# Calpain Inhibition for Prevention of Right Heart Failure

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## Technology description

## Summary

Background: Right Heart Failure Right heart failure is a condition in which the heart chamber that pumps blood through the lungs (the right ventricle) is unable to keep up with the body’ s demand for blood flow. Right heart failure can cause excess fluid accumulation, shortness of breath, dizziness, and death, even when the main pumping chamber of the heart (the left ventricle) is entirely normal. Right heart failure commonly occurs in conditions that cause an increase in the blood pressure on the right side of the heart, such as blood clots to the lungs, chronic lung diseases, and following heart operations. Right heart failure contributes directly to at least 60,000 deaths per year in the United States. There is currently no pharmaceutical agent available for prevention or treatment of right heart failure due to pressure overload other than procedures or medications designed to reduce right heart pressure; these strategies are often unsuccessful or result in serious complications. Invention The exact mechanism of right heart failure in pressure overload is incompletely understood; however, CU investigators have shown that right heart failure during pressure overload may persist even after the elevated right heart pressure has been alleviated. The CU team hypothesized that the calcium-activated protease calpain contributes to right heart dysfunction by degrading contractile or regulatory proteins, and that calpain inhibition would attenuate the development of right heart failure during acute right heart pressure overload. To test this hypothesis, pigs were treated with calpain inhibitors and subjected to acute right heart pressure overload. Right heart function was measured during and after acute right heart pressure overload.

## Application area

The studies demonstrated that right heart failure was attenuated by calpain inhibitors, offering a potential new therapeutic strategy for treatment of this condition. These data are the first to suggest a potential therapy for right heart failure in acute pressure overload that targets the underlying mechanism of the contractile dysfunction.

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