Advanced Nanobiomaterials for Neural Interfaces

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LECTURE ABSTRACT

Recent advances in nanotechnology have generated wide interest in applying nanomaterials for neural prostheses. An ideal neural interface should create seamless integration into the nervous system and performs reliably for long periods of time. As a result, many nanoscale materials not originally developed for neural interfaces become attractive candidates to detect neural signals, stimulate neurons, and regenerate axons. I have extensive experience in application of polymeric nanobiomaterials for neural interface technology, particularly in the areas of neural recording, nerve regeneration, and drug delivery. I have a special interest in application of electroactive biomaterials for neural engineering and neural interfaces, in particular for neural tissue regeneration, drug delivery to brain tumor, and neurochemical sensing. In this talk, I will introduce some of the material-based approaches that we have developed within the past few years to improve long–term efficacy of neural interfaces. I will focus on synthesis, fabrication, and application of electroactive nanostructured materials including conducting polymer nanotubes and bioactive nanofibers for drug delivery to the brain, chronic neural recording, neurochemical sensing, and axonal regeneration.

SPEAKER BIOSKETCH

Mohammad Reza Abidian is currently an Associate Professor at University of Houston in the Departments of Biomedical Engineering. He directs the laboratory Advanced Regenerative Biomaterials and Therapeutics for Neural Interfaces, which investigates at the interface of biomaterials and electronic devices to develop the next-generation of neural interfaces. His lab utilizes interdisciplinary material-based approaches, to develop micro/nano-scale technologies with the ultimate goal of triggered delivery of drugs and biomolecules to the nervous system, neurochemical sensing, neural recording, and neural tissue engineering. His research has been featured several times on the cover of frontier journals including *Advanced Materials* and *Advanced Functional Materials*. Prof. Abidian has received many awards and honors including Materials Research Society Silver Award, the University of Michigan Rackham Pre-Doctoral Fellowship, College of Engineering Student Distinguished Achievement Award, and Plenary Speaker in US-Turkey Advanced Study Institute on Healthcare Challenges. Prof. Abidian received his B.S. in Mechanical Engineering and M.S. in Biomedical Engineering from Amirkabir University of Technology (Tehran Polytechnic) and his Ph.D. in Biomedical Engineering from University of Michigan. He completed his postdoctoral training in the Center for Neural Communication Technology and Plastic Surgery Department at the University of Michigan.

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