

Abstract

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Roles of transglutaminases in cardiac and vascular diseases.

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BACKGROUND: All transglutaminases share the common enzymatic activity of transamidation, or the cross-linking of glutamine and lysine residues to form N epsilon (gamma-glutamyl) lysyl isopeptide bonds. The plasma proenzyme factor XIII is responsible for stabilizing the fibrin clot against physical and fibrinolytic disruption. Another member of the transglutaminase family, tissue transglutaminase or TG2 is abundantly expressed in cardiomyocytes, vascular cells and macrophages. The transglutaminases have a variety of functions independent of their transamidating activity. For example, TG2 binds and hydrolyzes GTP, thereby fostering signal transduction by several G protein coupled receptors.

DISCUSSION: Accumulating evidence points to novel roles for factor XIII and TG2 in cardiovascular biology including: (a) modulating platelet activity, (b) regulating glucose control, (c) contributing to the development of hypertension, (d) influencing the progression of atherosclerosis, (e) regulating vascular permeability and angiogenesis (f) and contributing to myocardial signaling, contractile activity and ischemia/reperfusion injury.

SUMMARY: In this review, we summarize the cardiovascular biology of two members of the family of transglutaminases, Factor XIII and TG2.

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