Highly sensitive electrochemical impedance spectroscopy based sensor for *Staphylococcus aureus* detection

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Staphylococcus aureus is now considered one of the major pathogen of prostatitis. Its resistance to multiple drugs makes it difficult to treat, leading to a high morbidity and mortality rate. Therefore, it is imperative to establish sensitive, rapid and timely methods for the detection of *Staphylococcus aureus*. In this work, an electrochemical impedance spectroscopy sensor based on functionalized gold nanoparticles was constructed and realized for the rapid and highly sensitive analysis as well as the detection of *Staphylococcus aureus*. The experimental results demonstrated that the biosensor has a detection limit of 3×10^3 CFU/mL and a linear response range of $3 \times 10^3 - 3 \times 10^7$ CFU/mL, which means a high sensitivity. In addition, the sensor has a short detection time, simple operation and high stability, which can be used for real-time detection.

Keywords: *Staphylococcus aureus*; EIS; Biosensor; AuNPs; Prostatitis

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