Label-free detection of avian influenza virus based on optical analysis

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We demonstrate the detection of avian influenza (AI) virus using the optical sensor devices. This work was focused on the development of miniaturized chip fabrication to obtain recombinant proteins which have the gold-specific affinity. The principle of this strategy is that the gold binding polypeptide (GBP) as a fusion partner specifically binds onto the gold-patterned surface for immobilizing proteins. The AI virus surface antigen was used as a model protein for the specific immobilization of GBP-fusion protein onto the gold surface. The fusion protein was successfully immobilized on the gold surface by nanopatterning and microarray. We also successfully characterized the detection limit as low as 30 pg/ml of anti-AI. Furthermore, the GBP-fusion method allows immobilization of proteins onto the gold surface without surface modification and in bioactive forms suitable for studying protein-protein, DNA-DNA, and other biomolecular interaction studies. [Our work was supported in part by the IT Leading R&D Support Project from the Ministry of Knowledge Economy through IITA and by the KOSEF through the Center for Ultramicrochemical Process Systems.]