

New discovery permits rapid diagnosis and treatment of sepsis

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Despite numerous advances in treating infections and disease, effective treatments for sepsis remain elusive. A new discovery published in the June 2013 issue of *The FASEB Journal* not only could help health care providers predict who is more and less likely to develop sepsis, but it also opens the doors to new therapies that actually address the root cause of the problem, rather than just managing the symptoms. This also has the potential to benefit patients suffering from influenza and other viral infections, as well as chronic inflammatory diseases such as periodontal disease, rheumatoid arthritis, inflammatory bowel disease and chronic obstructive pulmonary disease.

"Addressing infectious and inflammatory complications early and effectively in burn and trauma patients remains a significant unmet clinical need," said Daniel Irimia, M.D., Ph.D., a researcher involved in the work from the BioMEMS Resource Center and the Department of Surgery at Shriners Hospital for Children in Boston, MA. "This need is augmented by the difficulties of diagnosing infections early and the upsurge in frequency of multi-[drug resistant bacteria](#)."

To make this discovery, Irimia and colleagues studied two groups of rats with burn injuries and septic complications by designing a microfluidic assay to precisely measure the movement of isolated neutrophils. They found that the ability of neutrophils to move becomes progressively worse during the first week after the injury, and that a known compound, called resolvin D2, can restore neutrophil movement. Using neutrophil measurements as a guide, researchers optimized the

parameters of the treatment, and as a result all treated animals survived, while all untreated animals died. This study suggests that measuring neutrophil motility could become a useful biomarker for the actual risk for septic complications in patients. Rather than relying on statistical data for each disease and patient group, measuring neutrophil movement could help personalize treatments for individual patients, resulting in better outcomes.

"Reports of patients contracting deadly secondary infections while in the ICU continue to increase," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*, "but doctors have to find out what's wrong, and find it out quickly. This research should lead to faster diagnosis and better treatments for burns and sepsis. It's an important step on the way to new therapeutics."

More information: Tomohiro Kurihara, Caroline N. Jones, Yong-Ming Yu, Alan J. Fischman, Susumu Watada, Ronald G. Tompkins, Shawn P. Fagan, and Daniel Irimia. Resolvin D2 restores neutrophil directionality and improves survival after burns. *FASEB J* June 2013 27:2270-2281; [doi:10.1096/fj.12-219519](https://doi.org/10.1096/fj.12-219519)

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