



Special Issue on **Stem Cells for Engineering Cardiovascular Bioartificial Organs: Concepts, Methodologies, and Therapeutic Applications**

CALL FOR PAPERS

Stem cells continue to be in the spotlight of the field of regenerative medicine and tissue engineering and exploiting their unique properties has become a global endeavor. They distinguish themselves from other cell types by (1) the capacity for self-renewal and (2) differentiation into tissue- or organ-specific cells with special functions. Cell-renewal allows noninvasive derivation of a stem cell pool as merely a few isolated host cells can be expanded *in vitro* up to large numbers. The differentiation spectrum, depending on the stem cell type, can be broad or narrow and make these cells suitable for different applications with the purpose of creating the desired cellular phenotype *in vitro*. The ultimate self-renewal and the broadest differentiation potential are hallmarks of pluripotent stem cells. Although most of these technologies are limited to the preclinical phase so far, increasing knowledge in the field of stem cells has also resulted in novel human therapeutic approaches as part of initial clinical trials.

Cardiovascular disease is still one of the leading causes of mortality and morbidity worldwide. Stem cell technologies have been used to improve the function of injured heart tissue, particular in the field of structural as well as ischemic cardiovascular disease. Beside direct transplantation of stem cells in the diseased heart, also the *in vitro* engineering of bioartificial organs has received more attention. In the field of structural heart disease, the *in vitro* fabrication of tissue engineered vascular grafts and heart valves has stimulated significant hope for autologous treatment of heart valve disease as well as congenital heart disease. In ischemic heart disease, the *in vitro* engineering of myocardial tissues as well as myocardial microtissues for transplantation into infarcted myocardium has generated optimism for future therapeutic concepts. In part, these technologies have already reached the clinical phase.

We invite investigators to contribute original research articles as well as review articles that will stimulate the continuing efforts to investigate the use of stem cells for the manufacture of cardiovascular bioartificial organs and/or tissues. This includes articles on therapeutic as well as disease modeling aspects involving different types of stem cells including multi- as well as pluripotent cell types.

Potential topics include, but are not limited to:

- ▶ Embryonic or induced pluripotent stem cells for 2D and 3D *in vitro* cardiovascular tissue engineering
- ▶ Autologous stem cell-based *in situ* cardiovascular tissue engineering
- ▶ Different subsets of mesenchymal stem cells for fabrication of cardiovascular bioartificial organs
- ▶ The use of stem cells for fabrication of microtissues for cardiac repair
- ▶ Bioreactor systems for stem cell-based cardiovascular bioengineering
- ▶ Clinical translation of stem cell-based cardiovascular tissue engineering approaches

Authors can submit their manuscripts via the Manuscript Tracking System at <http://mts.hindawi.com/submit/journals/sci/cmta/>.

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Manuscript Due

Friday, 20 November 2015

First Round of Reviews

Friday, 12 February 2016

Publication Date

Friday, 8 April 2016