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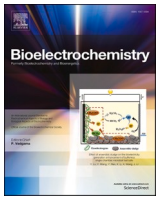

Editorial for the special issue of bioelectrochemistry: Diagnostic biosensors for infectious diseases

Rapid and robust biodiagnostic measures for the efficient detection of infectious bacterial and viral diseases represent a worthy and timely challenge for researchers working in bio-electroanalytical chemistry and the biosensor arena. Such analytical tools aid in the comprehension of the relevant intricacies involved in tackling communicable diseases. Portable biosensor devices offer promising solutions by facilitating on-site measurement of pathogens using accessible sample matrices, thereby impacting the escalation of infection control measures.

Early-stage detection and monitoring of infectious diseases has implications for public-health and associated mortality and economic factors. It is extremely valuable to have a suite of sensitive, rapid, and effective methods that can help inform the early stages of communicable disease spread in order to prioritise critical care for those at risk. This capability has connotations for the global usage of antibiotic and antiviral therapeutics and associated emergence of resistance to these molecules, as accelerated by the recent COVID-19 pandemic.

This special issue collates research efforts in this area as captured by comprehensive reviews focused on infectious viral diseases (*L.R. Panicker et al.*), SARS-CoV-2 field-effect transistor biosensing (*J. Sengupta and C.M. Hussain*), digital point of care devices for malaria, dengue, COVID-19 disease (*S. Baruah and C.A. Betty*) and miniaturised MXene based viral biosensors with focus on fabrication and the role of POC diagnostics in the detection of infectious agents *(A. Parihar et al.*).

The breadth of biorecognition strategies employed in the papers presented reflects the exclusive capacity of biomolecules, to include aptasensors for *E coli* (*R.B. Jamal et al.)* and TB pathogens (*O. Uhuo et al)*, monoclonal antibodies for SARS-CoV-2 (*Fabiani et al.)* and biomarkers of periodontitis (*Tortolini et al.),* DNA sensors based on nanocubic materials (*M. Zhu et al.*)., and peptides and protease assays for Respiratory Syncytial Virus (*J. Yu et al.*), SARS-CoV-2 (*Hou et al.*). The articles also exploit innovative nanostructures as scaffolds for DNA and aptasensing, comprising MnFe@Pt (*Zhu et al.)* and chitosan-indium nano-kesterite (*Uhuo et al.*) respectively, with an insightful review of MXenes and their nanocomposites for viral biosensor design and fabrication (*A. Parihar et al.*).

Unsurprisingly, COVID-19 features strongly in the collection as addressed by *L. Fabiani et al.* in a smartphone assisted paper based electrochemical lateral flow assay for N protein quantification together with a simplified SARS-CoV-2 protease assay which combines fluorescence and electrochemical signalling (*M. Hou et al.*), and facile construction of $Mn_3[Fe(CN)_6]_2$@Pt based electrochemical DNA sensors for ultrafast precise determination of SARS-CoV-2 viral RNA in serum (*M. Zhu et al.*). A disposable electrocatalytic "off–on" aptasensor for bacterial detection sensor for *E. coli* was developed which exploited ferricyanide reduction by methylene blue on mixed PEG/aptamer monolayers (*R.B. Jamal et al.*) and an approach for disulfide manipulation in paediatric Respiratory Syncytial Virus detection is presented via peptide-based electrochemical potential scanning (*J. Yu et al.*).

Such encouraging methodologies with testing on human samples, embeds important scientific knowledge and competency, ensuring resilience and heightened defence in relation to future pandemics with associated global health and economic impact. Our aspiration is that this special issue helps inform readers' perspectives, challenges, and new ideas regarding future pathways wherein bioelectrochemistry can underpin multiparametric diagnostic solutions for communicable diseases. The research presented in this special issue paves the way for successful deployment of a suite of biosensing/bioelectrochemical devices capable of sensitive and selective pathogenic activity (viral/bacterial) monitoring. This has significance in relation to pandemic preparedness and global health and wellbeing, catalysing further discoveries and scalable solutions for use in all regions of our planet.

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