Insights in Stem Cells: Cell-Based Therapy of Ischemic Heart Failure

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Abstract

Ischemic heart failure (IHF), heart failure secondary to myocardial infarction, is the number one killer in the US. Despite all the major advances in cardiac interventions, its relevance is on the rise. Stem cells have the potential to ameliorate many chronic illnesses such as IHF. Like any new therapy, several unanswered questions need to be addressed. The first question to be addressed is which type of stem cell should be used? There are several types of cells that have previously been investigated including embryonic stem cells, inducible pluripotent cells, and adult cells. Among the most commonly used adult cell type are fat cells, cord blood, bone marrow, cardiac cells, and myoblasts. Many cell-based strategies have been utilized, for example, one strategy has been directed differentiation of embryonic and inducible pluripotent stem cells have provided an unlimited number of cardiomyocytes for cell replacement of the lost cardiac cells in IHF. A second strategy has been exogenous stem may be generated and used to regenerate the myocardium. A third strategy has been adult cardiac progenitor cells may be created by partial de-differentiation of tissue cardiac cells and delivered to regenerate the injured myocardium. At this time, it appears that modified autologous cardiac-derived cells is a good candidate for cell therapy of IHF, and the retrograde perfusion via the the coronary vein is an efficient cell delivery approach.

Image

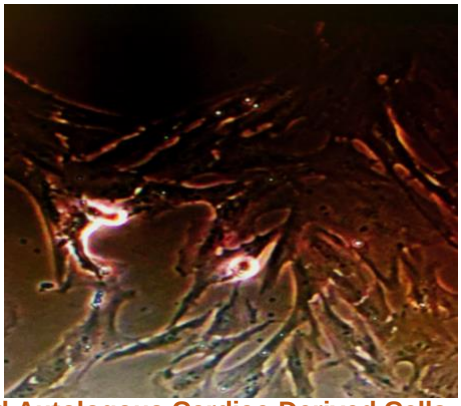
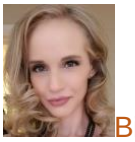


Figure 1: Modified Autologous Cardiac-Derived Cells

Relevant Publications

1. Lisboa S, Gaballa M (2016) Cell-Based Therapy of Ischemic Heart Failure. Insights in Stem Cells: 8/22/2016
2. Zakharova L, Nural-Guvener H, Feehery L, Popovic-Sljukic S, Gaballa M (2015) Transplantation of epigenetically modified adult cardiac C-kit+ cells retards remodeling and improves cardiac function in ischemic heart failure model. Stem Cells Transl Med 4: 1086-1096.
3. Zakharova L, Nural-Guvener H, Nimlos J, Popovic S, Gaballa M (2013) Chronic heart failure is associated with transforming growth factor beta-dependent yield and functional decline in atrial explanations-derived c-Kit+ cells. J Am Heart Assoc 2: e000317.
4. Zakharova L, Nural-Guvener H, Gaballa M (2012) Cardiac explanation-derived cells is regulated by Notch-modulated mesenchymal transition. PLos One 7: e37800.
5. Gaballa M, Sunkomat JN, Thai H, Morkin E, Ewy G, et al. (2006) Grafting an acellular 3-dimensional collagen scaffold onto a non-transmural infarcted myocardium induces neoangiogenesis and reduces cardiac remodeling. J Heart Lung Transplant 25:946-954.



Biography

Sarah Lisboa has her expertise in laboratory research, management, and consulting. Her passion is building a better future for patients suffering from cardiac illness through advanced stem cell research. She believes in the education of many is paramount to a new era treating cardiac disease. Sarah Lisboa implements a ground up methodology that utilizes the ideas of all and never the few: ask, question, test and repeat. This approach implements boundless options for teaching, learning and experimenting.

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