Heart failure is associated with increased acetylation of metabolic proteins

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In cardiac hypertrophy, metabolic energy reserves in the heart are depleted, which is thought to contribute to the subsequent development of heart failure. The primary energy source in the heart relies on fatty acid oxidation within the mitochondria, the cell's energy powerhouse.

In this month's issue of *JCI Insight* , Daniel Kelly of the Sanford Burnham Prebys Medical Discovery Institute and his coauthors sought to explore how post-translational modification of mitochondrial proteins involved in energy metabolism contributes to the development of heart failure. Using an unbiased screen to look for changes in protein acetylation, the researchers profiled heart tissue from 5 end-stage heart failure patients who went on to receive heart transplants.

They found that failing cardiac tissue had increased levels of acetylated mitochondrial proteins. Further, in a mouse model, they detected elevated levels of mitochondrial protein acetylation at the earliest stages of heart failure. As a proof of principle, they showed that increased acetylation of one specific protein, succinate dehydrogenase A, reduced its function in cultured cells.

Collectively, their work suggests that mitochondrial protein hyperacetylation may promote the metabolic defects seen in heart failure.

More information: Julie L. Horton et al. Mitochondrial protein hyperacetylation in the failing heart, *JCI Insight* (2016). DOI: 10.1172/jci.insight.84897