SERS sensor combined with S1 nuclease treatment for the effective detection of single nucleotide polymorphisms

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This study reports a novel and highly effective method for the detection of single nucleoptide polymorphisms (SNPs) in disease relvant genes. We have successfully identified mutations causing genetic disorders in Wilson disease (WD) and Avelllino corneal dystrophy (ACD) in the clinical samples using Au Nanowire (NW)-on-film SERS sensor aided by S1 nuclease reaction. Compared with other SERS-based methods, our SERS platform of well-defined Au NW-on-film provides very sensitive and reproducible SERS signals and can identify label-free DNAs more efficiently without multiple hybridization step. Adoption of enzymatic reaction provides high specificity for SNP assay and allows us to detect multiple SNPs by only optimization of the S1 enzymatic reaction, thereby making high-throughput detection of SNPs possible with high specificity. [This research was supported by WCU program through the Korea Science and Engineering Foundation funded by the Ministry of Education, Science and Technology]