Microarray-based immunoassay system based on Metal-enhanced fluorescence of silver nanoparticles-embedded PVA nanofiber

윤병주, 한상원, 국윤민, 홍혜진, 유병용, 고원건†
연세대학교
(wongun@yonsei.ac.kr†)

Metal-enhanced fluorescence (MEF) is a phenomenon that involves the interaction of fluorophores with plasmon resonance from metal particles, resulting in an increased fluorescence emission. Achieving larger surface area to intensify the signal, electrospun nanofiber was used. Poly(vinyl alcohol) (PVA) is a polymer that has been known for its good film forming ability, biocompatibility, and chemical resistance. In this study, PVA/AgNPs composite nanofiber webs were prepared by an electrospinning process. Under heat treatment the cross-linking of these composites and the reduction of the AgNPs can easily take place simultaneously. Next, nanofiber-based protein microarrays were fabricated through a hydrogel lithography. Photopatterning of poly(ethylene glycol) (PEG) hydrogel on the electrospun fiber webs fabricated clearly defined hydrogel microstructures with incorporated nanofibers. Though this method, biomolecules such as antibody were selectively immobilized only within nanofiber region. Using the hydrogel micropatterning strategy, our system has potentials to be used not only to provide new platforms for immunoassays but also to detect specific biomolecules by micropatterned structures.