Mycobacterium diagnostics: from the primitive to the promising.

Abstract

The field of clinical microbiology has been revolutionised by genomic and proteomic methods, which have facilitated more rapid diagnosis and characterisation of infection in many cases. In contrast, mycobacteriological evolution has tended to retain the traditional methods of smear microscopy for detection of acid-fast bacilli to indicate mycobacteria, along with culture, and in synergy with more modern molecular methods. Thus, efforts have been focused on reducing the time to diagnosis of infection, while increasing the amount of diagnostic information available, including more definitive speciation, and more rapid susceptibility test results. Although smear microscopy remains a mainstay for the laboratory-based diagnosis of mycobacterial infection, molecular testing has vastly reduced the time needed for identification of Mycobacterium tuberculosis in particular, when compared with traditional culture-based techniques. Molecular methods may also yield antimicrobial susceptibility results through testing for the most common resistance-inducing mutations to some of the antimicrobial agents of choice. However, the diversity of resistance mutations already characterised suggests that these currently-available molecular detection systems should be accompanied by culture-based susceptibility testing. This review compares the efficacy of microscopic, phenotypic, proteomic and genotypic methods available for mycobacterial diagnosis. The diversity of methods currently in use reflects the complexity of this area of diagnostic microbiology.