



Conference Report

Abstracts of the 5th International Electronic Conference on Biosensors

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9. Paper-Based Biosensors

9.1. A Novel DNA-Based Electrochemical Sensor for the Detection of *Candida* Species

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The frequency and prevalence of invasive fungal infections have increased, particularly among hospitalized patients with severe underlying illnesses and/or immunocompromised individuals [1,2]. The survival of these patients relies on the prompt identification of the infection and on the timely initiation of antifungal therapy, and yet standard laboratory testing may yield ambiguous results [3]. The diagnostic approaches for candidiasis include culture testing, serological assays, and histopathologic analysis of tissues; however, these methods may be time-consuming and can yield insensitivity or inaccuracies. The prevailing “gold standard” for identifying *Candida* spp. fungemia is blood culture. Nonetheless, this is considered insensitive, as it has been shown to be positive in fewer than half of individuals with chronic disseminated candidiasis [4]. Culture methods are time-intensive, with certain *Candida* species requiring up to a week for development, which is an intolerable delay before initiating fungemia treatment. The difficulties in diagnosing *Candida* infections highlight the necessity for efficient and rapid methods to detect and identify clinically relevant fungi in a microbiology laboratory. This work involves the development of an electrochemical DNA-based sensor for the rapid, simple, and precise detection of *Candida* spp. This sensor, self-assembled in an electronic paper device (ePAD), is based on the electrochemical detection of the hybridization reaction between two complementary single-stranded DNA sequences. Initial research indicated that this DNA-based sensor may identify *Candida* spp. in synthetic DNA samples. Notwithstanding these results, efforts are underway to enhance the sensor for measuring *Candida albicans*; this methodology will be corroborated by a further study. Future advancements will focus on application within a medical setting, encompassing sensitivity, accuracy, response time, challenges, and potential.

9.2. Development of Blood Glucose Meter

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Blood glucose level was developed and tested. The test meter was developed for non-invasively monitoring the blood glucose level. This is due to the fact that some forms of monitoring glucose and cholesterol with instruments involve invasive blood tests, which are needless given present-day biomedical instrumentation technology. Given the global prevalence of high blood glucose levels and related issues, there is an urgent need for non-invasive monitoring methods that engage in comfortable testing compared