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Lab on a Piece of Paper

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ABSTRACT

Paper-based microfluidic devices, also known as microPADS, offer a promising platform for the development of point-of-care assays for use in remote, resource-limited settings. Paper-based devices are inexpensive to fabricate, portable, simple to operate, and can complete an assay without relying on electrical power or supporting equipment. This presentation will describe our work on the development of methods of fabricating paper-based devices, methods for controlling wicking in paper-based devices and methods for performing assays and calibrating the results of assays, all of which provide important building blocks for the development of future paper-based diagnostic devices. Our fabrication methods rely primarily on the use of commercially available printers, and are developed for lab-scale prototyping of devices. Our interest in controlling the wicking of fluids in paper-based devices stems from the need for performing multi-step assays with minimal user input. Finally, paper-based diagnostic devices frequently rely on enzyme-catalyzed colorimetric assays to detect analytes. These types of assays are ideal for on-site diagnostics because they can be read by eye, but they are limited by the instability of enzymes when dried on paper and the difficulty of quantifying color intensities in the field.

BIO:

Andres W. Martinez is an associate professor in the Chemistry and Biochemistry Department at California Polytechnic State University, San Luis Obispo. He was born in California, raised in Bolivia, and completed his B.S. in chemistry at Stanford University and his Ph.D. in chemistry at Harvard University with George Whitesides. His research is focused on expanding the capabilities of paper-based microfluidic devices for applications in point-of-care diagnostics.