

Hybrid Graphene oxide (GO)-Au nanoarray-based multi-DNA sensor by using collateral effect of CRISPR-Cas12a without nucleic acid amplification step

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Several nucleic acid biomarkers could be detected for accurate and early diagnosis through its targeted gene editing property. However, there should be an essential process that caused to waste of cost and time to amplify the target nucleic acids for the sensitive detection. To overcome the limitation, in this study, surface-enhanced Raman spectroscopy (SERS)-based biosensing platform was developed by integration of graphene oxide (GO), triangle Au nanoflower substrate (TANF), and Raman probe-functionalized Au nanoparticles (RAuNPs). Using this platform, minute amounts of viral DNA were successfully measured within 20 min through the reduction of the SERS signal intensity. This strategy provided a simple and ready-to-use detection approach because it did not need any post-steps such as labeling and washing after the target reaction, as well as a sensitive detection system. In this point of view, this system is quite similar to a label-free detection system, which could offer a precise and straightforward detection system without complicated steps.