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Nanobiosensor application in detecting biomarkers in *Candida* infection

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Candida colonization occurs in the oral cavity, gut and reproductive tract in healthy individuals but is a common cause of fungal infection in high risk patients (immunocompromised patients, transplants, diabetes, etc.) with prevalence of 50% in intensive care units. Numerous biomarkers have been anticipated to be of potential use for prognosis in septicemia, including cytokines, cell-surface markers, acute proteins, coagulation factors and apoptosis factors. Sample size is a critical factor and it is unclear if it could predict clinical outcome. This proof of concept study investigated biomarkers of *Candida* immune response from various body fluid samples using a biosensor method. The successful detection of cytokine IL-17A (infection key marker) and *Candida*-antibody were used as biomarkers to detect infection and immune response in saliva, serum, plasma and semen. A specific, label-free, immunosensor was assembled using polyaniline electropolymerization on a graphene screen-printed electrode base and antibodies covalent binding against IL-17A and *Candida*. Limits of detection of 0.250 pg/ml (IL-17A) and 7 *Candida* cells/ml were achieved within a linear range of $R^2=0.98$ and $R^2=0.97$, respectively. Sample volume used in the nanosensor method was greatly reduced in comparison with the traditional methods. Diverse fluid samples from various body sites from the same participants tested in this study were also detectable. Nanosensors used in the present study were able to detect *Candida* cells and IL-17A level in comparison to gold standard traditional methods. Further studies are needed to characterize specificity and sensitivity of the diagnosis method using nanosensor.

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