



SEMINAR

Physical and Biological Response of Adherent Cells Subjected to Shock Waves

ABSTRACT

This presentation illustrates a systematic, cell-level study of the effects of shock waves on the mechanical and biochemical properties of cells on solid supports. Motivated to better understand the relationship between shock exposure and heterotopic ossification (HO) a type of soft tissue injury, an experimental setup was designed to expose cell sheets of adipose derived stem cells to shockwaves. A key guideline in the experimental design was to control cavitation. To this end we built a spark transducer and used a pressurized sample chamber. Cell viability tests and cytoskeletal staining showed little difference between shock-exposed cells and controls. This may be attributed to the absence of cavitation. Time-resolved gene expression revealed that a large number of genes were affected by the shockwave exposure. Importantly, the experimental setup and the procedures we developed provide a basis for further studies of shock wave effects on a broad range of other cells. Specifically, they could be adopted to gain further understanding of cellular level causes of traumatic brain injury.

BRUCE LAMATTINA

Dr. Bruce LaMattina has over 15 years experience in private industry, academia, and government. Immediately following his BS from the University of Delaware he worked as an engineer in manufacturing and engineering design at the Okonite Company. He then conducted graduate work for his MS and PhD at the University of Delaware and NC State University before he joined the corporate Research and Development team at ABB where conducted research covering a wide variety of topics related to power transmission and distribution and offshore oil exploration. In 2001, Dr. LaMattina joined ARO as a Program Manager for Solid Mechanics in the Mechanical Sciences Division of the Engineering Sciences Directorate. During his tenure at ARO, the Solid Mechanics Program has steadily grown tripling in size within the first 5 years. Dr. LaMattina has successfully developed strong collaborations with AFOSR, ONR, DARPA, and JIEDDO and increased externally-funded basic research projects to over \$30M/year. Under his direction, the program, he has been focused on developing a fundamental understanding of the mechanisms that govern the behavior of lightweight heterogeneous materials. He has developed significant programs to address ballistic and blast loading effects on individual Soldiers and vehicles while also expanding into interdisciplinary areas to address Army issues related to molecular biology and Micro-Electro-Mechanical Systems (MEMS).

LOCATION: 300 South Main Street
Room B110

DATE: Thursday, November 20, 2008

TIME: 2:00 PM to 3:00 PM

Light refreshments will be served



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