Rapid and highly sensitive detection of Enterovirus 71 by using nanogold-enhanced electrochemical impedance spectroscopy

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Short title: Detection of EV71 by using EIS

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Abstract

Enterovirus 71 (EV71) infection is an emerging infectious disease causing neurological complications and/or death within 2–3 days after the development of fever and rash. A low viral titre in clinical specimens makes the detection of EV71 difficult. Conventional approaches for detecting EV71 are time-consuming, poorly sensitive, or complicated, and cannot be used effectively for clinical diagnosis. Furthermore, EV71 and Coxsackie virus A16 (CA16) may cross react in conventional assays. Therefore, a rapid, highly sensitive, specific, and user-friendly test is needed. We developed an EV71-specific nanogold-modified working electrode for electrochemical impedance spectroscopy (EIS) in the detection of EV71. Our results show that EV71 can be distinguished from CA16, Herpes simplex virus, and lysozyme, with the modified nanogold electrode being able to detect EV71 in concentrations as low as 1 copy number/50 µL reaction volume, and the duration between sample preparation and detection being 11 minutes. This detection platform may have the potential for use in point-of-care diagnostics.