Stem cells hold a great promise for regenerative medicine, especially for replacing cells in in-farcted organ that hardly have any intrinsic renewal capacity, including heart. Being more specif-ic, several types of stem cells, manufacturing methods and delivery routes have been tested in different clinical settings but direct comparison between them is challenging and hinders further research. For ischemic heart disease, use of both autologous and allogeneic stem cells is appearing to be growing. Both autologous and allogeneic cell therapies for ischemic heart disease show a similar improvement in left ventricular ejection fraction in myocardial ischemia.

For instance, autologous cell can be applied without immunosuppression, and the cells have been exposed to risk factors and aging. Allogeneic cell therapy enables preoperative production of po-tent cell lines and immediate availability of cell products, allowing off-the-shelf therapy. Moreo-ver, concomitant transplantation of endothelial cells and stem cells can significantly improve the efficacy of cell based heart repair.

Cell based gene therapy, in turn, markedly improves the angiogenesis achieved as well. And, moreover, rejuvenating aged stems cells prior to transplantation restores the functional benefits attained. Finally, modulating the cellular environment in aged individuals permits the full func-tional benefits of stem cell therapy to be realized. The latter is important for the design of future clinical trials.

Moreover, after myocardial infarction, the heart undergoes extensive myocardial remodeling through the accumulation of fibrous tissue in both the infarcted and noninfarcted myocardium, which distorts tissue structure, increases tissue stiffness, and accounts for ventricular dysfunc-tion. To monitor the latter, optimal management of myocardial infarction in the subacute and post-infarction periods focuses on improving the discharge planning process, implementing ther-apies early to prevent recurrent myocardial infarction, and avoiding hospital readmission. In this sense, early noninvasive stress testing is an important risk assessment tool, especially in patients who do not undergo revascularization. Non-invasive imaging would also play a major role for determination of structural myocardial damage and loss of function. And, for sure, secondary prevention regarding drug-based and off-drug therapy is appearing to be dependent on myocar-dial function. So, structured discharge processes should be used to enhance communication and facilitate the transition from the hospital to the family physician's care. In this sense, nutrition and exercise training as parts of off-drug therapy would play an important role in the rehabilitation.

For instance, exercise-based cardiac rehabilitation is an effective and safe therapy to be used in the management of clinically stable people following myocardial infarction or percutaneous cor-onary intervention or who have heart failure. Future technologies in the area would secure cardiac rehabilitation whilst recruiting higher risk patients and persons-at-risk and re-considering con-temporary models of cardiac rehabilitation delivery, whilst identifying effective interventions for enhancing adherence to rehabilitation.

However, the number of industry products available for widespread clinical use does not match this magnitude of activity. There are several problems which need to be overcome.

First, although the clinical trials mentioned have been shown to be safe, only a relatively small effect on cardiac function has been observed. It has become clear that each cell type applied in cell-based therapy has its own ability for cardiac repair. And functional restoration of damaged myocardium will require a functional cell type with similar phenotype and characteristics of the damaged tissue that can also integrate, survive, and electrically couple to the host.

The second concern among this trend would relate to cost-effectiveness, efficacy, reimburse-ment, and regulation. We would have to focus on the legacy of the latter to move ahead faster and to secure the positive outlook for future treatment of cardiac diseases with stem cell thera-pies.

So, we hypothesize that the paucity of engagement with the clinical community is a key contrib-utor to the lack of commercially successful cell therapy products.

Biography

Evgeny Rosseikin was born in the city of Sevastopol, USSR. In 1994, he graduated from I.M. Sechenov Moscow Medical Academy and was awarded with MD. In 2002, Rosseikin maintained his PhD in B.V. Petrovsky Russian Centre of Surgery. From 2008 till present Rosseikin the chief of surgery in Federal Centre of Cardivascular Surgery in Penza, Russian Federation. Rosseikin is author of 32 publications and 12 patents.