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Researchers discover a protein that triggers inflammatory responses in hemorrhage and sepsis

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Investigators at The Feinstein Institute for Medical Research have discovered a protein in the human body that can trigger and mediate inflammation in patients suffering from hemorrhage and sepsis. The findings were published in the online version of *Nature Medicine* on October 6, 2013.

Thirty-seven million people are admitted to the emergency room with traumatic injury each year, and these injuries are a leading cause of death in the US. Two major reasons why traumatic injury is so deadly are loss of blood (hemorrhage) and a clinical condition called sepsis. Sepsis occurs when molecules released into the bloodstream to fight an injury or infection trigger inflammation throughout the body. Inflammation is necessary for maintaining good health – without inflammation, wounds and infections would never be controlled or heal. However, persistent and constant inflammation often results in organ dysfunction or damage, leading to patient death – 28 to 50 percent of people who suffer from sepsis die from the condition.

For years, Feinstein Institute scientists have been researching ways to treat sepsis by halting persistent and constant inflammation. As a result of this effort, Ping Wang, MD, director for the Laboratory of Surgical Research and head of the Center for Translational Research at the Feinstein Institute, and his colleagues discovered that a protein called cold-inducible RNA-binding protein (CIRP) is increased and released

into the bloodstream in response to hemorrhagic shock and sepsis. When CIRP triggers inflammation, it contributes to damage of organs in the body. Dr. Wang hypothesized that if CIRP activity is blocked, causing reduced inflammation, then patient survival will improve. To test this theory, he and his colleagues observed that treatment with an antibody against CIRP significantly increased survival rates during hemorrhage and sepsis in preclinical studies.

"In this study, we identified a small peptide that can be potentially developed as anti-CIRP compound," said Dr. Wang. "What this means for patients is that we may have discovered a molecule that could be used in the future to treat hemorrhage and sepsis and save many lives."

"There's a great need for new ways to diagnose and treat sepsis," said Sarah Dunsmore, PhD, of the National Institute of Health's National Institute of General Medical Sciences, which partially funded the research. "By targeting molecules such as CIRP, which are part of the body's normal response to stress, we may be able to tailor each patient's treatment based on how much damage has already been done and which organs are at risk of failure. Dr. Wang's work may also provide insight into how healthy cells survive extreme temperatures and other stressors, information that might be harnessed to treat a variety of disorders."

More information: Cold-inducible RNA-binding protein (CIRP) triggers inflammatory responses in hemorrhagic shock and sepsis, DOI: 10.1038/nm.3368

Provided by North Shore-Long Island Jewish Health System

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