Vision Research Program

VISION
Transform vision trauma care for our armed forces and the nation

MISSION
Improve the health and readiness of military personnel affected by eye injuries and vision dysfunction by identifying clinical needs and addressing them through directed medical research

PROGRAM HISTORY
Eye injury and visual dysfunction resulting from battlefield trauma affect a large number of Service members and Veterans. Surveillance data from the U.S. Department of Defense (DoD) indicate that eye injury accounts for approximately 15% of all injuries from battlefield trauma sustained during the wars in Afghanistan and Iraq, resulting in more than 182,000 ambulatory patients and 4,000 hospitalizations between 2000 and 2011. In addition, traumatic brain injury (TBI), which affects ~380,000 Service members according to statistics from the Defense and Veterans Brain Injury Center, can have significant impact on vision, even when there is no injury to the eye. Research sponsored by the U.S. Department of Veterans Affairs (VA) showed that as many as 75% of Service members who suffered a TBI had visual dysfunction.

The DoD Vision Research Program (VRP) was established by Congress in fiscal year 2009 (FY09) to fund impactful military-relevant vision research that has the potential to significantly improve the health care and well-being of Service members, Veterans, their family members and caregivers, and the American public. The VRP received $69.95 million (M) in Congressional appropriations in FY09–FY17. The FY18 VRP appropriation is $15M.

HIGH-IMPACT ADVANCES SUPPORTED BY THE VRP
Research funded by the VRP has propelled advances across the care continuum, as well as understanding of combat ocular trauma. VRP funding has led to 15 patents, patent applications, or provisional patents; 8 clinical trials either funded by the VRP or based on the results of VRP–funded projects; and more than 160 peer-reviewed publications. The following are some examples of the high-impact advances supported by the VRP:

BATTLEFIELD CARE
- A novel reversible adhesive to manage ocular trauma
- A multi–use eye drop to deliver corneal repair drug in the field

ACUTE DEFINITIVE CARE
- A handheld optical coherence tomography device with remote wireless web–based interactive control capability for retinal imaging
- Extracellular matrix technology to protect and repair injured retinas and optic nerves

CHRONIC CARE AND RESTORATION OF VISUAL FUNCTION
- An animal model of whole–eye transplantation
- Deciphering the primate neural code to create an optogenetics–based retinal prosthetic

PATHOBIOLOGY OF COMBAT OCULAR TRAUMA
- The time course of visual dysfunction and pathology after blast exposure
- Comprehensive modeling of ocular alkali injury
PROGRAM PRIORITIES:
The FY18 VRP Vision Setting meeting identified two program priorities. These program priorities are expected to be stable for the next 5 years. They will be reviewed during the VRP’s annual Vision Setting meetings and revised/updated as needed.

- **Accelerate research in eye injury and vision dysfunction due to military-relevant trauma**
  The VRP is uniquely focused and positioned to promote research that addresses current and anticipated battlefield-related eye and vision injuries. To preserve the eyesight of injured Warfighters, we must achieve a better understanding of the biological, physical, and mechanical mechanisms by which military-relevant trauma damages the ocular system and impairs vision, as well as develop more effective preventive and treatment approaches.

- **Advance diagnosis and treatment of eye injuries in both a forward operating environment and a prolonged field care setting**
  It is anticipated that the future battlefield will require more advanced eye injury management and treatment options to accommodate austere conditions such as prolonged evacuation time and limited specialty care. To preserve eyesight in an austere environment, we must develop diagnostics and interventions that enable decision-making, triaging, stabilization, and management by forward casualty caregivers who are as close to the point of injury as possible.

INVESTMENT STRATEGY:
To address the program priorities identified above, the VRP will focus its investment on the understanding, prevention, diagnosis, mitigation, and treatment of battlefield-related eye injury and vision dysfunction over the next 3–5 years.

For each fiscal year, the specifics of the VRP’s investment strategy, including award mechanisms, focus areas, and funding levels, will be determined at the annual Vision Setting meetings, taking into account the most current state of the science and available Congressional appropriations.

In FY18, the VRP is offering three award mechanisms. The Focused Translational Team Science Award mechanism is intended to support highly collaborative and translational team initiatives that will fundamentally advance the understanding and treatment of eye injuries and/or visual dysfunction that result from a military-relevant traumatic event. The Investigator-Initiated Research Award mechanism is intended to support innovative studies that will yield highly impactful discoveries or major advancements in research and/or patient care of eye injury and/or visual dysfunction related to military-relevant trauma. Finally, the Expansion Award mechanism will support continued investigation and further development of highly impactful research projects that were previously funded by the VRP.