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In vivo differentiation of human amniotic epithelial cells into cardiomyocyte-like cells and cell transplantation effect on myocardial infarction in rats: Comparison with cord blood and adipose tissue-derived mesenchymal stem cells

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Human amniotic epithelial cells (h-AECs), which have various merits as a cell source for cell therapy, are known to differentiate into cardiomyocytes in vitro. However, the ability of h-AECs to differentiate into cardiomyocytes *in vivo*, and their cell transplantation effects on myocardial infarction, are still unknown. In this study, we assessed whether h-AECs could differentiate into cardiomyocytes *in vivo* and whether h-AECs transplantation can decrease infarct size and improve cardiac function, in comparison to transplantation of cord blood-derived mesenchymal stem cells (MSCs) or adipose tissue-derived MSCs. For our study, we injected h-AECs, cord blood-derived MSCs, adipose tissue-derived MSCs, and saline into areas of myocardial infarction in athymic nude rats. After 4 weeks, 3% of the surviving h-AECs expressed myosin heavy chain, a marker specific to the myocardium. Compared with the saline group, all cell-implanted groups showed a higher ejection fraction, lower infarct area by positron emission tomography and histology, and more abundant myocardial gene and protein expression in the infarct area. We showed that h-AECs can differentiate into cardiomyocyte-like cells, decrease infarct size, and improve cardiac function *in vivo*. The beneficial effects of h-AECs were comparable to those of cord blood and adipose tissue-derived MSCs. These results support the need for further studies of h-AECs as a cell source for myocardial regeneration due to their plentiful availability, low immunity and lack of ethical issues related to their use.

Biography

Kyung-Soo Kim has completed his Ph.D. at the age of 34 years from Hanyang University and postdoctoral studies from NHLBI, NIH, USA. He is the Director of the Institute of Cardiovascular Research. He has published more than 60 papers in reputed journals.

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