

# Emerging Biomarkers for Early Detection of Myocardial Infarction

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## Introduction

Myocardial infarction (MI), commonly known as a heart attack, is a leading cause of death and disability worldwide. Timely detection and prompt intervention are critical in reducing the mortality and morbidity associated with this life-threatening condition. While traditional diagnostic tools, such as electrocardiograms (ECG) and cardiac enzyme measurements, have been pivotal in diagnosing MI, there is an increasing need for more sensitive and specific biomarkers to detect myocardial injury earlier and more accurately. Emerging biomarkers are promising tools that could improve early detection, facilitate risk stratification, and guide therapeutic decision-making.

This article explores the latest advances in biomarkers for myocardial infarction and their potential to transform clinical practice [1].

## Description

### Traditional biomarkers in myocardial infarction

### Emerging biomarkers for early detection of myocardial infarction

Recent advances in biomarker research have focused on identifying novel molecules that could detect myocardial injury more rapidly and with greater specificity. Several emerging biomarkers show promise for improving the early diagnosis of MI.

**High-sensitivity cardiac troponin (hs-cTn):** While cardiac troponins remain the cornerstone of MI diagnosis, hs-cTn tests have emerged as a more sensitive tool for detecting low levels of troponin in the bloodstream. These tests can identify minor myocardial injury earlier than traditional tests, allowing for more rapid detection of MI in

(non-ST-elevation myocardial infarction) in emergency settings [3].

**Growth differentiation factor 15 (GDF-15):** GDF-15 is a stress-responsive protein that is released from various tissues, including the heart, during episodes of myocardial injury [4]. It has been shown to be elevated in patients with acute coronary syndrome (ACS), even in the early stages of the disease, before troponin levels rise. Studies

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Received:

expressed on the surface of endothelial cells, which line the blood vessels. Elevated ESM-1 levels have been associated with endothelial dysfunction, a key factor in the development of atherosclerosis and MI. ESM-1 has shown promise as a potential biomarker for early detection of coronary artery disease and MI, particularly in patients who do not exhibit typical symptoms or elevated troponin levels [8].

### Conclusion

The early detection of myocardial infarction is critical for improving patient outcomes and reducing the burden of cardiovascular disease. While traditional biomarkers such as cardiac troponins remain essential for diagnosing MI, emerging biomarkers are paving the way for more sensitive, specific, and timely detection. High-sensitivity cardiac troponins, along with other novel markers such as GDF-15, H-FABP, and circulating microRNAs, offer great potential for identifying myocardial injury in its earliest stages. By incorporating these biomarkers into clinical practice, healthcare providers can more effectively diagnose MI, stratify risk, and tailor therapeutic interventions to improve survival rates and reduce complications. Ongoing research will continue to refine and validate these biomarkers, ultimately leading to more precise and personalized care for individuals at risk of myocardial infarction.

### Acknowledgement

None

### Conflict of Interest

None

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