

Treating battlefield injuries with light-activated technology

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Airmen's traumatic battlefield injuries may be more effectively treated by using a new light-activated technology developed as a result of research managed by Air Force Office of Scientific Research and supported by funds from the Office of the Secretary of Defense.

This new treatment for war injuries includes using a process or technology called Photochemical Tissue Bonding, which can replace conventional sutures, staples and glues in repairing skin wounds, reconnecting severed peripheral nerves, blood vessels, tendons and incisions in the cornea.

Harvard Medical School professor and Massachusetts General Hospital Wellman Center researcher, Dr. Irene Kochevar and her colleague at Wellman, Associate Professor Robert Redmond are both pleased with the initial lab bench experiments that led to a pilot clinical study.

"We have demonstrated that this technology is very helpful in medicine for the Air Force because it produces better healing and functional outcomes than the same wounds that were treated with conventional materials," she said.

The process of creating the bonding or nanosutures is accomplished by applying a dye to the wound or damaged tissue and then exposing it briefly to green light. The dye absorbs the light and that helps it to molecularly bond proteins on the tissue surface.

"No glues, proteins or other materials are used that might stimulate an inflammatory response," said Kochevar. "An immediate, water-tight seal is formed between the tissue surfaces leading to reduced inflammation in the near term and better scar formation in the long term."

The researchers are planning to continue to evaluate the effectiveness of the new technology and how it can be even more effective in theater. Currently, they are seeking a shorter treatment time that yields an even stronger bond.

"We are approaching this challenge by identifying the basic molecular mechanisms responsible for light-activated crosslinking," she said. "We believe that this information will show us how to improve the efficiency and effectiveness of the nanosuturing technology on the battlefield."

Provided by Air Force Office of Scientific Research

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