

Label-Free Detection of the *BIGH3* gene mutations by using Optical Biosensor Based on LSPR Properties

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Point mutations of the *BIGH3* gene are associated with the most common corneal dystrophies (CDs), such as Avellino corneal dystrophy (ACD), Reis-Bucklers corneal dystrophy (RBCD), and Lattice corneal dystrophy (LCD). Since the detection of these corneal dystrophies is urgently needed before laser-assisted in situ keratomileusis operation to prevent blindness, genetic analysis of the *BIGH3* gene is critical in most ophthalmological clinics. In this study, we report localized surface plasmon resonance (LSPR)-based detection of the *BIGH3* gene mutations by using multispot gold-capped nanoparticle array (MG-NPA) biochip. Under the optimal conditions, the detection of DNA hybridization with each CD target DNA was performed with a detection limit of 1 pM target DNA. The selective and sensitive discriminations against a single-base mismatched DNA sequence from homozygous and heterozygous CD samples were also achieved by using MG-NPA platform [This work was supported in part by the IT Leading R&D Support Project from the Ministry of Knowledge Economy through KEIT].