Stem Cell Exosomes for Cardiovascular Repair: Sacks full of Goodies or Not!

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Abstract:

Recent studies suggest that stem cell mediated myocardial repair is largely associated with paracrine effect. Exosomes, a family of extracellular vesicles, have recently been identified as major paracrine functional unit of stem cells. Exosomes are secreted from all types of cells and contain cell specific small RNAs, lipids and proteins cargo that largely determines exosome function. Stem cell-derived exosomes show cardiac repair and regeneration properties akin to their parent cell themselves. However, all exosomes, even when secreted by same cells, are not created equal; different pathophysiological conditions and stimuli of parental cells is known to alter exosome content and may modulate exosome function. Additionally, comorbid factors associated with cardiovascular diseases such as systemic inflammation and diabetes etc. are known to compromise the functional properties of autologous stem/progenitor cells. Using bone marrow derived endothelial progenitor cells (EPC), we investigated whether exosomes isolated from inflamed or diabetic EPC retain their cardioprotective properties or not, if the exosome cargo from these cells is different from EPCs obtained from wildtype mice and molecular mechanisms of inflammation and diabetes associated EPC-exosome dysfunction. Understanding the molecular mechanism of exosome function/dysfunction is urgent for exosome manipulation as well as application of this cell-free therapy in cardiovascular disease. These data will be presented and discussed.