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### Selective detection of glucose, cholesterol and urea with metal oxide nanostructures based field effect transistors array biosensors

Nanotechnology revolution has led to the nano fabrication of sensor devices for rapid and specific identification of chemical/biological species. However, the development of multiplexed nanoscale biosensor for simultaneous detection of different analytes still remains a major challenge at the nanotechnology frontier. It is well recognized that diabetes mellitus is a metabolic disorder resulting in an abnormal blood glucose level and activation of several metabolic pathways related to inflammation and apoptosis events. Heart disease and stroke due to excess cholesterol in blood is the leading cause of death and disability, and kidney failure due to excess urea is caused by urea cycle disorders. We have developed metal-oxide nanostructures based, integrated field-effect transistors (FETs) array biosensor with simultaneously immobilizing GOx, ChOx and Ur enzymes on three separated FET arrays. In this lecture, we report a novel straight forward approach for simultaneous and highly selective detection of multi-analytes (i.e., glucose, cholesterol and urea) with the FETs array biosensor without interference in each sensor response. Compared to analytically measured data, performance of the FETs array biosensor is found to be highly reliable for rapid detection of multi-analytes in mice blood, serum and blood samples of diabetic dogs. The development of an integrated, low-cost FETs array biosensor will produce quick detection under critical patient conditions, early identification of disease/disorder, and also have an enormous impact on the future generations.

### Biography

Yoon-Bong Hahn is a Fellow of Korea Academy of Science and Technology, Director of BK21 Center for Future Energy Materials and Devices, Director of National Leading Research Lab for Hybrid Green Energy and Head of Semiconductor and Chemical Engineering School, Chonbuk National University (CBNU). He joined CBNU in 1991 prior to which he worked for LG Metals Research Center from 1988-1991 after he received his PhD in Metallurgical Engineering from University of Utah in 1988. His main research interest is the synthesis of metal and metal oxide nano structures and their applications for optoelectronic devices and chemical and biological sensors, resulting in over 280 peer-reviewed SCI papers and 14 patents. He co-authored 6 books including "Metal Oxide Nanostructures and Their Applications" published in March 2010 by American Scientific Publishers. He received Asian Energy Technology Award 2017 by International Association of Advanced materials, Rudolf A Marcus Award for outstanding research work in the field of Chemical Science in 2016, the ACerS Global Ambassador Award 2016 conferred by the American Ceramic Society, the Scientist of the Month Award in 2011 by Korea Ministry of Education, Science and Technology, the CBNU's Best Research Professor Award consecutively in 2008-2010, and top 100 scientists award four times in 2005, 2011, 2014 and 2015 accredited by International Biographical Center, Cambridge, UK.

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