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Low-Level Laser Irradiation Precondition for Cardiac Regenerative Therapy

Yiwei Liu, MD, and Hao Zhang, MD, PhD

Abstract

Objective: The purpose of this article was to review the molecular mechanisms of low-level laser irradiation (LLLI) preconditioning for heart cell therapy.

Background data: Stem cell transplantation appears to offer a better alternative to cardiac regenerative therapy. Previous studies have confirmed that the application of LLLI plays a positive role in regulating stem cell proliferation and in remodeling the hostile milieu of infarcted myocardium. Greater understanding of LLLI's underlying mechanisms would be helpful in translating cell transplantation therapy into the clinic.

Methods: Studies investigating LLLI preconditioning for cardiac regenerative therapy published up to 2015 were retrieved from library sources and Pubmed databases. Results: LLLI preconditioning stimulates proliferation and differentiation of stem cells through activation of cell proliferation signaling pathways and alteration of microRNA expression. It also could stimulate paracrine secretion of stem cells and alter cardiac cytokine expression in infarcted myocardium.

Conclusions: LLLI preconditioning provides a promising approach to maximize the efficacy of cardiac cell-based therapy. Although many studies have reported possible molecular mechanisms involved in LLLI preconditioning, the exact mechanisms are still not clearly understood.