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A human enzyme (CD 39) targets the Achilles heel of sepsis

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There may never be a way to completely prevent infection, but sepsis may have an Achilles heel that would allow for more effective treatment of the condition. In a new report published in the January 2015 issue of the *FASEB Journal*, scientists use mice to show that a human membrane-bound enzyme called CD39, which can clear the dangerous buildup of adenosine triphosphate (ATP) from the bloodstream, significantly improves survival of mice in sepsis. In addition to sepsis, the researchers speculate that CD39 may also be used in other diseases associated with inflammation, such as trauma, hemorrhagic shock and burns.

"Although we have come a long way in the treatment of sepsis since it was first described by Hippocrates in the fourth century BC, about 250,000 Americans still die from sepsis each year," said Gyorgy Hasko, Ph.D., a researcher involved in the work from the Department of Surgery and the Center for Immunity and Inflammation at Rutgers New Jersey Medical School. "A drug that could cure patients with sepsis would not only save the lives of many, it would also decrease the enormous costs associated with treating septic patients in the intensive care unit and would help unburden the healthcare system."

To make their discovery, Hasko; and colleagues used two groups of mice. The first group had the CD39 gene missing. The second group was normal. When both sets of mice were exposed to sepsis, mice with the missing CD39 gene had worsened survival when compared to the normal mice. With this information in hand, the researchers then performed another experiment with two more groups of normal mice that were

septic. The first group was injected with CD39 and the other with placebo. The mice that received CD39 had improved survival compared to the ones injected with placebo.

"Finding a more effective treatment for sepsis would be a major step forward," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal, "since far too many people still die from overwhelming microbial infection. If CD 39 proves to be as critical a factor in humans as in mice, this is a major discovery."

More information: CD39 improves survival in microbial sepsis by attenuating systemic inflammation. *FASEB J.* January 2015 29:25-36; published ahead of print October 15, 2014, DOI: 10.1096/fj.14-253567

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