A paper-based microfluidic platform for quantitative detection of albuminuria

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This paper describes paper-based microfluidic platform that can quantitatively detect albuminuria as alternatives to a urine dipstick tester based on colorimetric determination. The colorimetric determination method is semi-quantitative detection which requires an electronic image analysis equipment to analyze the extent of color change of dye depending on the amount of albumin in the urine. Here, we present a paper-based device that allows for precisely quantitative detection of albuminuria by measuring the area of the color changed without any electronic devices. The paper-based device is made out of paper followed by printing the dye on a specific area of the paper. We detect analysts quantitatively by dipping the edge of a paper into a same volume. By varying the concentration of albumin, we found the change of colored area. Depending on the change of colored area in the device, we are able to know the specific concentration of albumin in the urine. That means the color changed area is concentration of albumin in the urine. These devices provide an inexpensive method for quantitative diagnosis of albuminuria to the Third World countries that can't afford to get high-priced electronic equipment.