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Autologous Stem Cell Therapy for Preventing Organ Transplant Rejection

Category

Organ transplant rejection

Problem

Cardiac transplant recipients have a low survival rate of only 50% at 10 years post-transplant.

Technology Overview

Administration of CD117+ host progenitor cells increases graft survival

IP Status

- Patents Issued in US, Britain, Germany, and France.
- Available for Exclusive or Non-Exclusive Licensing

Value Proposition

- Significantly improves patient survival rate.
- Decreased need for aggressive immunosuppressant therapy after transplant.
- Adverse side-effects not expected, since therapy is autologous cells

Market Attractions

- Rapid development is possible
- 34,000 organ transplants performed in 2016

Contact
Heather Callahan
heather.callahan@ucdenver.edu
Ref# CU2425H

CU Innovations
12635 E. Montview Blvd.
Suite 270, Aurora, CO 80045

t. 303-724-0221
f. 303-724-0816
innovations.ucdenver.edu

Problem: Up to 80% of cardiac transplants suffer an episode of acute rejection within the first year which, if untreated, can lead to graft destruction and death. Current therapies for acute transplant rejection include chemotherapeutic drugs designed to suppress the immune system; however, immunosuppressive therapy has adverse effects such as an increased risk of infection and the spread of malignant cells, hypertension, dyslipidemia, and more. Therefore, an unmet need exists for a therapy that reduces the risk of organ rejection without causing the debilitating side effects associated with standard of care immunosuppressive therapy.

Technical Solution and Key Value Propositions: A research group at the University of Colorado – led by Dr. Todd Grazia, Dr. Martin Zamora, and Mr. Robert Plenter – has developed a method for preventing acute transplant and increasing graft survival. In this method, isolated autologous bone marrow stem cells that express the protein CD117 on their surface are systemically administered at the time of organ transplant. The method allows for potential cytoprotection of the graft parenchyma without attenuation of systemic T-cell populations thus potentially allowing for significant dose reduction of classical immunosuppressives - such as calcineurin inhibitors - to avoid off-target toxicity and global systemic immune suppression.

Studies utilizing these stem cells in a mouse heart transplant model demonstrated significantly improved survival of transplanted hearts – as much as five times that of untreated transplants (Figure 1).

Anticipated benefits of implementing this method include:

- A reduction in the effective dose of immune-suppressants.
- Improved graft survival.
- Fewer complications from patient non-adherence to strict immune-suppressive therapy regimens.

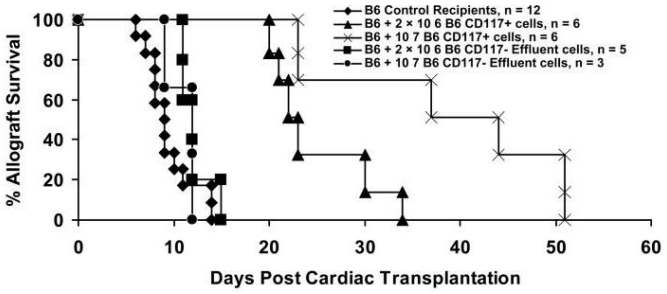

Figure 1. Black 6 mice were injected with 10^7 host CD117+ Progenitor Cells on day +1, and either 2 x 10^6 or 10^7 CD117+ Progenitor Cells on days +5, +9, and +15. Results were compared with a control population of mice receiving injections of CD117-depleted cells from effluent.

Key Documents and Sources:

"Prolongation of Cardiac Allograft Survival by a Novel Population of Autologous CD117+ Bone Marrow-Derived Progenitor Cells", Am J Transplant. 2011 Jan; 11(1): 34–44.

"CD117+ Cells and Uses Thereof" Issued US Patent 9,345,726 and Issued European Patent 2475379

Additional Information: This method may be useful in the treatment of other abnormal immune responses, such as type 1 diabetes.