Researchers examine role of inflammatory mechanisms in a healing heart

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(Medical Xpress) -- Virginia Commonwealth University researchers have found that an inflammatory mechanism known as inflammasome may lead to more damage in the heart following injury such as a heart attack, pointing researchers toward developing more targeted strategies to block the inflammatory mechanisms involved.

Following a heart attack, an inflammatory process occurs in the heart due to the lack of oxygen and nutrients. This process helps the heart to heal, but may also promote further damage to the heart. The mechanisms by which the heart responds to injury are not fully understood, so researchers have been examining the cellular pathways involved to gain further insight.

In a study published online the week of Nov. 21 in the Proceedings of the National Academy of Sciences, researchers addressed the role of a specific inflammatory mechanism, called inflammasome, during the process of healing in the heart. Using an animal model, the team found that inflammasome amplifies the response by generating the production of a key inflammatory mediator known as Interleukin-1β. Further, they described that pharmacologic inhibition of the formation of inflammasome prevents heart enlargement and dysfunction.

“Defining the role of the inflammasome in the response to injury in the heart and the possibility to intervene opens a new area of investigation for the prevention and treatment of heart failure following a heart attack,” said Antonio Abbate, M.D., assistant professor of medicine in

the VCU Department of Internal Medicine and Division of Cardiology.

According to Abbate, who serves as the interim director for the cardiac intensive care unit at the VCU Pauley Heart Center, this study supports the team's previous findings that showed that Interleukin-1β affects the heart, and blocking Interleukin-1β benefits patients of heart attack and heart failure.

"Based on the findings of the current study we are even more convinced that blocking Interleukin-1β may be safe and beneficial, and we are now exploring novel ways to do so," he said.

Abbate said there are four ongoing clinical trials at the VCU Pauley Heart Center in patients with various heart conditions treated with a drug called anakinra which blocks Interleukin-1β.

Abbate and his team continue to examine the molecular mechanisms of inflammasome formation and heart injury, and hope to determine new ways to intervene with potentially more targeted strategies in the future.

The study was conducted in the Victoria W. Johnson Center for Research at VCU, which is directed by Norbert Voelkel, M.D, professor of medicine in the Pulmonary and Critical Care Division.

Abbate led with a multidisciplinary team of VCU researchers biologists, physicians, and pharmacists including Eleonora Mezzaroma, Ph.D., and Stefano Toldo, Ph.D., post-doctoral associates in the VCU Pauley Heart Center; Daniela Farkas, B.S., research specialist in the Victoria Johnson Research Laboratory; Benjamin Van Tassell, Pharm.D., assistant professor of pharmacology and outcome sciences; and Fadi Salloum, Ph.D., assistant professor of medicine and physiology in the VCU Pauley Heart Center.

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