Translating metabolism into cardiovascular epigenetics

Carlo Gaetano

Internal Medicine Clinic III, Division of Cardiology, Goethe University, Frankfurt - Germany

Diabetes is one of the major risk factor for cardiovascular diseases. Prolonged exposure to uncontrolled hyperglycaemia in the heart induces dramatic metabolic changes that alter tissue homeostasis providing basis for the so called “metabolic memory”. Although epigenetic mechanisms have been described contributing to this process, the molecular events that establish metabolic memory remain elusive. Recent reports revealed that stable oxidation derivatives of methylated cytosines (5mC) such as 5-hydroxymethyl (5hmC) and 5-formyl (5fC) cytosines may accumulate in the heart upon age but none of these changes has been associated yet to metabolic memory or diabetes. Our prior work described that human cardiac stromal cells isolated from diabetic donors (D-CSMCs) displayed stable epigenetic alterations including enrichment of 5mC. We queried here about the existence of an epi-metabolic control circuit capable of regulating DNA demethylation enzymatic machinery and the onset of metabolic memory diabetic tissues and cells. Tour results indicate that the epi-metabolic modulation of DNA demethylation may provide future therapeutic strategies aimed at prevention/treatment of diabetic cardiac complications.