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Contact: Sharon Holland, Office of
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Blood Shortage on the Battlefield? Just Make it On-site

Bethesda, Md. – A new program launched by the Department of Defense could be the answer to blood shortages on the battlefield, other remote locations, and in hospitals.

The Uniformed Services University of the Health Sciences' 4D Bio3 On-Demand Blood Program, or 4D Bio3 Blood, is developing highly efficient protocols and technology to generate red blood cells from stem cells. A key part of this technology is large-scale cell expansion at low cost, producing sufficient red blood cells for treatment in trauma care. This technology is also being adapted to create neutrophils, ultimately allowing for whole blood transfusion using these methods in the future.

Currently, blood used for trauma care is obtained from human donors and is reliant on donor health, a robust network of blood donation, capacity for long-term storage, and extensive testing. Cell culture systems can be relatively small and easy to transport, making it possible to fabricate blood in locations where it is needed most. The potential of manufacturing human red blood cells safe for human transfusion on-site, even in an austere location, reduces the need for extensive donor networks, donor blood screening concerns and streamlines logistics related to processing, long-term storage and transport of blood.

“Ensuring the health and readiness of our warfighters is becoming increasingly challenging with our changing global threats that typically require our service members to operate in austere environments and under very extreme conditions. Adaptation of novel biotechnology for use near the point-of-need can provide the solutions necessary to make certain that our warfighters are prepared and also provided the best healthcare, regardless of their location,” stated Dr. Vincent Ho, Director of 4D Bio3 and chair of Radiology at USU.

The 4D Bio3 Blood program was established to provide military service members access to quality, non-contaminated, fresh blood supplies anywhere in the world. The program is a collaboration between the Uniformed Services University of the Health Sciences, which is part of the Department of Defense, The Geneva Foundation, Safi Biosolutions, Sciperio, Advanced Bioprocess Services, Massachusetts General Hospital, Harvard Medical School and the Food and Drug Administration.

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About the Uniformed Services University:

The Uniformed Services University of the Health Sciences (USU) is the nation's only Federal health sciences university. USU educates, trains and prepares uniformed services health professionals, officers and leaders to directly support the Military Health System, the National Security and National Defense Strategies of the United States and the readiness of our armed forces. For more information, visit: www.usuhs.edu.

About the 4D Bio3:

The Uniformed Services University's 4D Bio3 is a federally funded program that advances the development and application of advanced bioprinting, biofabrication, and biomanufacturing technologies for research pursuant to Department of Defense (DoD) priorities and ultimately for translation into clinical medical defense care and training solutions, advancing the future care for the next generation of our nation's deployed warfighters. For more information, visit: <https://www.usuhs.edu/4dbio3>.