Molecular Techniques to Detect and Identify Protozoan Parasites in the Environment

SIMONE M. CACCIÒ

Department of Infectious, Parasitic and Immunomediated Diseases, Istituto Superiore di Sanità, viale Regina Elena 299, 00161 Rome, Italy.

Abstract

The environmental route of transmission is important for many protozoan and helminth parasites, with water, soil and food being particularly significant. Both the potential for producing large numbers of transmissive stages and their environmental robustness pose persistent threats to public and veterinary health. The introduction of molecular techniques, in particular those based on the amplification of nucleic acids, has provided researchers with highly sensitive and specific assays for the detection and identification of these pathogens. The application of these techniques to clinical, environmental, and food samples is instrumental for a thorough understanding of the epidemiology of the infection and for the implementation of control measures. Here, the advantages and drawbacks of some molecular techniques (Polymerase Chain Reaction - PCR; Reverse- Transcriptase PCR - RT-PCR; Real-time PCR - qPCR; Nucleic Acid Sequence-Based Amplification - NASBA) will be briefly reviewed. Some application of these techniques will be illustrated with reference to two important and widespread human parasites, the apicomplexan Cryptosporidium and the flagellate Giardia.

Key words: Cryptosporidium, Giardia, water; food, molecular methods for detection

Tel. + 39 06 4990 2484, Fax + 39 06 4938 7065, e-mail: caccio@iss.it