**Project Title:** Genetic Networks Activated by Blast Injury to the Eye  
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**Background:** The increased use of explosive devices within the battle space has caused a rise in the number of blast injuries to the eye. The pathogenic pathways triggered by the blast injury are largely unknown, yet are critical for the development of therapeutic interventions and assessment of immediate medical responses.  

**Objective:** Provide direct insight into the genetic pathways that are susceptible to blast injury, as well as a framework for establishing sensitive biomarkers to monitor the injury.  

**Hypothesis:** Researchers can identify individual blast response genes in the eye and their associated functional networks using a mouse model.  

**Specific Aims:** 1) Define the initial sequence of molecular events triggered by blast injury to the eye. 2) Define potential biomarkers to aid in defining the severity of the injury. 3) Identify the network of molecular pathways whose activity and function are altered by injury. 4) Develop a strategy and bioinformatics platform to mine associated pathways, providing therapeutic strategies for treatment.  

**Study Design:** Employ systems biology and advanced microarray technology to probe the response of the entire mouse genome to a blast injury of the eye; utilize the BXD recombinant inbred mouse strain set as the genetic reference panel; and apply the sophisticated bioinformatics tools developed and made available on the website, GeneNetwork.org.  

**Relevance:** This project will monitor the entire mouse genome to characterize the transcriptional changes underlying the response of the mouse eye to blast. Since the same networks are likely present in humans, the data will also be highly predictive for potential biomarkers and most importantly, for strategic drug targets that could be developed for injured warriors.