

"Leprosy" in Wild Armadillos

Abstracts of two communications^{1,2} of considerable significance and interest to those concerned with the problems of leprosy appear on page 421 of this issue. Their venues are such that they may not be readily available to many whose main concerns are related to leprosy. For this and other reasons they warrant comment.

The publication of the first of these reports is accompanied by a guest editorial³ raising many pertinent points but based essentially on the assumption that the report relates to a newly discovered, naturally occurring, leprosy-like mycobacterial infection in wild armadillos. This report is, in turn, based on the finding of a mycobacteriosis, sometimes widely disseminated, in seven feral armadillos which had been in the hands of Gulf South Research Institute, New Iberia, Louisiana for periods ranging from one day to 15 weeks and which had not been experimentally infected with *M. leprae*.

The six color photomicrographs accompanying this communication are virtually "dead ringers" for those previously presented as illustrating *M. leprae* infection of armadillos.^{4,5} The second communication² indicates that a total of 14 wild armadillos have shown this same diffuse mycobacteriosis and that bacilli from such armadillos yielded immunofluorescent staining, and pyridine acid-fast extractability identical to that of *M. leprae*. Lepromin prepared from the bacilli yielded positive Mitsuda reactions at 28 days.

Both Gulf South Research Institute (GSRI) and the U.S.P.H.S. Hospital at Carville maintain large colonies of armadillos. GSRI's experience with these animals as experimental subjects dates back about a dec-

ade. In 1971 when experimental leprosy was first reported in the armadillo,⁴ the question was raised as to whether or not any mycobacterial infection was known in armadillos. It was stated that no such infection was known or reported⁶ and a companion manuscript on the armadillo⁷ did not make mention of any such infection in its review of known infections in armadillos.

Ever since the first report of *M. leprae* infection in armadillos, we have argued that the comparative pattern of response in the armadillo to a series of other mycobacteria should be established. This seems not to have been attempted. It is quite understandable that both Carville and GSRI would be resistant to making such studies themselves in view of the hazard of contaminating their armadillo colonies with other mycobacteria.

Thus, with no prior reports of diffuse mycobacteriosis in the armadillo prior to the establishment of experimentally induced *M. leprae* infection, and no report of naturally occurring mycobacterial infection in armadillos having been reported in the subsequent period of armadillo interest and capture, the present occurrence involving armadillos captured in southern Louisiana in 1974-1975 would appear to be a new phenomenon. In these animals the prevalence is estimated at about ten percent. These reports do not mention any experience with armadillos from other parts of Louisiana or other areas such as Texas or Florida. All the infections of wild armadillos thus far are reported as being in animals caught within 39 miles south to southwest of GSRI along the Gulf Coast.⁸

Following the appearance of these reports Carville has summarized its experience.⁹

¹Walsh, G. P., Storrs, E. E., Burchfield, H. P., Cottrell, E. H., Vidrine, M. F. and Binford, C. H. Leprosy-like disease occurring naturally in armadillos. *J. Reticuloendothel. Soc.* **18** (1975) 347-351.

²U.S. Department of Health Education and Welfare. Leprosy-like disease in wild-caught armadillos—Louisiana. *Morbidity and Mortality Weekly Reports* **25** (1976) 18 & 23 (Jan. 24).

³Weiser, R. S. Natural leprosy-like disease in armadillos: a boon to leprosy research? *J. Reticuloendothel. Soc.* **18** (1975) 315-316.

⁴Kirchheimer, W. F. and Storrs, E. E. Attempts to establish the armadillo (*Dasypus novemcinctus*, Linn.) as a model for the study of leprosy. *Int. J. Lepr.* **39** (1971) 693-702.

⁵Kirchheimer, W. F., Storrs, E. E. and Binford, C. H. Attempts to establish the armadillo (*Dasypus novemcinctus*, Linn.) as a model for the study of leprosy. II. Histopathologic and bacteriologic post-mortem findings in lepromatoid leprosy in the armadillo. *Int. J. Lepr.* **40** (1972) 229-242.

⁶Storrs, E. E. Personal communication.

⁷Storrs, E. E. The nine-banded armadillo: a model for leprosy and other biomedical research. *Int. J. Lepr.* **39** (1971) 703-714.

⁸News Report. Leprosy in 14 wild armadillos claimed. *The STAR* **35** (1976) 5, 11.

⁹Kirchheimer, W. F. Leprosy-like disease in feral armadillos? Leprosy Scientific Memoranda.

From 1974 to February 1976 a total of 233 armadillos were examined, 89 by histopathology and bacteriology of lymph nodes, spleens and livers, and 144 by examination of blood buffy coats and ear-clips. No sign of mycobacteriosis was found in any of these animals by these technics. Of these animals, 87 were captured in Florida, 13 in Texas, and 133 in Louisiana, the latter all coming from east of the Atchafalaya River.

Both the Atchafalaya and the broad Mississippi River lie between Carville and GSRI and the reported area in which the infected armadillos were captured lies in the opposite direction.

The question, though not discussed in these reports, of the possible initiation of a leprosy zoonosis by escaped, experimentally infected armadillos has been raised. Correspondents state that there is no record of any armadillo having escaped. They further note that the armadillos in captivity are marked with a tenacious yellow paint—the same as is used for the marking of highways—and that no armadillos captured in the wild have had such markings. If thus marked armadillos had escaped, the random chance of coming across one in the midst of the thousands of armadillos in the Louisiana countryside would, however, be very slim unless there had been a massive outbreak of the imprisoned animals. Further, the carapace of these animals is a biological self-renewing structure somewhat in the manner of fingernails. Though the marking paint may adhere well

under conditions of captivity where single armadillos, or two animals, are kept in one concrete pen, these conditions are quite different from those in the wild where the animals are in and out of burrows and running through brush or swampy areas.

However, it is not necessary to assume that escaped, infected animals might be the source of the zoonosis. We have found that these animals will cannibalize dead armadillos. In so doing they root around and snuffle through the viscerae with their snouts. If infected carcasses, perhaps too decomposed for experimental use, are disposed of without complete incineration in an area accessible to wild armadillos, the feeding of the latter on the former could well be the beginning of an infection through the nose if infection through the digestive tract does not occur. There is presently no evidence for the latter route of inoculation despite the newspaper furor raised a number of years ago by speculation regarding infection by this route.¹⁰

Whatever the resolution and solution may be to this problem, it involves a fascinating and serious public health problem. If a leprosy mycobacterial zoonosis has existed unrecognized until now or, more particularly, if a zoonosis is inadvertently being initiated, there is a fascinating opportunity for the study of such a zoonosis and a notable challenge for devising means for its curtailment and eradication.

—OLAF K. SKINSNES

¹⁰Editorial. The Weddell theory on the pathogenesis of leprosy. *Lepr. Rev.* 34 (1963) 54-56.