

Application of nanotechnology and stem cell technology in the next generation cardiovascular implants

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Emerging advanced technologies such as nanotechnology offers great potential to overcome current issue in different fields including biomedical field. Development novel diagnostics and nanobiosensors, new therapeutics based on smart delivery systems and nanocarriers as well as multifunctional theranostics has opened new horizons to current medical practice. Application of nanotechnology in the field of biomedical and cardiovascular devices has attracted research attention in recent years. Development of new nanomaterials and nanocomposite hybrids with enhanced bio and hemocompatibility and improved mechanical and physicochemical properties offers great advantages over conventional materials. Based on these advanced materials, development of next generation biomedical devices has become achievable. Merging nanotechnology with other advanced technologies such as stem cell technology and regenerative medicine principals in development of next generation viable or semi-viable devices is a new paradigm in biomedical research. In this paper we will report our findings of development of next generation cardiovascular devices such as heart valve, coronary stents and bypass grafts based on nanotechnology and regenerative medicine principals. The results of multiple tests to investigate bio and hemocompatibility, mechanical and surface properties and self-endothelialisation potential were very promising. This indicates that future prospect of the application of nanotechnology and stem cell technology in development of next generation cardiovascular devices is bright.

Biography:

Dr. Ghanbari obtained his medical degree (MD) from Tehran University of Medical Sciences on 2002 and then joined to the Centre for Nanotechnology & Regenerative Medicine, University College London to do a PhD on Regenerative Nanomedicine (2007-2011). After completing his PhD, he joined the RAFT Institute in London as a Post-Doctoral fellow to conduct research on skin replacement "Smart Matrix". Then, he moved to Tehran University of Medical Sciences and started his job as a faculty member of School of Advanced technologies in Medicine, Department of Medical Nanotechnology. His research interest is application of nanotechnology in regenerative medicine, stem cell therapy and tissue engineering. He has also a broad experience on the development of next generation cardiovascular implants using nanotechnology and stem cell technology. He is co-founder of "Research Center for Advanced Technologies in Cardiovascular Medicine", located at Tehran Heart Center, one of the most advanced cardiovascular medical center in Iran.