DEFENSE-RELATED VISION RESEARCH

Vision Trauma Research Program (VTRP)

FY2013: Review in Process for $14.5 M in Awards

The Department of Defense (DOD) is currently reviewing full proposals requested from researchers who submitted successful pre-proposal submission by the November 25, 2013, due date for the $14.5 M in translational research...hypothesis-driven development awards...[precedent-setting Congressional appropriation of] $10 M, minus 8 percent sequester cut, plus $5 M transferred from other DOD agencies, primarily the Traumatic Brain Injury (TBI) Program. Unlike past years, DOD’s Telemedicine and Advanced Technology Research Center (TATRC) is managing the tail-end of the process, while its “sister” agency, the Congressionally Directed Medical Research Program (CDMRP), is managing front-end programmatic review.

FY2014: $10 M Appropriation Added to FY2013 Cycle

The Consolidated Appropriations Act of 2014 funded VTRP at $10 M—the second year at this level. Although that funding is also subject to a sequester cut, TATRC anticipates that sister DOD agencies may again add to the amount available for research awards, which will be combined with the FY2013 cycle funding. TATRC will fund further down the list of awardees approved in the current review cycle described above. With the addition of the FY2014 $10 M appropriation, the VTRP will yield at least $50 M in awards to vision researchers since it was created in FY2009 through NAEVR’s advocacy.

FY2015: NAEVR, VSOs/MSOs Request $10 M

NAEVR has requested $10 M in FY2015 VTRP funding, which has once again been supported by The Independent Budget submitted by Veterans Service Organizations (VSOs) and Military Service Organizations (MSOs) whose support was coordinated by NAEVR member Blinded Veterans Association (BVA).

PRMRP to Issue Funding Opportunities in April

In late March, DOD’s Peer Reviewed Medical Research Program (PRM RP) issued a press release to alert the medical research community about the upcoming release of its FY2014 Program Announcement, which is expected to be issued sometime in April. Unlike the VTRP, PRM RP does not focus on one particular area of research, but rather solicits research proposals from a list of 25 widely ranging topics. Two are potentially of interest to vision researchers: Neuroprosthetics and Dystonia, two forms of which can affect the muscles around the eyes. To be added to NAEVR’s email interest list for alerts of DOD funding opportunities, please contact NAEVR’s David Epstein at depstein@eyeresearch.org.

Visit the Defense-related Vision Research section of NAEVR’s Web site for full details

DOD-Funded Researcher Develops Novel Patch for Ocular Trauma

On March 6, AEVIR hosted a Congressional briefing co-sponsored by BVA and ARVO entitled Development of a Thermo-Responsive Patch for Ocular Trauma featuring Mark Humayun, M.D., Ph.D., Interim Ophthalmology Chair and Co-Director of the newly-created Eye Institute at the University of Southern California (USC). A FY2011-2012 VTRP Funding cycle awardee. His research addresses a major DOD-identified gap—lack of a means for battlefield medics to seal lacerations and perforations of the eye to protect it while a soldier is transported to a more robust medical facility where trained ocular surgeons can properly suture the globe.

Dr. Humayun—a clinician-scientist trained as both an ophthalmologist and engineer—leads a team conducting biomedical and biomechanical research for civilian and defense applications. He explained that a sight-impaired or blinded veteran may face upwards of 50-60 years of life with vision loss, since 97 percent of injuries occur in soldiers 18-24 years old. That is why his research is investigating ways to stabilize battlefield eye injuries—specifically corneal and scleral (eye wall) wounds—such as lacerations, perforations, and penetrating injuries, as well as intraocular foreign bodies (IOFBs). Combat medics usually do not have the skills or treatments to provide immediate care to prevent the vitreous gel from leaking out, dangerously low eye pressure, or infection from setting in before the soldier can be transported to a medical facility with the required microsurgical equipment and an ocular surgeon.

He described battlefield treatment options, noting the importance of maintaining the transparent nature of the cornea and minimizing scarring. Gluing is impractical, since it is irreversible and may have toxicity issues. Simply patching the eye has the potential complication of placing too much pressure on the globe, forcing further leakage of ocular fluids from the lacerations. His approach is using nanotechnology to develop the world’s first reversible glue. In contrast to most glues, it does not become adhesive until it is warmed up and reaches body temperature—meaning that it can be safely and easily transported to the eye, and only then does it become adhesive and form a seal. This material has a long shelf life and can be stored in extreme conditions, and only becomes sticky when applied to the body.

The material Dr. Humayun’s team has developed also prevents scarring, because it is only sticky on one side—the other side being smooth—so the patch does not adhere to surrounding tissue. He explained that the material, Poly-N-Isopropylacrylamide, or PNIPAM, is also not exothermic during the phase transformation, meaning that it does not give off heat as it becomes adhesive, again preventing damage to the eye. The early versions of PNIPAM did not have the desired strength to ensure a solid bond, but the current version has the strength needed to ensure that the patch will hold the tissue together while the soldier is transported.

What makes this ocular patch so ideal for temporary wound closure for an injured globe is that, once implanted in an eye, it can remain there until the soldier is transported to a medical facility with an ocular surgeon, who can remove the patch by the simple application of sterile saline. The saline lowers the material’s temperature sufficiently so that it loses its adhesive quality and is easily extracted, allowing the surgeon to then perform the necessary permanent repairs to the eye. In a video that was part of the presentation, the patch can be seen as repeatedly transitioning from sticky to non-sticky as saline is applied to an in-vitro eyeball. Because the patch is intended to be used for a very short term, the FDA regulatory approval process is also anticipated to be shorter, which should accelerate the process for getting it into battlefield medical kits.

Dr. Humayun stressed that there are no limits on the size or shape of the wounds for which the patch can be used. He also explained that this work is his team’s first step in the development of several other novel treatments. “While a temporary patch is an important step in preventing ocular damage until a surgeon can repair the eye, we are looking to develop a limbic stem-cell treatment that would actually stimulate the eye to repair itself.”

We are also looking to develop a limbic stem-cell treatment that would actually stimulate the eye to repair itself. —Dr. Humayun

Mark Humayun, M.D., Ph.D.
(University of Southern California)

Attendees from left: Jim Vale (Vietnam Veterans of America), Chong Cornell and her husband BVA President Mark Cornell, and Glenn Minney and Tom Zampieri, Ph.D. (BVA). Mr. Cornell testified earlier that day at a joint House/Senate Veterans Affairs Committee hearing, at which he stated BVA’s support for FY2015 VTRP funding of $10 million. Mr. Minney, BVA’s Chief Advocate in Washington, D.C., served 21 years in the U.S. Navy before losing his vision as a result of an Improvised Explosive Device (IED) explosion in 2005 while serving as a medical corpsman in Iraq. Dr. Zampieri will continue to advise BVA from his new home in Houston, Texas.

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