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How Is TB Transmitted ?

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To the Editor

Unlike nontuberculous mycobacteria, *Mycobacterium tuberculosis* is not considered to be an environmental mycobacterium; rather, humans are considered to be the reservoir for *M tuberculosis*, with transmission occurring person-to-person via the respiratory route. In this issue of *CHEST* (see page 1094), Velayati et al ¹ reported the surprising finding of viable *M tuberculosis* in 10% of water samples (and 1% of soil samples) in metropolitan Tehran.

One explanation for these results would be laboratory cross-contamination. Although there were no matching genotypes for isolates from human and environmental sources to suggest potential cross-contamination, information was not provided on the proportion of all *M tuberculosis* isolates handled by the laboratory during the study period that were genotyped. Notably, though, all positive water cultures were from sources other than tap water, making random cross-contamination less likely.

The authors did not find matching environmental and pulmonary isolates to suggest transmission between the environment and humans. However, this lack of correlation is difficult to interpret without information on the genotyping coverage among human cases. As animals can also become infected with *M tuberculosis*, another consideration would be that the source of environmental *M tuberculosis* could be nonhuman. ² In this regard, data on the prevalence of *M tuberculosis* in domesticated and wild animals in the Tehran region would be helpful.

The authors posit that contamination of water sources with *M tuberculosis* may occur through expectoration. However, since both human stool and urine can harbor *M tuberculosis*, sewage contamination of water sources could potentially be another source. ³

The possible connections between human TB and the environmental isolates are undiscovered—no environmental *M tuberculosis* isolates matched those from human pulmonary TB. One question is whether isolates from scrofula would have matched. An oral route of infection has been postulated as a source of TB in nodes draining the oropharynx. ⁴ For example, human TB from *Mycobacterium bovis* acquired through ingestion of contaminated dairy products is associated with cervical lymphadenitis. ⁵

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The finding of viable *M tuberculosis* in a broad survey of environmental sources, if confirmed in other settings, has several potentially important public health implications. The elegant studies that showed that *M tuberculosis* can be spread by aerosolized droplet nuclei did not exclude transmission through other routes. The findings of Velayati et al ¹ suggest that a broader view of possible routes of TB transmission should be reconsidered. Furthermore, immunologic effects of oral exposure to environmental sources of *M tuberculosis*, whether associated with infection and disease, merit consideration.

References

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