Improvement in cardiac function following transplantation of human umbilical cord matrix-derived mesenchymal cells.


Source

Department of Anatomy, Afzalipour School of Medicine, Kerman University of Medical Sciences, Kerman, Iran.

Abstract

OBJECTIVES:
Human umbilical cord mesenchymal cells (hUCM) can be easily obtained and processed in a laboratory. These cells may be considered as a suitable source in the repair of heart failure diseases. We, therefore, examined whether these cells may contribute to heart regeneration following an acute experimental myocardial infarction (MI).

METHODS:
MI-induced animals received 5 × 10⁶ hUCM cells, 5 × 10⁶ azacytidine-treated cells (dhUCM), or PBS alone, subepicardially. A group of animals with MI and no other former intervention served as controls. dhUCM cells were assessed for F-actin, myogenin and troponin-I expression.

RESULTS:
dhUCM cells appeared as binucleated cells with extensive cytoplasmic processes. These differentiated cells were F-actin and myogenin positive. Thirty days after LAD ligation, left ventricular ejection fraction and the percentage of fractional shortening improved significantly in cell-receiving animals. In addition, the amount of scar tissue was significantly reduced in hUCM and dhUCM groups compared to MI group (p < 0.05). These parameters were comparable between hUCM and dhUCM groups. Histopathological evaluations revealed that some engrafted cells adjacent to and remote from the MI area expressed troponin-I, F-actin and connexin 34.

CONCLUSION:
These findings demonstrated the potential therapeutic use of either differentiated or undifferentiated hUCM cells in treatment of heart failure conditions.

Copyright © 2011 S. Karger AG, Basel.