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강연제목: Surface enhanced Raman spectroscopy analysis of sweat creatinine exploiting skin interfaced microfluidic platform

Abstract:

This study presents practical utilization of Surface-Enhanced Raman Spectroscopy (SERS) analysis for sweat creatinine integrating skin-interfaced microfluidics. Addressing challenges in SERS, such as reproducibility and control of nanoparticle monolayer formation, the study introduces three key strategies: (1) the dual readout system combining SERS signal with color development for confirmation, (2) pre-loading reservoirs with a known quantity of rhodamine 6G (R6G) as an internal standard for signal normalization, and (3) performing multiple SERS measurements from the same reservoir to generate statistically meaningful distribution curves. The microfluidic platform contains multiple reservoirs pre-loaded with SERS-active substrates coated with gold nanorods, along with the internal standards (R6G), substrate (Leucomalachite; LMG) and enzymes necessary for a reaction cascade that converts LMG to malachite green (MG), producing a SERS signal proportional to creatinine concentration. A simultaneous color change provides a visual read out enabling duplication of measurements in situ. The system was validated both in laboratory conditions and through in situ testing with human subjects, demonstrating its potential for non-invasive and reliable creatinine monitoring.

Brief Biosketch

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