo transfer occurs readily, as the same strain has been found in five states. Monitoring for spread of *M. leprae* as armadillos expand their territory will improve understanding of risk factors associated with leprosy. Too, recognition of the link between armadillos and human leprosy cases may provide relief to some patients trying to identify a plausible source for their disease.^{3, 4}

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