



Biomedical Engineering
FLORIDA INTERNATIONAL UNIVERSITY

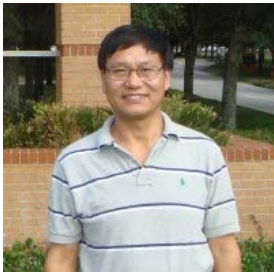
Lecture Series Seminar

NO Electrochemical Sensors for Biomedical Application in Space Shuttle

Friday, February 13, 2009

1:00 PM, Room EC 2300

Dr. Prof. Xueji Zhang, PhD



Dr. Xueji Zhang is the Senior Vice President of Science for World Precision Instruments, Inc., a Courtesy Professor of the Department of Chemistry at the University of South Florida, and an Associate Editor of *Frontiers in Bioscience*.

The small molecule nitric oxide (NO) mediates many physiological processes related to neurology, immunology, and muscle cell action. Nitric oxide is a key intercellular messenger in the human and animal bodies. The identification of NO as the endothelium-derived relaxing factor (EDRF) has driven an enormous effort to further elucidate the chemistry, biology and therapeutic actions of this important molecule. It has been found that nitric oxide is involved in many disease states such as chronic heart failure, stroke, and impotent (erectile dysfunction). The bioactivity of nitric oxide intrinsically linked to its diffusion from its site production to the sites of action. In last two decades, NO has been the target of intensive research work aimed at monitoring its role in biological systems. Accurate reliable in real time detection of NO in various biological systems is therefore crucial to understanding its biological role. However, the instability of NO in aqueous solution and its high reactivity with other molecules can cause difficulties for its measurement depending on the detection method employed.

With support of the European Space Agency (ESA) and NASA, this research aimed at evaluating early opportunities in Microgravity Sciences to commercialize space and to develop the biotechnology facility for the International Space Station. The main task was to develop a micro NO sensor and device to evaluate NO production in cell suspensions in bioreactors designed for the Space Shuttle.

We describe here the development of NO microsensors based on nanotechnology, including the fabrication, of sensors, characterization of sensors and applications in space shuttle pilot experiments.