Peter A Everts, J Tissue Sci Eng 2018, Volume 9
DOI: 10.4172/2157-7552-C2-047

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Overview of studies on bone marrow concentrates for myocardial tissue regeneration, with emphasis on new preparation technology addressing cell composition, erythrocyte contamination, and plasma free hemoglobin

Tissue engineering and regenerative medicine offer solutions to a number of compelling clinical problems that have not been adequately addressed through the use of permanent replacement devices. The challenge will be to select the optimal biomaterials, or biological cells, and soluble regulators. Although stem cells hold considerable promise for the treatment of numerous diseases, including cardiovascular disease, musculoskeletal disease, etc. impediments such as cell harvesting and processing techniques, the control of stem cell fate, cell viability must be overcome before their therapeutic potential can be realized. This requires first of all a meticulous aspiration technique and preparation protocol. Cardiovascular diseases (CVD) are the leading cause of death worldwide, according to a recent report of the American Heart Association. European show that CVD accounts for 45% of all deaths (49% for women and 40% for men) and lead to more than four million people deaths every year (1.4 million before the age of 75 years). Acute myocardial infarction (AMI) and chronic ischemic heart disease (IHD) cause significant mortality, morbidity, and treatments result in a growing economic burden. A significant number of these patients develop heart failure due to advanced myocardial remodeling and left ventricular (LV) dysfunction. The existing pharmacological modalities have been able to slow the progression of CVD but have no capacity for reversing or regenerating this process. There is an unmet need for new therapies, including autologous biologics like bone marrow concentrate (BMC), for myocardial repair. Although results from individual trials have been conflicting, emerging evidence from several large meta-analyses of pooled data suggest that therapy with BMC may employ beneficial effects in patients with AMI as well as chronic IHD, enhancing LV function and tissue remodeling, ultimately improving outcomes. Albeit that several trials have been unable to document benefits of BMC therapy, and the overall effects of cell therapy have remained controversial. An explanation for the inconsistency in results might be attributed to differences in trial design, and methods to produce a viable BMC product, containing a significant concentration of mesenchymal cells, with less erythrocyte contamination, a low incidence of hemolysis, and sufficient niche contributors like platelets. This presentation provides a critical overview of the translation of first and second-generation cell types, with focus on a new generation of autologous BMC, Aspire-Pure BMC, in relation to the biological differences of previously used BMC products for cardiac repair, to improve cell-based therapies for CVD

Biography

Peter A Everts is the Chief Scientific Officer at EmCyte Corporation with a demonstrated history of working in the medical practice industry. He is skilled in medical devices for biological therapies which use in Orthobiology-MSK, spine, chronic wound care, cardiac surgery, reconstructive surgery, facial aesthetics, hair regrowth, and other regenerative medicine applications. He is a strong research professional graduated from the University of Utrecht PhD program, and International ATMO, San Antonio, TX, USA.

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