Stem Cells in Cardiac Regeneration and 3D Bioprinting

Cell therapy has been published significantly in animal and clinical applications to treat patients around the globe. We have examined the role of embryonic stem cells, and reprogrammed induced pluripotent stem (iPS) cells, and to regenerate infarcted heart following transplantation. We have also used various cytokines and growth factors to enhance cardiac repair and regeneration. We reported differentiation of endogenous and transplanted stem cells into cardiac myocytes, endothelial and vascular smooth muscle cells. Furthermore, we investigated whether these transplanted cells have any effects on cardiac remodeling. Cell signaling studies were also determined on cardiac remodeling and regeneration. Our heart function data suggest that there were significantly improved cardiac function following stem cell transplantation. Now we are using the gained knowledge on stem cells and various growth factors to differentiate them into heart cells using a cutting edge 3D Bio printing technology. In summary, we will discuss on transplanted stem cells in the infarcted heart that provide beneficial effects via increasing cardiomyogenesis, neovascularization, vasculogenesis as well as in the future studies to use them in 3D Bioprinting.

Biography

Dr. Dinender Singla received his B.Sc. and M.Sc. degrees from Punjabi University, Patiala, India and his Ph.D. from the Post Graduate Institute of Medical Education and Research, Chandigarh, India. He held post-doctoral fellowship positions in different Universities in Canada. He was joined as a tenure track Assistant Professor of Medicine at the University of Vermont in 2004. His current position at the University of Central Florida is a Professor of Medicine. His major area of research is related to stem cells, heart failure, diabetes, inflammation and cardiac regeneration. He is continuously serving to review the grants for various NIH, AHA, ministry of Italian health, and Hong Kong study sections. He is an Academic Editor for PLoS one, Associate Editor for Canadian Journal of Physiology and Pharmacology as well as he is serving on the Editorial board member for different journals such as American Journal of Physiology: Heart and Circulatory. He is a chair, TPIG committee, American Physiology Society and also currently is a secretary North American section of the international academy of cardiovascular sciences. He is a fellow international academy of cardiovascular sciences. He is a reviewer for different journals. He served as a chair for various scientific sessions throughout the world. He has also organized a scientific conference. He is an author or coauthor for more than 70 peer reviewed papers.

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