AMERICAN SOCIETY FOR MICROBIOLOGY | Journal of Clinical Microbiology

LETTER TO THE EDITOR

Restricted Identification of Clinical Pathogens Categorized as Biothreats by Matrix-Assisted Laser Desorption Ionization–Time of Flight Mass Spectrometry

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These days, many public and private clinical microbiology laboratories use matrix-assisted laser desorption ionization–time of flight mass spectrometry (MALDI-TOF MS) as a primary means of identification of bacterial isolates (1). In our laboratory, we use a MALDI Biotyper (Bruker Daltonics, Bremen, Germany) with MALDI Biotyper CA System software. This system is capable of identifying more than 90% of all routinely encountered bacterial isolates to the species level (2). In July 2015, we repeatedly isolated morphologically similar, fastidious bacterial colonies in subcultures of enrichment cultures (thioglycolate broth) of joint tissue biopsy specimens from an 84-year-old patient with a complicated clinical course following total knee endoprosthesis surgery. The isolated bacterial colonies had a fine, grayish morphology on cooked blood agar; the Gram stain showed faint Gram-negative coccoid rods. The MALDI Biotyper spectra were of good quality (based on the number of spectral peaks), but the software repeatedly reported no identification. On the basis of 16S rRNA gene sequencing and SmartGene IDNS (SmartGene, Zug, Switzerland) sequence homology searches, the bacterial isolates were finally identified as *Francisella tularensis* (3). Because of export restrictions, the Bruker Biotyper database does not allow the identification of potential agents of bioterrorism. Customers wishing to identify *F. tularensis* have to acquire a separate database termed a security-relevant database and have to obtain governmental export permission prior to installation.

Zoonotic organisms are rarely, if ever, implicated in prosthetic device infections. A single case report of *F. tularensis* as the cause of a chronic total-knee endoprosthesis infection is described in the literature (4). During the laboratory workup, a total of 10 laboratory personal inadvertently had significant exposure when working with primary material or cultures from this case.

Our case illustrates that commercially available MALDI-TOF MS-based identification systems, whose use is widespread in clinical microbiology laboratories for routine identification, do not allow the identification of potential agents of bioterrorism because of export restriction regulations (dual-use policy). This policy is problematic and potentially dangerous. We also note that our report is not without precedent (5). Together, these observations urge and reinforce the need for a policy change, as many bacteriology laboratories are about to lose biochemical and morphological identification methods in routine use. It is, however, important that laboratory directors have mechanisms in place to ensure the proper handling of potential biothreat organisms and confirmation of identification prior to the release of results. Relying on MALDI-TOF MS-based identification without a working knowledge base of other characteristics of the pathogen in question can result in undependable and erroneous identifications. These other characteristics may include growth characteristics on different media, colony morphology, Gram stain characteristics, motility, urease, oxidase, and results of other common rapid tests. Unrestricted, rapid identification of pathogens that are possible biothreats, such as *Brucella* spp., *Bacillus anthracis*, *F. tularensis*, and *Yersinia pestis*, is imperative in order to protect our employees from laboratory infections, to take the appropriate safety precautions, and to serve our patients by allowing diagnosis in a timely manner.

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Accepted manuscript posted online 13 January 2016

Citation Keller PM, Bruderer V, Müller F. 2016. Restricted identification of clinical pathogens categorized as biothreats by matrix-assisted laser desorption ionization–time of flight mass spectrometry. J Clin Microbiol 54:816. doi:10.1128/JCM.03250-15.

Editor: E. Munson

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