The Realisation of Research

Thymosin ß4 and Cardiac Progenitors: New Treatments for Heart Disease

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Description:

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Summary

Cardiac progenitor cells capable of differentiating into several cell types, including smooth muscle and endothelial cells, have been induced from adult heart tissue by treatment with thymosin ß4. These cells will be a valuable tool in the search for drugs that promote myocardial regeneration after a heart attack, or in the treatment of heart disease.

The Technology and its Advantages

For heart attack (myocardial infarction) victims, the long term prognosis is poor. Damaged cardiac tissue is replaced by non-contractile scar tissue, which impairs cardiac function. An important goal in the treatment of myocardial infarction (as well as other heart diseases) is, therefore, to promote regeneration of cardiac tissue and collateral blood vessel growth. To this end, much emphasis has been placed on identifying sources of adult cardiac progenitor cells and developing drugs that stimulate endogenous populations of these to repair damaged myocardium.

Researchers at UCL have isolated epicardium-derived cells (EPDCs) by culturing adult heart tissue explants with thymosin ß4 (Tß4). These EPDCs have properties of embryonic cardiac progenitors, displaying extensive outgrowth, multi-potency and expression of embryonic genes. EPDCs are capable of giving rise to the different cells types needed to replenish injured heart muscle and vasculature. Therefore, administering Tß4 to the ischaemic or inflamed heart may encourage myocardial regeneration by stimulating EPDC outgrowth.

Screening for compounds that promote EPDC differentiation into specific cell types (such as vascular precursors or fibroblasts) will identify additional drugs with therapeutic potential for treating heart diseases/disorders.

Furthermore, EPCDs have potential for use in cell transplantation therapies, either administered alone or in conjunction with Tß4 or other drugs.

Market Opportunity

According to the National Center for Health Statistics, diseases of the heart are the leading cause of death in the United States, accounting for nearly 30% of all deaths in 2003. Datamonitor predicts that with an ageing and increasingly obese population , this figure is set to increase. In a 2007 report, they described the heart failure market as having a high unmet need, and, in spite of this, reported a weak pipeline for new drugs.

EPDCs will be a useful tool in the development of new drugs. EPCDs will be a useful tool in the development of new drugs and cell transplantation strategies for treating cardiac disease.

Intellectual Property Status

A US patent for this technology has been filed

Further Information

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