A rapid PCR-based method for identification of four important Candida species

Duà Nazzal, Salem Yasin, Khaled Abu-Elteen
Biological Sciences Department, Hashemite University, Al-Zarqa, Jordan

The rapid detection and identification of Candida species in clinical laboratories are extremely important for the management of patients with hematogenous candidosis. Currently available culture and biochemical methods for detection and identification of Candida species are time-consuming. This study describes the use of a simple and rapid PCR method using species-specific oligonucleotides for the detection of clinical isolates of Candida species. These species-specific oligonucleotides are complementary to unique sequences within the intergenic transcribed spacer 2, located in between the 5.8S and 28S ribosomal DNA, and generated DNA fragments by both the conventional and hemi-nested PCR reactions. Conventional PCR produced a single DNA fragment of variable size in all isolates, while the hemi-nested PCR produced two discrete DNA fragments, both with the expected sizes of 111bp/57bp (C. albicans), 84bp/42bp (C. glabrata), 94bp/45bp (C. krusei) and 95bp/49bp (C. parapsilosis). In conclusion, the PCR–based method described in this study is fast and specific for the identification of clinically important Candida species.

KEY WORDS: Candida species, PCR, Identification

INTRODUCTION

Candida genus includes more than 200 Candida species, which often are part of the normal microbial population of the skin and mucous membranes of healthy individuals (Odds, 1988). Candida species can become opportunistic pathogens when changes occur in the host environment causing an imbalance of the normal microbial population of the body or a decrease in the host resistance to infection (Levitz, 1992). Although most cases of candidosis are still caused by C. albicans (Odds, 1988), there has been a striking increase in the frequency of non-albicans Candida species including C. glabrata, C. parapsilosis and C. krusei. These species have been isolated and indicated as the causative agents of candidosis in immunocompromised patients and people without any obvious immune defects (Hannula et al., 1997; Darouiche, 1998). They also represent a major causative agent of illness in the reproductive tract of women in several intervals of their reproductive life (Abu-Elteen et al., 1997; Bello et al., 2002; Chong et al., 2003). In this respect, various anti-fungal drugs such as amphotericin B, nystatin, ketoconazole, fluconazole and itraconazol (White et al., 2002) were developed and used in the treatment and management of candidosis. However, most of these drugs were limited in their use because of their toxicity (Bougnoux et al., 1999) and the emergence of candida-drug resistant variants (White et al., 2002; Cirak et al., 2003; Onyewu et al., 2003). Therefore, accurate detection and