

VISION RESEARCH PROGRAM



VISION

Transform visual system trauma care for our armed forces and the nation

MISSION

To address clinical needs through innovative research targeting the mechanism, effects, and treatment of service-connected eye injuries and vision dysfunction

PROGRAM HISTORY

The DOD Peer Reviewed Vision Research Program (VRP) was established by Congress in 2009 to “target the various causes, effects and treatment of vision injury” as related to military exposure. The VRP has received appropriations totaling \$144.95M through FY21 and is the leading funder of research on visual system injury ranging from ocular trauma to visual dysfunction associated with TBI.

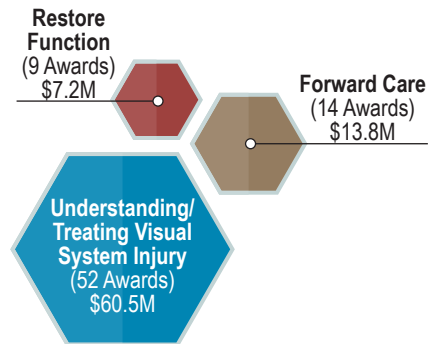
RELEVANCE TO MILITARY HEALTH

Eye injury and visual dysfunction resulting from military exposure affect a large number of Service Members and Veterans. Surveillance data from the DOD showed more than 275,000 eye injuries in the U.S. Armed Services between 2000 and 2017. More than 6,000 of the injuries were categorized as high risk of blindness. In addition, statistics from the Traumatic Brain Injury Center of Excellence show that through the third quarter of 2021, more than 449,000 Service Members have been diagnosed with TBI, which can have significant impact on vision even when there is no injury to the eye.

The VRP challenges the scientific community to design innovative research that will significantly advance the understanding, prevention, diagnosis, mitigation, and/or treatment of eye injury or visual dysfunction associated with military exposure and research that will enable the delivery of care in the military operational environment.

FOCUS AREAS

- Eye injury or visual dysfunction as related to military exposure
- Diagnosis, stabilization, and treatment of eye injuries in austere environments and prolonged field care settings
- Restoration of visual function after military exposure-related vision loss or severe visual impairment



VRP Investment by Focus Areas FY17-FY21

Scan me to access even more information about the program.



2021 Congressional Appropriations, Research Investment, and Withholds and Management Costs

Congressional Appropriations	Research Investment	Withholds and Management Costs
\$20M	Clinical Trial Award.....\$2,237,200 Investigator-Initiated Research Award \$14,216,162 Translational Research Award \$1,512,511 Modification to ongoing awards \$192,791	USAMRDC \$386,660 SBIR/STTR \$667,000 Mgt Costs (4.16%) \$787,676
Total: \$20M	Total: \$18,158,664	Total: \$1,841,336

HOT OFF THE PRESS FROM VRP-FUNDED RESEARCH



Dr. Michael Iuvone, Emory University

PMID: 34353120

Traumatic blast injury, such as those caused by improvised explosive devices, is a common cause for vision loss due to damage to the optic nerve and central visual pathway.

Dr. Michael Iuvone and his team at Emory University characterized the pathobiology and time course of vision loss in a mouse model of blast injury and investigated the neuroprotective effect of a small molecule, HIOC. They demonstrated that HIOC, an activator of the tropomyosin-related kinase B receptor (TrkB, the cognate receptor for brain-derived neurotrophic factor), effectively protected vision when systemically administered within 3 hours after blast. One week of HIOC treatment mitigated vision loss for at least 4 months. These results identify HIOC as a promising candidate for preserving vision after traumatic blast injury.



Dr. Steven Wilson, Cleveland Clinic

PMID: 35074340

Corneal scarring fibrosis is a major contributor to blindness worldwide. Dr. Steven Wilson and his team at the Cleveland Clinic are using a corneal-injured rabbit model to evaluate the effects of Losartan, an angiotensin II receptor antagonist.

Specifically, they treated the injured eye with Losartan and evaluated corneal transparency, as well as the expression of collagen IV and transforming growth factor beta. The topical application of Losartan was found to reduce the negative effects of corneal scarring fibrosis, and future work will evaluate this promising drug in a larger animal model.



Dr. Valeria Canto-Soler, University of Colorado, Denver

PMID: 35256656

Inherited retinal disorders and dry age-related macular degeneration result in the loss of photoreceptors/vision. New treatments such as gene therapy and cell replacement require monitoring response to light at a cellular level. Dr. Canto-Soler and

her team at the University of Colorado, Denver, together with their collaborators at Nanoscope Instruments, have developed an optical coherence tomography-guided micro-focal multicolor laser stimulation and electroretinogram platform to record electrophysiological responses at the cellular level in the retina. Their latest work tested their imaging system in a disease and healthy minipig model with great success, showing function recording of rods and cones.



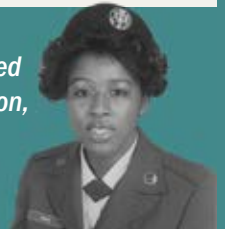
Dr. Nawajes Mandal, University of Tennessee

PMID: 34365584

TBI causes neuroinflammation and neurodegeneration, leading to visual, motor, and emotional deficits. Dr. Nawajes Mandal and his team at the University of Tennessee demonstrated that

mice with elevated levels of systemic n-3 polyunsaturated fatty acid (n-3 PUFA) are resistant to TBI-induced decline in visual/motor functions and depression. This is associated with a blocking of TBI-mediated increase of ceramide, a sphingolipid that induces neuroinflammation and degeneration, in the mouse brains. This study suggests that n-3 PUFA is a promising candidate for preventing TBI-induced neurodegeneration.

Doris Jones, Blinded Veterans Association, Consumer Peer Reviewer FY17, FY19-FY21



“I have enjoyed the opportunity to serve as a consumer reviewer for the Vision Research Program the past 3 years; being able to provide input for life-changing research is a rewarding experience. I feel like a valuable member of these peer reviews, and I know what I have to bring to the table matters. It is an honor to give a voice to those living with vision loss and provide insights from lived experience.”

RETINA AND OPTIC NERVE INJURY RESEARCH IN-PROGRESS REVIEW AND STATE-OF-SCIENCE MEETING

The VRP held a Retina and Optic Nerve Injury Research In-Progress Review and State-of-Science meeting on January 31, 2022. More than 40 attendees from the DOD Research and Development community, ophthalmology and optometry services, other federal and non-federal funders of vision research, academia, and consumer groups participated in the meeting, which showcased progress made in retina and optic nerve injury research and identified challenges remaining. Col. Marcus Colyer, M.D., a retinal specialist and Army Ophthalmology Consultant to the Surgeon General, gave an overview on the management of vitreoretinal injuries following combat ocular trauma. Five investigators presented their VRP-funded research aiming to develop therapies for a number of retina and optic nerve injury conditions. The speaker and attendees participated in an open panel discussion of ocular trauma models, approaches of therapeutic development, and considerations for clinical translation.