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The cardiac atrial appendage stem cell: A new candidate for myocardial repair

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The current therapy for myocardial infarction (MI) is not sufficient since mortality after MI remains very high. Stem cell transplantation seems to be a promising future therapy to repair the heart, by replacing the lost cardiomyocytes. Previous clinical studies using bone marrow stem cells (BMSC) reported only minor improvement of cardiac function. Indeed, follow-up research demonstrated only a limited cardiomyogenic differentiation potential of BMSC. However, BMSC transplantation can be beneficial because these cells can promote cardiomyocyte survival through paracrine effects. Meanwhile, scientific focus shifted from BMSC towards cardiac stem cells (CSCs). These cells are probably better suited for cardiac repair, since they are most likely "pre-programmed" to become cardiomyocytes. Recently, our research group reported the existence of a new intrinsic cardiac stem cell (CSC) population, the cardiac atrial appendage stem cells (CASCs). These CASCs do possess *in vitro* a greater myocardial differentiation potential compared to the previously described c-kit+ CSCs or the cardiosphere-derived stem cells. In an *in-vivo* follow-up study of autologous CASCs transplantation in a Göttingenminipig MI model, we showed that CASCs are able to preserve cardiac function, while control animals developed progressive ventricular dilatation.

In conclusion, the identification of this new stem cell population opens interesting perspectives for cell therapies in patients with ischemic heart disease or heart failure. Currently, further research is performed to assess if CASCs can contribute to cardiac angiogenesis via both endothelial differentiation and paracrine mechanisms. Furthermore, we also investigate in detail whether the endogenous repair mechanism of the heart can be stimulated by identifying the signalling pathways involved in self-renewal, proliferation and differentiation of CASCs.

Biography

Karen Hensen has completed her Ph.D. at the age of 28 years from Leuven University, Belgium and Postdoctoral studies from University of Massachusetts Medical School, Worcester, USA. She is the PI of the laboratory of Experimental Hematology at the Jessa Hospital, one of the largest private hospitals in Belgium. She has published more than 25 papers in reputed journals. The primary focus of her work is the development of a cardiac stem cell therapy for patients with heart failure.

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