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Conventional methods, molecular assays and MALDI-TOF MS as combined tools in diagnostic parasitology

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Traditionally, diagnosis of parasitosis is performed by the microscopic examination of the sample. However, this approach is affected by several factors, such as the sensitivity of the microscopic examination positively influenced by the examination of multiple samples, the use of suitable staining techniques and/or culture and by the expertise of the parasitologist. Because of the cited difficulties, few laboratories routinely perform amplification assays (such as real-time PCR) targeting the genes encoding for ribosomal RNA that allow a more rapid and sensitive laboratory diagnosis, despite higher costs. At present, MALDI-TOF MS is being used increasingly for clinical microbiological diagnosis however, the diagnostic applications cover mainly bacteria and fungi and it is poorly described in diagnostic parasitology. In this study, we report the application developed in this field. In a first approach, the commercial database of the spectrometer used in our laboratory was supplemented with the spectrum of *T. vaginalis* reference strain; after implementation, the protein spectra of 21 *T. vaginalis* clinical isolates were correctly identified. In a second approach, protein biomarkers were picked out to identify and differentiate 6 *E. histolytica* and 8 *E. dispar* and to identify 13 *D. fragilis*. For each parasite, specific biomarkers were found that allowed to properly identify clinical strains. The versatility of the system was demonstrated, allowing us to identify different parasites using different approaches such as the creation of a

specific database modifying the parameter setting and by biomarkers detection. The use of conventional methods and molecular assays is combined for the diagnosis of malaria: microscopic examination of blood smears remains the gold standard, even if it presents limitations in sensitivity and/or specificity in cases of low parasitaemia and mixed infections and molecular assays allow the correct diagnosis of malaria, particularly in cases of infections by species other than *Plasmodium falciparum* and mixed infections.

Biography

Adriana Calderaro has a Degree in Medicine and Surgery at the Faculty Medicine and Surgery, University of Parma; license to medical practice in Medicine and Surgery awarded by the Faculty of Medicine and Surgery of the University of Parma; Member of the Medical Practitioners National Register; PhD in Basic and Applied Microbiology; Post-Degree at the Medical School of Microbiology and Virology at the Faculty Medicine and Surgery of the University of Parma. She is currently MD, PhD, Associate Professor of Microbiology and Clinical Microbiology at the Faculty of Medicine and Surgery at the University of Parma. Her research activity covers the fields of bacteriology (Mycobacteria, Spirochaetes); parasitology (Plasmodia, Toxoplasma Gondii, Intestinal Protozoa), virology (hepatitis viruses; gastroenteric viruses). She is the author of more than 400 papers and 4 books and chapters of books.

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