Project Title: Ameliorate Effects of Blast Pressure on the Eye and Brain
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Background: Blast injury has emerged as arguably the greatest threat to warfighters in current theaters of operation, and is a leading cause of vision loss in military personnel due to nonpenetrating traumatic injuries to the eyes and brain visual processing centers, likely caused by blast shock waves.

Objective: In light of the difficult lifelong disability that permanent loss of vision represents, the researchers propose there is an urgent need for new drug therapies that can arrest progression of neuronal cell death in the eye (retina) and brain, as result of exposure to blast waves.

Hypothesis: Their hypothesis is that novel omega-6 and omega-3 polyunsaturated fatty acid derived lipid mediators of inflammation, i.e., lipoxins, neuroprotectins, and resolvins, will aid as drugs in healing of neurons critical to visual function after blast wave induced eye and brain injuries.

Specific Aims: 1) characterize impact of traumatic injury on retinal and brain visual processing neurons; and 2) test novel drug treatments to reduce damage from injury, i.e., inflammation-resolving lipid mediators.

Study Design: The study design includes the utilization of a rodent model of traumatic eye and brain blast injuries to test candidate drugs known to be pro-resolving, lipid-based mediators of inflammation, chosen with the intent of reducing the degree and progression of neuronal apoptosis in the retina and brain. The four drugs to be individually tested in the blast-wave–injured animals are lipoxin A4, protectin DX, resolvin D1, and resolvin E1.

Relevance: The proposed study will provide preliminary results of four drugs in the treatment of blast injury in an animal model. If successful, a neuroprotective agent for blast injury could be identified for further research.