



## O6- Regenerative Medicine: From Past to Present and the Future

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### Abstract

Stem cells are the precursors of all other cell types in the body. What makes stem cells special is that they are regenerative. Regenerative medicine is a growing field that offers the potential to repair and replace damaged tissues and organs by using those that are specially grown. Stem cell transplantation was pioneered using bone-marrow-derived stem cells by a team at the Fred Hutchinson Cancer Research Center from the 1950s through the 1970s led by E. Donnall Thomas, whose work was later recognized with a Nobel Prize in Physiology or Medicine in 1990. Now these procedures have set for more than 2 thousands clinical trials. Although a number of stem cell therapies exist, but most are at clinical trials stages. The stem cells will soon be able to treat cancer, diabetes mellitus, Parkinson's disease, Huntington's disease, Celiac Disease, cardiac failure, muscle damage and neurological disorders, and etc. One of the key issues raised by cell-therapy is how to maximize the utility of cells delivered to a permissive environment in which there is context for the type of cell needed but in which very few biological signals are given to encourage normal cell function. The biomaterial system in which embedded cells gives off a signal for deeper cells to form bone while cells near the surface form cartilage. As a potentially ground-breaking technology, regenerative medicine offers many benefits for the future of our society. Scientific advancements in regenerative medicine have greatly helped our current population. According to the 2011 U.S. National Academy of Sciences Report, the numbers of patients that can benefit from regenerative medicine include 58 million from cardiovascular disease, 30 million from autoimmune diseases, and 16 million from diabetes. The California Institute of Regenerative Medicine (CIRM) predicts that its first 1.1 billion in grants will create nearly 25,000 jobs and \$200 million in new tax revenue for California by the end of 2014. It will create jobs not only in research and laboratory fields but also construction and building.

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