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Detection of airborne fungi using biosensors based on carbon nanotube-field effect transistors

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A irborne particles contain fungi that can cause several diseases such as allergies and human asthma. Especially, *Aspergillus* niger is known as one of the most frequently-observed allergenic antigens. Although the conventional *Aspergillus* detection method based on the sequential process of collection, culturing and DNA sequencing or immunoassay shows excellent sensitivity to the *Aspergillus* species, the process is highly labor-intensive and time-consuming. In this work, single-walled carbon nanotube (SWNT)-integrated field effect transistors (FET) were fabricated and employed to the rapid detection of *Aspergillus* niger in real time with high sensitivity. The amount of the specific primary antibody of *Aspergillus* niger was carefully determined using the enzyme-linked immunosorbent assay. Then, the antibody was covalently immobilized on the SWNT channel using conventional EDC/NHS chemistry. The FET current increase was observed with sequential adding of a concentrated solution of *Aspergillus* on the antibody-immobilized SWNT-FET, showing high sensitivity and selectivity. Our study will be of great importance for the health care and environment monitoring of elderly people and children which are more vulnerable to allergy disease.

Biography

Taejin Jeon has been working for the school of mechanical engineering in Korea University.

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