



Keynote Presentation

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Stem cell technologies to integrate biodesign-related tissue engineering within the frame of cell-based regenerative medicine: towards the preventive, therapeutic and rehabilitative resources and benefits

The end-stage heart failure is a global scourge, and cardiovascular disease (CVD) is a major health problem and the leading cause of morbidity and mortality in the Globe. And thus the treatment and prevention of CVD are considered to be the public health priorities. The latter means that CVD is a life course disease that begins with the evolution of risk factors that in turn contribute to the development of subclinical (pre-early and symptom-free) atherosclerosis.

The idea of extending the lifetime of the human heart has been fueled by a series of major advances in transplantation and drug therapies. Nevertheless, atherosclerotic complications and myocardial infarction, in particular, is characterized by the irreversible loss of cardiac myocytes because of the ischemic necrosis. Therefore, the need to re-establish the structural and functional features of native heart tissue represents a major challenge for the field of cardiac regeneration and engineering as the latest avenue to move ahead.

Cardiac stem cells (CTCs) are described in a number of mammalian species including humans, and their clusters are considered to consist of both lineage-negative and partially committed cells which, in turn, are located among contracting cardiac myocytes. CSCs are directly involved in cardiac cellular homeostasis during aging and adaptation to physiological and pathological stress and being transplanted into damaged hearts, CSCs have the capacity to generate de novo myocardial tissue. The niche for CSCs can be activated by several active biomolecules (including cytokines and growth factors), or through the injection of systemic drugs, such as statins, to obtain beneficial results similar to those of CSC transplantation.

There are currently many challenges facing the cell-based therapy industry. And the requirements for high levels of process, translational pipelines and product characterization will result in significant direct costs in all process stages, from establishment of a master cell bank to final product testing and expertise.

As an industry, cell-based therapies are still in the early stages of translational applications and clinical development. And developers considering the range of available manufacturing technologies need to balance the competing pressures discussed. So, moving forward, we must better characterize cell-based therapy clinical trials with accessible information for a host of variables, including cell dose, patient numbers and cell providence. This will allow for efficient and accurate data collection on cell-based therapy clinical trials, facilitating decision making across the cell-based therapy sector. As understanding of the cell-based products increases, we will likely experience step change improvements in manufacturing capability.

Anyway, we would have to focus on bringing cell-based strategies into the therapeutic pipeline through generating and differentiating absolutely novel cell types using the latest drug design and bioengineering approaches. Pharma's primary strengths are the process by which lead compounds are turned into a marketable drug. Although the pharmaceutical industry has embraced SCs as tools in drug discovery, few companies have taken the risk to deliver SC-based medicines.

Biography: Sergey Suchkov was born in the City of Astrakhan, Russia, in a family of dynasty medical doctors. In 1980, graduated from Astrakhan State Medical University and was awarded MD. In 1985, Suchkov maintained his Ph.D. as a Ph.D. student of the I.M. Sechenov Moscow Medical Academy and Institute of Medical Enzymology. In 2001, Suchkov maintained his Doctor Degree at the National Institute of Immunology, Russia. From 1989 through 1995, Suchkov was being the Head of the Lab of Clinical Immunology, at Helmholtz Eye Research Institute in Moscow. From 1995 through 2004 - a Chair of the Dept for Clinical Immunology, Moscow Clinical Research Institute (MONIKI). From 1993-1996, Suchkov was a Secretary-in-Chief of the Editorial Board, of Biomedical Science, an international journal published jointly by the USSR Academy of Sciences and the Royal Society of Chemistry, UK.

At present, Sergey Suchkov is:

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