

News Release



Defense Threat Reduction Agency

U.S. Strategic Command Center for Combating Weapons of Mass Destruction

Standing Joint Force Headquarters for Elimination

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DTRA AND NAVY LOOKING TO SHARKS FOR WARFIGHTER PROTECTION

FORT BELVOIR, Virginia – In new research funded by the Defense Threat Reduction Agency's Joint Science and Technology Office (JSTO) and performed by U.S. Naval Research Laboratory (NRL) scientists, shark antibodies are proving to offer new alternatives to chemical and biological threat detection and treatment tools. In an era of Department of Defense belt-tightening, the goal is to find more innovative, cost-effective approaches to protecting our warfighters.

Current detection and treatment applications use mammal antibodies. However, shark antibodies are smaller and more thermally stable when heated, allowing for greater structure and binding retention qualities. These properties allow for more consistent product development of therapeutic and diagnostic tools and stabilizing high melting temperatures to reduce the logistical cost of shipping and storing since refrigeration would no longer be required.

Other advantages include the ability of single-domain antibodies to be rationally-selected, tailored to specific applications and easier to mass-produce by standard recombinant technology. These benefits support the tenants of DoD's Better Buying Power 3.0 by developing new, cost-effective technologies for our nation's defense.

Offering the first demonstration of molecular engineering to increase the thermal stability of shark-derived antibodies, researchers published their success in a PLOS ONE journal submission, ["Importance of Hypervariable Region 2 for Stability and Affinity of a Shark Single-Domain Antibody Specific for Ebola Virus Nucleoprotein."](#)

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DTRA is the U.S. Department of Defense's official Combat Support Agency for countering weapons of mass destruction, addressing the entire spectrum of chemical, biological, radiological, nuclear and high yield explosive threats. DTRA's programs include basic science research and development, operational support to U.S. warfighters on the front line, and an in-house WMD think tank that aims to anticipate and mitigate future threats long before they have a chance to harm the United States and our allies. SCC-WMD, the U.S. Strategic Command Center for Combating Weapons of Mass Destruction, synchronizes Combating Weapons of Mass Destruction efforts across our military's geographic commands and leverages the people, programs and interagency relationships of DTRA at a strategic level. We work with the military services, other elements of the United States government, and countries across the planet on counterproliferation, nonproliferation and WMD reduction issues with one goal in mind: Making the World Safer.