Priming blood vessel repair cells for improved transplantation success

Mahsa NOURI BARKESTANI

Sara SHAMDANI

Mazdak AFSHAR BAKSHLOO

Nassim AROUCHE

Bijan BAMBAI

Georges UZAN

Sina NASERIAN

Video Byte

Keywords: Cell communication and signaling, Endothelial Progenitor Cells (EPCs), Endothelial Colony Forming Cells (ECFCs), T cells, Immunomodulation, TNF α -TNFR2 signaling pathway, TNF α priming, bone marrow, transplant, immunosuppression, anti-inflammatory, TNFR1, TNFR2, cardiovascular disease

Posted Date: February 25th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-276033/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Bone marrow-derived endothelial progenitor cells, or EPCs, help repair damage to blood vessel walls and can actually be transplanted from healthy donors into patients with cardiovascular disorders. Unfortunately, transplanted EPCs tend to be rejected by host immune cells. Now, researchers have discovered one promising way to prime EPCs for improved acceptance in the body. The method relies on the molecule TNF α , one of the main mediators of EPC activation. TNF α interacts with two receptors, TNFR1 and TNFR2, in opposing ways. While TNF α -TNFR1 signaling provokes inflammation and cell death. TNF α -TNFR2 signaling leads to cell survival, activation, and proliferation. Interestingly, treating EPCs with a small amount of TNF α significantly up-regulated protective TNFR2 expression and increased their immunosuppressive function without increasing the expression of TNFR1 or other molecular markers of injury that typically accompany transplant rejection. The findings suggest that treating EPCs with TNF α could be one way to decrease the chances of transplant rejection boosting the ability of transplanted EPCs to initiate new cell growth and regeneration in damaged blood vessels.