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The research team from the U.S. Naval Medical Research Center, UVA Health, Johns Hopkins University and the University of Utah will examine the role of brain inflammation in traumatic brain injury following blast exposures, seeking to understand the role of brain inflammation in TBI as well as how prior blast exposure affects brain inflammation. The goal: identify potential treatment options and ways to block brain inflammation and TBI.    “This effort is the culmination of several years of intense research by members of this collaborative team to understand the risks from repetitive blast exposures over a military career,” said program lead Capt. Stephen Ahlers (retired), PhD, of the U.S. Naval Medical Research Center. “This new grant will extend recent work implicating neuroinflammation in the brain that may underlie physiological changes resulting from blast exposure. Our efforts may pave the way for new pharmacological treatments for blast exposure and may have implications for other conditions such as long COVID that may involve brain inflammation.”    **Understanding Brain Inflammation**  While the brain’s immune system is vital to brain health, it can also become active in ways that damage the brain. Through brain imaging and blood sampling from active-duty and retired service members who are repeatedly exposed to blasts in training and operations, researchers in one component of the project will seek to better understand how the immune system may be contributing to brain inflammation and TBI.    "I am excited to be part of this team effort to develop the knowledge needed to protect the brains of service members against the effects of repeated low-level blast exposures," said James Stone, MD, PhD, a University of Virginia School of Medicine radiologist. Using advanced brain imaging to directly visualize inflammation along with blood sampling, we hope to develop a better understanding of how the brain and immune system react to blast exposures."    **Causes of Long-Term TBI Symptoms**  While most service members recover from TBI within weeks, about a third will have long-term symptoms. The project’s second component will seek to identify inflammatory markers in the brain that are connected to longer recovery periods from a TBI, which could help identify Service Members at higher risk for poor outcomes after a brain injury as well as identify potential treatment options.    “Our new laboratory methods related to brain-derived exosomes provide a unique opportunity to understand pathological changes that may relate to the chronic symptoms observed in military personnel and veterans. Combining this with the novel imaging methods will greatly advance our understanding of blast exposures,” said Jessica Gill, PhD, RN, a Johns Hopkins School of Nursing researcher.    **Veterans with Chronic TBI**  In the project’s third component, researchers will use brain imaging and blood sampling from Veterans diagnosed with chronic TBI to determine whether their brain’s immune system has been activated on a long-term basis by repeated blast exposures and how the immune system may be affecting their brain function. Researchers hope this information could be helpful in treating TBI in Service Members and Veterans who have been repeatedly exposed to blasts.    “This portion of the integrated project will provide data on the long-term consequences of persistent pathological inflammation in Veterans with exposure to TBI,” said Dr. Elisabeth Wilde, PhD, a neuropsychologist at the Spencer Fox Eccles School of Medicine at University of Utah and a George E. Wahlen VA Health Research Scientist. ”We hope to understand how immune responses influence brain structure and function so that we can identify and prevent continued secondary injury.”    **A Potential Treatment Target for Brain Diseases**  The project’s final component will examine whether one of the brain’s main inflammatory responses, known as TNF-alpha, could be a useful target for treatments or preventive measures to protect against brain diseases in service members repeatedly exposed to low-level blasts. In a laboratory setting, researchers will use a drug that blocks the development of TNF-alpha to better understand how blocking this cause of inflammation could protect the brain.    “Our approach will shed light on whether a promising immune-related drug protects the brain following blast exposure. This work could translate into effective treatments for service members and law-enforcement personnel who sustain TBI following blast,” said Dr. Rania Abutarboush, PhD, a neuroscientist at the Neurotrauma Department at the Naval Medical Research Center. “The findings may also help with the search for treatments for other brain diseases where the immune system is involved, such as Alzheimer’s disease.”    ####  [UVA Health](https://u7061146.ct.sendgrid.net/ls/click?upn=TeZUXWpUv-2B6TCY38pVLo9vgOPrmjxYKBaw-2FhY4hGaOwnC4YZn7tx0FgzHrb-2BRuGWa5Cv_juuVeyFUZ1qWZVOwlpHiFruOUF1IUyPBbuTbb1kDZCheHYFB3Z40a-2Bxnl4o-2FEWpb5Eq1L9okldnXAKqCiTARLVVDCRIjtfOePvHzC-2BvaGys7LW0Vvy3dR6RlYBs7jg7q2qo5X1QtxeDj56g4mqFkif9bbDCfGIjA7FxYdqHuv9C2Kwpaop0C-2BSa-2Bux2nzKnguL34YV7G0JUpxV4V35INgXWVdIGRZSFaaywbMmP-2F89ZxyRZ76T4f9nqpPPp6OLU-2FOAbaO-2BK4dLuuJNzkkOX-2Bvbz-2ByDdCFPxqhJmoUm7zm6ELFV0JHtlPsFxJxy92IfdGjQVd-2FFfR4MzXkYp48uLDCqWWjBCOZcCblWrYXcwu9G4-3D) is an academic health system that recently expanded to include four hospitals across Charlottesville, Culpeper and Northern Virginia, along with the UVA School of Medicine, UVA School of Nursing, UVA Physicians Group and the Claude Moore Health Sciences Library. With more than 1,000 inpatient beds, approximately 40,000 inpatient stays annually and more than 1 million outpatient encounters annually at UVA Health, more than 1,000 employed and independent physicians provide high-quality, comprehensive and specialized care to patients across the Commonwealth and beyond. Founded in 1819 as just the 10th medical school in America, the UVA School of Medicine – with 21 clinical departments, eight basic science departments and six research centers – consistently attracts some of the nation’s most prominent researchers to develop breakthrough treatments to benefit patients around the world. Those research efforts are backed by more than $200 million in grant funding. UVA Medical Center is recognized as the No. 1 hospital in Virginia for children by U.S. News & World Report, with five specialties rated among the top in America. More than 230 UVA physicians are honored on the Best Doctors in America list. For more information, resources, and to follow us on social media, please visit uvahealth.com. |

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