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New generation of mesenchymal stem cells-based therapy for acute myocardial infarction: from bench to bedside

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Abstract

Despite stem cell therapy has, for past two decades, emerged as one of the most promising therapeutic strategies to repair or regenerate post infarct myocardium, meta-analysis of randomized clinical trials indicated that cell therapy increased left-ventricular ejection fraction (LVEF) by just 3.17% in patients with acute myocardial infarction (AMI). The low recruitment, poor survival and limited engraftment of transplanted mesenchymal stem cells (MSCs) in the ischemic environment are still the main hurdles that limit the therapeutic potential of MSCs. For the past decade, our studies demonstrated that atorvastatin (ATV) treatment improved the survival of MSCs, and ATV pretreated MSCs (ATV-MSCs) exhibited enhanced engraftment to injured myocardium. Our recent studies found that combined treatment with ATV and ATV-MSCs or multiple ATV-MSCs transplantation significantly enhanced the targeted recruitment and survival of transplanted MSCs, and resulted in subsequent cardiac function improvement by augmenting SDF-1/CXCR4 signaling. Exosomes obtained from ATV-MSCs also have significantly enhanced therapeutic efficacy for treatment of AMI through lncRNA H19/miR-675 mediated endothelial cell function regulation passway. We also test the efficacy of such kind of ATV treatment combined stem cells transplantation in patients suffering from anterior ST-elevated myocardial infarction (STEMI) and found significantly increased LVEF change values of 7.6% compared with control group. These strategies of enhancing therapeutic efficacy by ATV treatment represent the new generation of MSC-base therapy, which can achieve enhanced recruitment and survival of transplanted cells and also convenience for clinical application.

Biography

Peisen Huang has completed his MD and PhD in 2019 from Chinese Academy of Medical Sciences, Peking Union Medical College (PUMC) and won the title of outstanding graduate of PUMC. During 2017.09-2018.12, he did research in the University of North Carolina at Chapel Hill as a visiting scholar. Now he is a young clinical doctor and scientist in the department of Cardiology, the First Affiliated Hospital of Sun Yat-Sen University. He has published more than 10 papers in reputed journals and led several research grants.

Speaker Publications:

1. Global Health Estimates 2016. Deaths by cause, age, sex, by country and by region, 2000-2016. Geneva: World Health Organization; 2018

2. Tompkins BA, Balkan W, Winkler J, Gyongyosi M, Goliasch G, Fernandez-Aviles F, et al. Preclinical studies of stem cell therapy for heart disease. Circ Res. 2018 2018;122(7):1006–20.

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