

Optofluidic Detection of Interleukin-6 via SERS

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Proinflammatory cytokines, for example, Interleukin-6 (IL-6), are known as key proteins secreted to trigger in-vivo immune responses. Thus, rapid and sensitive detection of these proteins makes it possible to closely monitor inflammation in patients and to treat them immediately. Conventional method to detect IL-6 is enzyme-linked immunosorbent assay (ELISA). However, this method generally requires long sample incubation time (~ several hours) and suffers from poor sensitivity. Here we report a novel sandwich assay for IL-6 with surface-enhanced Raman spectroscopy (SERS) under fluidic conditions. First, we synthesize IL-6 specific Raman probes by (1) embedding Raman dyes into plasmonic nanoparticles and (2) subsequently conjugating anti-IL-6 antibody on their surface. The resulting Raman probes are extensively characterized by UV-Vis spectroscopy, transmission electron microscopy, and Raman spectroscopy. In addition, our Raman probes are applied to detect IL-6 under fluidic conditions.