PROJECT TITLE: Role of Sigma-1 Receptors in Traumatic Brain Injury

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Project Description

Traumatic Brain Injury (TBI) is a leading cause of death and disability worldwide and is the hallmark injury associated with current military conflicts occurring around the globe. The generation of neuropsychiatric disorders is one of most prevalent chronic and debilitating features of TBI. Compounding this problem is the current lack of any FDA-approved pharmacotherapies for treating the either acute or chronic effects of TBI. Sigma-1 receptors (Sig-1R) are membrane-bound chaperone proteins amenable to pharmacologic modulation and are posited to be molecular targets for the development of therapies aimed at treating a myriad of neurologic disorders, including TBI. The current WISE project centers upon the hypothesis that Sig-1R are targets for drug discovery efforts aimed at treating TBI. The WISE student will be tasked with conducting experiments utilizing a murine model of blast-induced TBI to study the role of Sig-1R in the behavioral and biochemical ramifications of neural injury. These experiments will utilize a combination of novel pharmacologic and transgenic strategies to ascertain whether the modulation of Sig-1R activity post-injury may be an effective strategy for ameliorating the psychiatric complications of TBI. The WISE student will learn various assays relevant to the study of rodent behavior and standard molecular biology techniques such as real-time quantitative PCR, western blotting and ELISA, granting the student an opportunity to experience a wide breadth of laboratory assays. Additionally, the student will receive training in the areas of data analysis and the presentation of scientific data. All research will be conducted under the approved IACUC protocol #18-01-17-01.