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Targeted therapy using engineered mesenchymal stem cells-derived exosomes for myocardial infarction

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Exosomes are membranous vesicles generated by almost all cells. Recent studies demonstrated that MSCs derived exosomes possessed many effects including anti-apoptosis, anti-inflammatory, stimulation of angiogenesis, anti-cardiac remodeling and recovery of cardiac function on cardiovascular diseases. However, targeting of exosomes to recipient cells precisely *in vivo* still remains a problem. Ligand fragments or homing peptides discovered by phage display and *in vivo* bio-panning methods fused to the enriched molecules on the external of exosomes have been exploited to improve the ability of exosomes to target specific tissues or organs carrying cognate receptors. It is briefly elucidated that effective targeting of exosomes to ischemic myocardium can be achieved by engineering exosomal enriched membrane protein (Lamp2b) fused with a peptide motif CSTSMLKAC (IMTP). In vitro results showed that IMTP-Exos could be internalized by hypoxia injured H9C2 cells more efficiently than Blank-Exos. Compared with Blank-Exos, IMTP-Exos was observed to be increasing accumulated in ischemic heart area ($P<0.05$). Meanwhile, attenuated inflammation and apoptosis, reduced fibrosis, enhanced vasculogenesis and cardiac function were detected by MSCs derived IMTP-Exos treatment in ischemic heart area. Our research concludes that exosomes engineered by IMTP can specially target ischemic myocardium and MSCs derived IMTP-Exos exerts enhanced therapeutic effects on acute myocardial infarction.

Biography

Jiacheng Sun is currently a Master's Student in Soochow University, China. He has published 3 papers in reputed journals in the field of stem cell therapy for ischemic diseases.

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