

**ME 600 Seminar**

**Dr. Ibolja Cernak**

M.D., Ph.D. [M.E., M.H.S.]

Professor of Pathophysiology & Neuroscience

Department of Biomedical Sciences/Mercer University School of Medicine/Columbus, GA

Faculty Host: Dr. Sarah A. Bentil

**March 29, 2022 at 11:00 A.M. in 2004 Black Engineering Building**

**Title**

Blast injuries: Modeling challenges to reflect reality

**Abstract**

Accumulating evidence shows the overwhelming prevalence of explosive injuries in current military actions. This underlines the pressing need for better understanding the mechanisms, progress, and outcomes of injuries caused by explosions, and thus for intensified experimental research. Although full understanding of blast physics should be a prerequisite for developing and using appropriate experimental models, many models fail to reproduce essential components of explosion-generated shock waves seen in real-life scenarios.

This lecture will discuss the basic mechanisms of blast injuries including subtle ultrastructural changes and molecular impairments, and their relationships with acute and chronic neurological and behavioral deficits. Moreover, the main requirements for experimental models aimed at reliably reproducing blast-induced neurotrauma (BINT) and their acute and long-term consequences will be addressed, and the pros and cons of the most frequently used models discussed.

Due to the complexity of the injurious environment, BINT is a very challenging clinical pathology and demanding research problem. A progress in our understanding of BINT can be achieved only by unified front of physicists, engineers, military scientists, biomedical researchers, and clinicians who use out-of-the-box thinking and novel research approaches; thus, potential collaborative ideas will also be discussed.

**Biography**

**Dr. Ibolja Cernak** is a Professor of Pathophysiology and Neuroscience in the Department of Biomedical Sciences at the Mercer University School of Medicine (Columbus, Georgia, USA). She has a broad multidisciplinary expertise that includes an M.D., Ph.D. in Physiology and Neuroscience, M.S. in Biomedical Engineering, and M.S. in Homeland Security in Public Health Preparedness. Dr. Cernak is world renowned for her research - both clinical and experimental - addressing the pathobiology of blast injuries and blast-induced neurotrauma; long-term consequences of traumatic brain injuries; and chronic effects of prolonged exposure to stress. She has published over 200 research articles in international refereed journals and delivered over 400 invited presentations, nationally and internationally, as an invited keynote speaker, session chair, and plenary discussion moderator at numerous scientific meetings. Dr. Cernak has three patents related to blast injury research and portable electroencephalogram (EEG).



***This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.***

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