

## Usefulness of DNA Fingerprinting in Combating Tuberculosis

van Embden et al. have proposed DNA fingerprinting of all *Mycobacterium tuberculosis* strains to perform global epidemiological studies on tuberculosis (1). With a view to a DNA pattern library, restriction fragment length polymorphism (RFLP) analysis could make it possible to gain important insights into the global transmission of tuberculosis. We do believe that these new typing techniques can be very useful in clearing up epidemics and thus should be made available to public health officers as a valuable tool in the fight against tuberculosis. On the other hand, detection of chains of infection will be of no practical consequence in the majority of cases, because of the long time span between infection and clinical manifestation of this disease in most afflicted patients. We have subjected 36 strains of *M. tuberculosis* isolated in 1992 from 31 Austrian patients to RFLP analysis with *PvuII* and an INS-986 probe. All but two isolates were found to have unique patterns. Our investigation revealed no dominating strains except in the case of a married couple; there, however, the chain of infection appeared to be obvious even without molecular epidemiological techniques (due to the temporal association of the onset of disease). The renewed rise in the incidence of tuberculosis and the increasing spread of multidrug-resistant strains of *M. tuberculosis*, which are due to lack of compliance with prescribed regimens and poor social conditions, call for intensified efforts by the public health sector to contain this endemic infectious disease. In the fight against tuberculosis, it is still essential to guarantee that the necessary diagnostic and therapeutic means are available for all patients with tuberculosis; strain identification of *M. tuberculosis* by DNA fingerprinting will have only limited practical importance in this context.

### REFERENCE

1. van Embden, J. D. A., M. D. Cave, J. T. Crawford, J. W. Dale, K. D. Eisenach, B. Gicquel, P. Hermans, C. Martin, R. McAdam, T. M. Shinnick, and P. M. Small. 1993. Strain identification of *Mycobacterium tuberculosis* by DNA fingerprinting: recommendations for a standardized methodology. *J. Clin. Microbiol.* 31:406-409.

Franz Allerberger  
Werner Vogetseder  
Manfred Fille  
Manfred Dierich  
Federal Public Health Laboratory  
Schoepfstrasse 41  
A-6020 Innsbruck  
Austria

### Authors' Reply

In their comment on the recommendations for a standardized method of fingerprinting *Mycobacterium tuberculosis*, Allerberger et al. state that the identification of sources of infection by DNA typing will have no practical value in the majority of cases, because of the long time span between

infection and clinical manifestations of the disease. However, it is known that in the vast majority of individuals who develop disease, the incubation period is less than 2 years and often only weeks to a few months. Styblo (1) showed that 42% of the smear-positive patients had been coughing for 1 to 6 months. Therefore, it is to be expected that by rapidly finding strains with identical fingerprints, the putative sources of infection can be tracked more reliably and easily than by the present day practice of contact tracing using skin testing with tuberculin. Recently, various undiagnosed individuals with pulmonary tuberculosis were recognized as the source of infection by using contact tracing; these sources could have been identified months before the results of the contact tracing studies were available if fingerprint results had been available more promptly. The proper containment of such sources is of critical importance in the long-term control of tuberculosis.

Recent observations by various laboratories have demonstrated the usefulness of fingerprinting in the epidemiology of tuberculosis; many small epidemics, nosocomial infections, and outbreaks of drug resistant *M. tuberculosis* have been traced by DNA fingerprinting alone. The fingerprinting of a mere 36 strains from 31 Austrian patients as described by Allerberger et al. is not the way to draw conclusions about the usefulness of the establishment of fingerprint libraries. The great diversity among these 36 isolates is to be expected from a country in which there is a low incidence of tuberculosis. If more strains had been fingerprinted over a longer time span, the authors likely would have been able to trace epidemiological relationships among previously unexpected epidemiologically related cases. In The Netherlands, such outbreaks have been established by fingerprinting alone, even without systematic typing of all isolates. Examples of sources of infections identified in this manner included a pub, bronchoscopes, a discotheque, and an Austrian bull that was imported into The Netherlands last year. This last source caused an outbreak in cattle on various farms, the first such outbreak since bovine tuberculosis was eradicated in the Netherlands 25 years ago.

### REFERENCE

1. Styblo, K. 1991. Epidemiology of tuberculosis, vol. 24, p. 55-70. Royal Netherlands Tuberculosis Association.

J. D. A. van Embden  
Dick van Soolingen  
Petra E. W. de Hass  
Unit Molecular Microbiology and Laboratory  
of Bacteriology and Antimicrobial Agents  
National Institute of Public Health and  
Environmental Protection  
P.O. Box 1  
3720BA Bilthoven  
The Netherlands