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## Detection of *Aspergillus* species using single-walled carbon nanotube-based sensors

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*Aspergillus niger* is one of the most important filamentous fungus which are known to cause allergenic diseases. The inhaled fungal spores and their fragments may attach on the pulmonary walls and eventually cause diseases such as Aspergillosis, a well-known invasive fungus-originated lung disease. In this paper, we demonstrate a biosensor for the real-time detection of fungal spores and the fragments of *Aspergillus niger* using single-walled carbon nanotube (SWNT)-integrated field effect transistors (FETs). The primary antibody binding to *Aspergillus niger* in the form of immunoglobulin M was immobilized on the SWNT channel using covalent bonding. The effect of antibody immobilization on the surface morphology of the SWNT was observed using fluorescence and atomic force microscopy. Fluorescein isothiocyanate (FITC)-conjugated secondary antibody was used to confirm the antibody-antigen binding. The sensor showed selective response towards *Aspergillus niger* of concentration as low as  $\sim 0.3$  pg mL<sup>-1</sup>, and showed almost no response to other fungal species such as *Alternaria alternata*. We expect that our sensor will be an effective tool in the early detection of air-borne allergenic pathogens for immunologically vulnerable people.

### Biography

Junhyup Kim received his BS in physics in 2014 from Yonsei University, Korea. Currently, he is a graduate student in the School of Mechanical Engineering at Korea University. His current research interests are focused in the development of carbon nanotube-based biosensors for the detection of pathogens and microorganisms and in electrochemical sensor for the detection of various toxins.

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