



Scientists take closer look ‘underneath the hood’ of body’s response to combat wounds

Bethesda, Md. – Advances in trauma care on the battlefield have drastically improved over the last few decades, but current surgical approaches to avoid further complications in extremity wounds have continued to delay wounds from healing. A new study led by researchers at the Uniformed Services University (USU), however, offers a better understanding of how the body responds to combat wounds, which could ultimately lead to further advancements in care.

The collaborative study, “The influence of microbial colonization on inflammatory versus pro-healing trajectories in combat extremity wounds,” a first of its kind, was published March 4 in *Scientific Reports*. Knowing the process of healing wounds depends on various factors, such as subsequent infections – a particular concern in a combat environment – the researchers took a closer look at the body’s biological response to injury, which is not known to have been done at this resolution before when studying these types of wounds.

The researchers analyzed data from a combat casualty biobank, which compiled biopsy tissue data from service members injured in combat since 2007. They found different patterns in how these wounds heal, depending on whether they were also colonized by microbes. They were able to drill down on specific gene “programs” involved in the healing process, looking at the genetic expression – how our body biologically turns “on” what it needs at any given time. They found that prolonged inflammation was one of the main culprits in wounds not healing correctly. In this case prolonged inflammation appears to prevent wounds from activating regenerative “programs” that facilitate healing. With these findings, the researchers believe this will help better inform precision medicine, predicting more effective treatments for patients injured on the battlefield.

The study, led by USU’s Surgical Critical Care Initiative (SC2i), highlights the interplay between the elements of the body’s response to injury in combat wounds, noted Dr. Eric Elster, professor and dean of USU’s School of Medicine, and SC2i director.

“While we have made tremendous advances in the care of combat casualties, this study allows us to ‘peer underneath the hood’ to understand the biology which drives the outcomes we observe,” Elster said. “Research like this forms the basis from which new treatment approaches, decision support tools, and drugs which will be developed, ensure that future warfighters receive the most advanced care possible.”

The study was a collaborative effort between USU, the Henry M. Jackson Foundation for the Advancement of Military Medicine, Royal Centre for Defence Medicine, Lawrence Livermore National Laboratory, University of Pittsburgh, and the Walter Reed National Military Medical Center. Funding for the study was provided by DARPA through a contract to University of Pittsburgh D20AC00002 and to HJF through subaward AWD00001593. SC2i members were further supported by the following cooperative

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