Public Abstract

It is the objective of this research project over a brief 18-month period to investigate a series of drugs -- already formulated in our non-invasive episcleral ocular delivery system -- for controlling inflammation, tissue healing, and intraocular cellular proliferation. These episcleral interventions are in addition to two neuroprotective agents that we’ve formulated and tested in the episcleral device with earlier Department of Defense support. The end goal is to provide a broad episcleral therapeutic "tool chest" for mitigating visual loss secondary to traumatic ocular injuries and allowing intervention across broad pathogenic pathways for customized treatment of these varied and complex injuries. The episcleral interventions are designed for placement in-theatre -- within 1 hour of the injury and without need for complex skill or equipment. The episcleral device's primary and secondary packaging systems that are completely designed and tested enable preservation of product integrity, sterility, and shelf life in harsh environments. Finally, as demonstrated with both neuroprotective agents, the episcleral device enables sustained-release drug delivery to the retina and other ocular tissues that to our knowledge is not obtainable by other means. The Defense and Veterans Brain Injury Center has identified over 212,000 traumatic brain injuries (TBIs) from the wars in Iraq and Afghanistan. The majority of blast injuries have been caused by IEDs (improvised explosive devices), a trend that continues to the present. The Blinded Veterans Association reports that 64% of those with TBI test positive for visual dysfunction. The episcleral device with a range of drugs may provide a comprehensive tool chest to promptly treat these signature wounds of current engagements with initial treatment in theater.