Injury Models

Assessment of Cytokine Levels in Plasma, Brain, and Retina of a Rat Model of Blast-Induced mTBI, Using Immunoassay Arrays.

Chemokines and cytokines play early pivotal roles in the inflammatory cascades underlying blast-induced injuries and are promising targets for therapeutic interventions. To effectively pursue this therapeutic avenue, the timing of the interplay among these responses must be characterized to identify the key participants and the optimal therapeutic windows for intervention. Cytokine levels in plasma, brain, and retina are being longitudinally screened by researchers at WRAIR at varied times after blast exposure using immunoassay arrays based on newly developed Luminex® bead technology. The arrays (Research & Development Systems Inc.) are used to precisely simultaneously quantify very small concentrations (pico-molar) of up to 17 rat specific cytokines across a single 96 sample well plate. Thus, this method is highly time and cost effective versus data yield. Analyses to date reveal marked increases (< 2-fold) in the pro-inflammatory cytokines CXCL3, ICAM-1, IL-1-α, IL-6, and TNF-α along with elevations in inflammation resolving cytokine TIMP-1 during three days post-insult. Based upon these response profiles, interventions with existing compounds targeting these mediators are likely to be most effective during subacute or acute phases of injury.