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Researchers reveal metabolic dysregulation distinct to diabetic acute myocardial infarction

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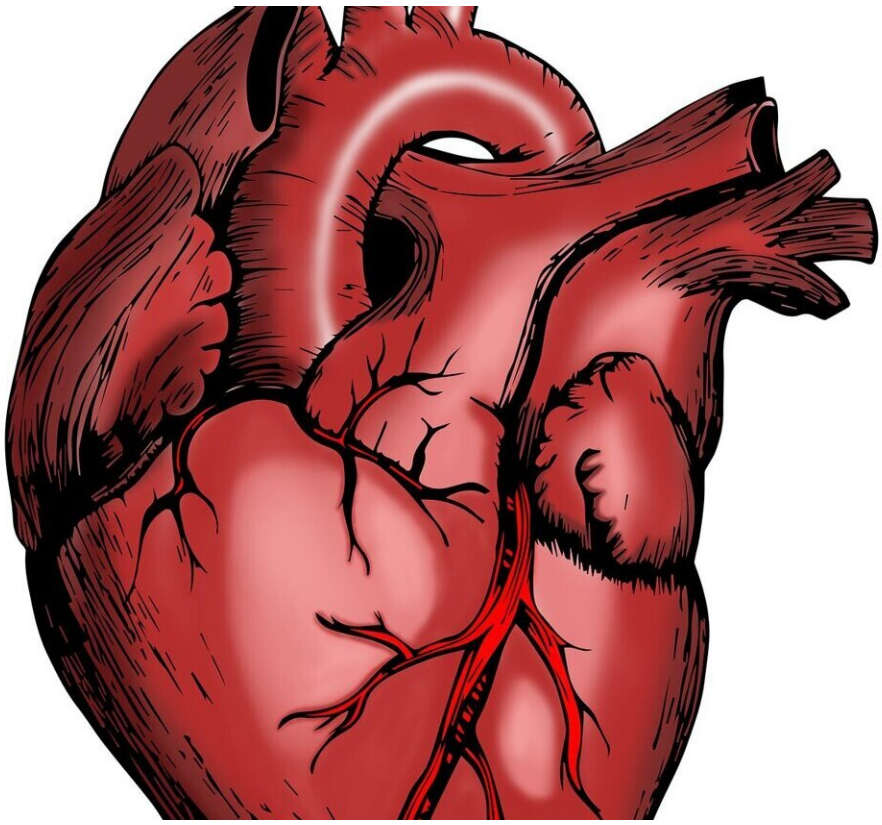

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Acute myocardial infarction (AMI) causes a massive loss of cardiomyocytes, leading to heart failure with fibrosis, stiffening of the

heart and loss of function. Diabetes mellitus (DM) is a well-known risk factor for AMI. Acute hyperglycemia, defined as elevated plasma glucose at hospital admission, was shown as an independent determinant of adverse events in AMI. However, apart from the marked increase in glucose at the acute state, little is known about the global metabolic dysregulation during this critical time window, which could potentially reveal new metabolic targets for therapeutic intervention.

In a recent study conducted by Prof. Dr. Shui Guanghou's group at the Institute of Genetics and Developmental Biology of the Chinese Academy of Sciences, Drs. Xia Jinggang and Yin Chunlin from the Xuanwu Hospital reported the discovery of systemic metabolic dysregulation distinct to acute myocardial infarction associated with diabetes.

The researchers used precise metabolomics to investigate plasma metabolic differences between DM-AMI and non-DM-AMI patients. A wide range of perturbed metabolic pathways were identified, including carbohydrate metabolism, lipid metabolism, glycolysis, tricarboxylic acid cycle and amino acid metabolism.

Precise metabolomics also defined a metabolic signature of impaired mitochondrial function aggravated by concurrent diabetes in AMI patients. In particular, N-lactoyl-phenylalanine (N-Lac-Phe) and lyso-phosphatidylcholines as key functional metabolites that skewed the metabolic picture of DM-AMI compared to non-DM-AMI.

Precise metabolomic evaluation of distinct plasma metabolome alterations in DM-AMI relative to non-DM-AMI dissects the molecular microenvironment that contributes to compromised cardiac function and worse outcome in DM-AMI. The characteristic metabolic shifts provide new clues and therapeutic targets specific to the treatment of DM-AMI.

This work was published in *Arteriosclerosis, Thrombosis, and Vascular Biology* on Feb. 2.

More information: Jing-gang Xia et al, Precise Metabolomics Defines Systemic Metabolic Dysregulation Distinct to Acute Myocardial Infarction Associated With Diabetes, *Arteriosclerosis, Thrombosis, and Vascular Biology* (2023). DOI: 10.1161/ATVBAHA.122.318871