

# Metabolite biomarkers of human heart failure

## Value Proposition

Heart failure is a very common condition affecting approximately 5.1 million people in the United States. Due to its association with age, the incidence of heart failure, as well as the cost of treatment, is likely to grow. Therefore, there is increasing need for the ability to accurately predict the development of heart failure and assess the risk for major adverse cardiac events. Heart failure (HF) can be classified into two types: heart failure with reduced ejection fraction (HFrEF) and heart failure with preserved ejection fraction (HFpEF). The ejection fraction is a measure of the percentage of blood that is pumped from the left ventricle with each heartbeat. HFpEF is defined as having a left ventricle ejection fraction greater than 50% and is seen in approximately half of all HF patients. While metabolite signatures have been identified for HFrEF, characterization of biomarker and metabolite abnormalities for HFpEF remain incomplete. A more detailed understanding of HFpEF markers could aid in disease diagnosis and treatment decisions.

## Technology

This technology is a tool for diagnosing HFpEF and assessing the risk of major adverse cardiac events in patients with HFpEF. By measuring metabolites in blood samples, this method can be used to create a risk score that can inform treatment options, as well as monitor disease progression. To identify biomarkers for HFpEF, whole blood and plasma samples were taken from patients presenting for cardiac catheterization at Duke University Medical Center. Fatty acid, amino acid, and carbohydrate metabolites from HFpEF, HFrEF and non-HF patients were analyzed by quantitative mass spectrometry. Significant differences in fatty acid oxidation and ketone related metabolites were identified in these samples that correlated with adverse outcomes and could aid in the diagnosis of HF. As such, this technology provides valuable diagnostic and prognostic insight into HFpEF.

## Advantages

- Risk assessment can be determined from blood samples
- Can aid in both treatment and diagnosis



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## Patents

Patent Number: 10,451,641

Title: COMPOSITIONS AND METHODS FOR METABOLIC  
PROFILING IN SUBJECTS WITH HEART FAILURE WITH  
PRESERVED EJECTION FRACTION

Country: United States of America