Inoculation of Foot Pads of Severe Combined Immunodeficient Mice with *M. leprae*

TO THE EDITOR:

Soon after the discovery of *Mycobacterium leprae* as the etiologic agent of human leprosy in 1875 ([1]), it became evident that this mycobacterium cannot be cultivated *in vitro*. Since then, the search for an animal model for leprosy has involved almost 30 species of animals ([2]), and this search for 117 years has yielded only three species of armadillos; nude mice and rats, black mice, and normal mouse foot pads; Korean chipmunks; and five nonhuman primates (gibbons, chimpanzees, and rhesus, African green and mangabey monkeys). Of these animals, only armadillos and nude mice are currently used for the production of *M. leprae* to be used in all fields of leprosy research. Recently, a mouse with severe combined immunodeficiency (SCID) has been developed, and such mice are now being used to study HIV pathogenesis as well as to search for effective drugs and vaccines ([3,4]). Preliminary studies were carried out to investigate if the SCID mice are susceptible to human leprosy bacilli.

During these studies, 20 SCID mice and 20 nude mice (as a control) were purchased from Harlan Sprague Dawley, Inc., Indianapolis, Indiana, U.S.A., and transported under aseptic conditions. A bacillary suspension was prepared from the foot pad lesions of nude mice previously infected with *M. leprae*. Hind foot pads of SCID and nude mice were inoculated with 1×10^6 *M. leprae*. Both types of mice were kept in one SPF vinyl plastic isolator. It was observed 135–150 days postinfection that the hind foot pads of the SCID mice were slightly swollen, indicating some multiplication of *M. leprae*; whereas such manifestation in the foot pads of nude mice was noticed only about 210 days after infection. The swelling gradually increased and after about 330–345 days of infection all foot pads of the SCID mice were completely swollen and lesions appeared to be fully developed. However, the same condition was observed in foot pads of nude mice only after 400–450 days postinfection. Although during these preliminary studies no bacillary counts were made, the results clearly indicated that lesions of foot pads developed earlier in the SCID mice than in the nude mice. The bacilli isolated from the foot pads of SCID mice were acid-fast, lost acid-fastness by pyridine extraction, did not grow on Lowenstein-Jensen and egg-yolk media, and showed DOPA oxidase activity. Thus, the bacilli obtained from the foot pads of SCID mice were considered as *M. leprae*.

After infection nude mice and armadillos have to be kept for 13–18 months before the infected tissues are ready to isolate bacilli for experiments. The maintenance of these animals under aseptic conditions for such a long time is quite expensive. It may be possible that the same or higher yields of *M. leprae* can be obtained from the foot pads of SCID mice in a relatively shorter period of time, thus reducing the cost. Investigations are in progress in which comparative detailed studies will be made of the size and weight of foot pads, total counts/foot pad, infection with different inoculation sizes, etc., using both SCID and nude mice.

—Muhammad Ishaque, Ph.D.

Professor
Applied Microbiology Research Center
Institut Armand-Frappier
University of Quebec
C.P. 100
Laval, Quebec, Canada H7N 4Z3

Acknowledgment. This investigation was generously supported by Le Secours aux Lépreux, Canada, Inc.

REFERENCES

1. HANSEN, G. A. On the etiology of leprosy. Br. Foreign Med. Chir. Rev. **55** (1875) 459–489.
2. JOHNSTONE, P. A. S. The search for animal models of leprosy. Int. J. Lepr. **55** (1987) 535–547.
3. MCCUNE, J. M., NAMIKAWA, R., SHIH, C. C., ROBIN, L. and KANESHIMA, H. Suppression of HIV infection in AZT-treated SCID-hu mice. Science **247** (1990) 564–566.
4. MILMAN, G. and D'SOUZA, P. HIV infections in SCID mice: safety consideration. ASM News **56** (1990) 639–642.