

SARS-CoV-2 RapidPlex: A Graphene-Based Multiplexed Telemedicine Platform for COVID-19 Diagnosis

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The COVID-19 pandemic is an ongoing global challenge for public health systems. The need for widespread testing to control the spread of COVID-19 has faced challenges due to testing backlogs, limited access to required equipment, and inaccurate assay results.^[1] To address this, we demonstrate an ultrasensitive telemedicine platform, the SARS-CoV-2 RapidPlex, based on target-specific immunoassays for rapid and remote assessment of COVID-19 biomarkers (i.e., nucleocapsid protein, anti-spike protein IgG and IgM, and C-reactive protein).^[2] Multiplex sensing of these targets provides information on three key aspects of COVID-19 disease: viral infection, immune response, and disease severity. The platform uses capture antigens and antibodies immobilized on mass-producible, low-cost, laser-engraved graphene electrodes.^[3,4] We successfully evaluated the platform's applicability using COVID-19-positive and COVID-19-negative serum and saliva samples. The SARS-CoV-2 RapidPlex has the potential to quickly and effectively triage patients and track infection progression, allowing for the clear identification of individuals who are infectious, vulnerable, and/or immune. Based on this pilot study, our multiplexed immunosensor platform may allow for high-frequency at-home testing for COVID-19 telemedicine diagnosis and monitoring.

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FIGURES



Figure 1: Insert caption to place caption below figure (Arial 10)