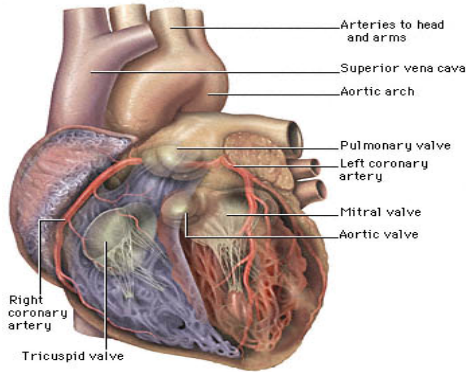


Cardiovascular Disease – Selected Excerpts

Interior structures of the heart

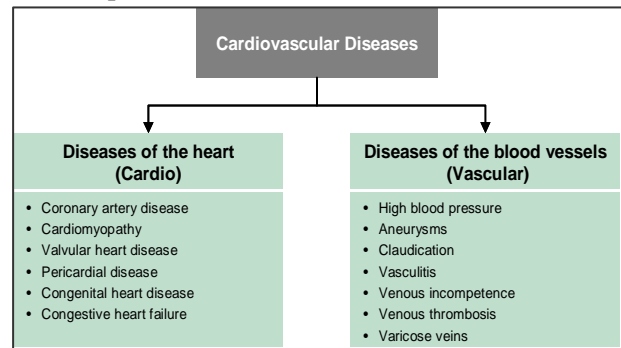


Based on promising animal trials, a number of major clinical trials of stem cells for the treatment of cardiovascular disease are in process.

Professor John Martin, who is also chairman of a European stem cell task force, said: "Previous studies have shown that stem cell delivery to the heart is safe."

Two years ago, researchers presented data from a prospective randomized trial of stem cells in heart therapy at the American Association for Thoracic Surgery that showed that injections of adult stem cells into damaged heart tissue significantly improved heart function in patients with severe congestive heart failure. The study involved 20 patients with severe heart failure (New York

Heart Association heart failure classification III and IV) who had ejection fractions less than 35 percent. Ejection fraction is a standard measure of heart function and is determined by the total amount of blood that the left ventricle pumps out per heart beat. A patient with good heart function has an ejection fraction of at least 55 percent. Each patient was scheduled for off-pump (beating heart) cardiac bypass surgery; 10 were randomized to also receive stem cells during surgery. The other 10 patients underwent the bypass operation alone. Each group consisted of eight men and two women.



Year	Diagnostic Angiography Procedures	Interventional Cardiology Procedures	Percutaneous Transluminal Coronary Angioplasty Procedures	Coronary Artery Bypass Procedures	Trans-myocardial Revascularization Treatment for Angina	Total Available Market for Stem Cell Cardio Repair	Stem Cell Market Penetration Estimate	Stem Cell Cardio Procedures	Growth (%)
2005	1,000,000	1,000,000	1,000,000	200,000	1,200	1,111,200	0.0%	-	-
2006	1,000,000	1,000,000	1,000,000	200,000	1,200	1,100,700	0.0%	-	-
2007	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	0.0%	-	-
2008	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	0.0%	1,000	-
2009	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	0.0%	4,000	200%
2010	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	0.0%	16,000	200%
2011	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	1.0%	20,000	200%
2012	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	1.0%	60,000	200%
2013	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	4.0%	70,000	20%
2014	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	1.0%	100,000	20%
2015	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	1.0%	120,000	20%
2016	1,000,000	1,000,000	1,000,000	200,000	1,200	1,000,200	8.0%	180,000	10%

In another major study, in which stem cells were injected directly into a patient’s heart muscle, they appeared to be safe and useful in treating end-stage heart failure, according to a rapid track report from *Circulation: Journal of the American Heart Association*. “This is one of the largest series of stem cell-treated patients reported so far and perhaps the first to inject stem cells directly into the heart,” said senior author James T. Willerson, M.D., president of the University of Texas Health Science Center at Houston and medical director and chief of cardiology at the Texas Heart Institute. “If our findings are confirmed in larger trials, this procedure could lead to an effective treatment for severe heart failure.”

Animal Studies: Five years ago researchers reported that they were able to isolate a select group of adult mouse progenitor bone marrow cells, and when they injected them into the damaged wall of the ventricle, these cells led to the formation of new cardiomyocytes, vascular endothelium, and smooth muscle cells. Thus, these cells generated de novo myocardium, including coronary arteries, arterioles, and capillaries. The newly formed myocardium occupied 68 percent of the damaged portion of the ventricle nine days after the bone marrow cells were transplanted.

To order the complete *Stem Cell Analysis and Market Forecast 2006-2016*, [click here](#).