Poster 17

Title: Detection of influenza viruses using a novel electrochemical assay.

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Category: Point-of-Care Testing and Infectious Disease or Point-of-Care Testing for Emergency Preparedness and Resource Limited Countries

Abstract:

Influenza virus is a deadly respiratory virus that causes approximately 200,000 hospitalizations and over 36,000 deaths per annum in the United States. New pandemic strains, cause millions of deaths worldwide, especially if it is a virulent strain like the 1918 strain. Current methods of detection include viral cultures, nucleic acid tests and antibody based sandwich assays. Culturing viruses and typing them is labor intensive and time consuming. High throughput screening of subjects with RT-PCR in an epidemic setting is not practical. Antibody based rapid diagnostic tests can be used for point of care testing, however, they suffer from a number of issues that include decreased stability under ambient conditions, difficulty in procurement of antibodies for emerging strains, etc. which leads to decreased selectivity and sensitivity and shelf life. Moreover, none of these tests can determine antiviral resistance unless it is performed in a clinical laboratory with expensive equipment and trained personnel, which is important from the perspective of guiding clinical decisions.

We have developed a novel electrochemical assay that can be used readily to detect all influenza strains and determine antiviral resistance. Briefly, we have synthesized synthetic molecules, that, upon exposure to any strain of influenza virus, releases electrochemically active molecules that can be readily and rapidly detected using a simple electrochemical setup. Using this approach, we have been able to detect multiple influenza strains, which include H1N1 and H3N2 strains. Our technology is disruptive in nature because existing electrochemical monitoring kits like the ones used for determining blood glucose can be retrofitted/modified to detect influenza viruses. In this presentation, we will focus on our approach, the designer molecules and test results that demonstrate our novel technology and its impact.