A label-free DNA detection method utilizing capacitive touchscreen

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We have developed a novel label-free DNA detection system based on the capacitive property of DNA which could be detected by the capacitive touchscreen. For this purpose, we first fabricated the touchscreen panel by patterning the ITO layer on the glass wafer, and the ITO layer was connected to the capacitive touchscreen controller. On the touchscreen panel, the PDMS layer was coated and modified with the capture probe, which was specifically designed to be complementary to the target H1N1 virus DNA. We applied DNA samples to the capture probe-immobilized PDMS layer and washed with PBS after 5 min hybridization. As the concentration of target DNA in the samples increased, the capacitance signal of ITO layer also increased. On the other hand, when there is no target DNA in the sample, no capacitance change was recorded. With this system, we have successfully detected H1N1 virus DNA in a label-free manner. As touchscreen is cheap and miniaturized device, our system has great potential for achieving point-of-care testing (POCT) application in the diagnostics field.