



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Injury Models

Primary Blast Injury Criteria for Animal/Human Traumatic Brain Injury (TBI) Models using Field Validated Shock Tubes

Animal models have been critical to understanding the relationship between blast exposure and mechanisms underlying observed brain injury. Despite significant advances in blast injury animal models, the ability to translate the observations in the animal models to brain injuries observed in humans is less understood. New Jersey Institute of Technology (NJIT) is a key participant in the Defense Trade and Technology Initiative (DTTI) between the US and India, and they have received funding to support this study from the Psychological Health/Traumatic Brain Injury Research Program (PH/TBIRP) managed by the Congressionally Directed Medical Research Program (CDMRP). The research team at NJIT works collaboratively with researchers within the Ministry of Defence, India and the Department of Defense (DoD) to strengthen understanding of the effects of blast TBIs in animal models. In addition, researchers will work to translate the findings of blast injury in animal models to humans through the development of a human Brain Injury Criterion (hBIC). In the initial stages of this work, the team at NJIT has begun to establish master dose response curves for blast overpressure (BOP) exposure in rats, mapping probability of survival over a range of field-relevant BOPs. In order to build and validate the hBIC, data from this effort are shared with researchers at Biotechnology High Performance Computing Software Applications Institute (BHSAI), Walter Reed Army Institute of Research (WRAIR), Naval Research Laboratory (NRL), as well as with collaborating Institute of Nuclear Medicine and Allied Sciences- Defence Research and Development Organization (INMAS-DRDO), Defence Institute of Psychological Research (DIPR), and Indian Terminal Ballistic Research Laboratory (ITBRL). This collaborative effort will facilitate the standardization of blast injury animal models and will increase knowledge regarding the association between BOP and TBI. A better understanding of the mechanisms of blast-induced TBI will contribute to the development of effective PPE designed to prevent or mitigate TBI and to the creation of tools to rapidly screen and diagnose Service Members involved in potentially concussive events.

