CORRESPONDENCE

Isolation of 'free-living' amoebae causing human disease

The review by Szénási and her co-authors [1] was useful, particularly the information on the new primary amoebic meningoencephalitis isolate from the Philippines ('*Naegleria philippinarum*'), and the possibility of a similar isolate from a swimming pool fed by a geothermal spring in Szeged, Hungary. However, I was surprised that reference to *Balamuthia mandrillaris*, an important cause of fatal human and animal brain infections [2] was omitted. This omission, also important because some infections previously thought to be caused by acanthamoebae, including one cited by the authors [3], were due to that leptomycxa-like amoeba [4]. *B. mandrillaris* does not grow on the bacterial lawns used to isolate other 'free-living' amoebae from clinical specimens and environmental samples. *B. mandrillaris* does consume acanthamoebae [4], and might therefore be isolated on plates inoculated with environmental samples if food protozoa for it were also present. Specimens from suspected cases should be inoculated into tissue cultures. This is information that needs to be widely known, if more isolates of *Balamuthia* are to be obtained.

The relationships between legionellae and free-living amoebae are varied and complex, but the notion of legionellae as 'endosymbionts of amoebae' [1] is not how I originally viewed the relationship between them [5]. At a low temperature a legionella may be consumed with little effect on the amoeba, but at a higher temperature it may multiply rapidly and reduce the amoeba to a bag full of highly motile legionellae. Thus, at low temperatures the legionellae may be food for amoebae, but at a higher temperature destroy them [6]. The same legionella may not infect other amoebae, or only rare obviously infected amoebae are seen. If an amoeba was to take in a legionella, but not utilise it as food, and the legionella was unable to multiply significantly, it could be considered an endosymbiont in that amoeba. If conditions were to change, such that weak amoebae succumbed to legionella infection, the fittest would survive. If the legionellae eventually released from the infected weak amoebae then readily infected and destroyed competing amoebae, or ciliates, or both, in the same habitat, then the legionella could be regarded as an aggressive

endosymbiont for the first amoeba, and a pathogen for its competitors.

Sarcobium lyticum (L2), referred to by the authors as a bacterial endosymbiont of amoebae, has always been regarded as a parasite of amoebae, it is now in the genus *Legionella* as *L. lytica* [7]. Incidentally strain L2, isolated from Polish soil in 1954, is now the oldest viable isolate of a legionella from the environment.

Some legionellae are pathogenic for man, other bacteria pathogenic or symbiotic for amoebae may also be pathogenic for man, e.g., certain chlamydia-like cocci [8], and strain LLAP-3, a *L. lytica*-like bacillus isolated from a case of pneumonia [7]. Therefore, amoebae are not only important as pathogens in their own right, but also as hosts for bacteria causing human disease.

T. J. Rowbotham, Leeds Public Health Laboratory, Bridle Path, York Road, Leeds LS15 7TR

References

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