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Microfluidic paper-based colorimetric sensor using pyrrolidiny peptide nucleic acid-induced silver nanoparticles aggregation for DNA diagnosis**Prinjaporn Teengam**

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A paper-based colorimetric assay for DNA detection based on the pyrrolidinyl Peptide Nucleic Acid (acpcPNA)-induced the nanoparticles aggregation was developed. The acpcPNA bearing positive charged of lysine at C-terminus was designed as a probe to induce the aggregation of citrate anion-stabilized Silver Nanoparticles (AgNPs). In the presence of DNA target, the AgNPs remain stable due to the sufficient charge repulsion of anionic PNA-DNA duplexes and a resulting in changing the color of the solution. Of this idea, we report on a simple, inexpensive method with the potential for screening of Middle East Respiratory Syndrome Coronavirus (MERS-CoV), Mycobacterium Tuberculosis (MTB) and Human Papillomavirus (HPV) using colorimetric paper-based analytical devices. To demonstrate the effectiveness of this approach, the synthetic oligonucleotide target can be detected due to the color changing of AgNPs. The low detection limits of 1.53 nM (MERS-CoV), 1.27 nM (MTB) and 1.03 nM (HPV) were achieved. The acpcPNA probe exhibited very high selectivity for the complementary oligonucleotides over the single-base-mismatch, two-base-mismatch and non-complementary DNA targets. As the utility of this method, the proposed paper-based colorimetric DNA sensor has potential to be an alternative device for simple, rapid, sensitive and selective DNA detection.

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