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Nanodevices based on Membrane-Carbon Nanotube Hybrid Structures HYE JUN JIN, TAE HYUN KIM, SEON NAMGUNG, SEUNGHUN HONG, Department of Physics and Astronomy, Seoul National University, Korea, SANG HUN LEE, TAI HYUN PARK, School of Chemical and Biological Engineering, Seoul National University, Korea — Proteins in cell membrane have been drawing attention due to their versatile functionalities such as ion transfer for neuronal activity and selective binding for sensory systems. However, it is still very difficult to manipulate and study those proteins because they easily lose their functionalities without lipid membranes. We developed a method to coat lipid membranes containing various functional membrane proteins on single-walled carbon nanotube (swCNT)-based field effect transistors (FETs). In this hybrid structure, the activity of membrane proteins can be monitored by underlying swCNT-FETs, allowing us to easily study the functionalities of membrane proteins. Furthermore, we built advanced devices based on these hybrid structures. For an example, we coated lipid membrane containing 'olfactory receptors' on swCNT-FETs, resulting in 'bioelectric nose' systems. The bioelectric nose system had high sensitivity and human nose-like selectivity to odorant molecules. This talk will also discuss about the future prospect of these membrane-CNT hybrid structures.

Hye Jun Jin
Seoul National University

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