The present work is focused on developing novel and advanced in vitro biodiagnostic tools based on aptamer integrated biosensors for an early detection of specific viral proteins or small biomolecules. Aptamers are short single stranded DNA or RNA which are designed to bind to a specific target biomolecule. They offer several advantages over antibodies/enzymes such as stability in harsh environment, ease of synthesis and functionalization and high batch to batch consistency. Aptamers undergo conformational changes upon target binding and produces physical or chemical changes in the system which are often measured as colorimetric or electrochemical signals. In the present work, we have explored the aptamer-analyte interaction on different platforms such as microfluidic channel, paper based substrate as well as organic electrochemical transistor to develop multiple compact, robust and self-contained diagnostic tools. These testing tools exhibit high sensitivity (detection limit in picomolar range) and selectivity, require no sophisticated high-end instruments or skilled labor to execute, leading a way to cheaper and more consumer driver health care.

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The public is welcome to attend.