



US DEPARTMENT OF DEFENSE

BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

Injury Models

Combined Effects of Primary and Tertiary Blast on Rat Brain: Characterization of a Model of Blast-Induced mTBI

In a study sponsored by the DoD's CDMRP, researchers at WRAIR acting through the Geneva Foundation have created an advanced blast simulator for the recreation of blast-like conditions in a rodent model of brain injury. Traditional methods of modeling blast utilize a cylindrical shock tube, which has inherent confounds with negative phase and recompression waves, reverberations, and secondary shock in the reverse direction. The advanced blast simulator eliminates these artifacts and creates positive pressure durations, which may better represent IED waveforms. Bad blast simulations have confounded much of the pre-clinical biomedical blast literature to date, and this newly developed research tool may help provide valuable pre-clinical insights. In studies with this tool, the research team has found significant increases in neuroinflammation (e.g., CCL2) and the accumulation of brain phospho-tau. Importantly, the enzyme primarily responsible for dephosphorylating phospho-tau, TNAP, was significantly decreased. This finding could provide a mechanistic explanation for increased phospho-tau following TBI and may suggest a target for therapeutic intervention in CTE.