Opinion Article

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The Potential of Muse Cells Derived from Menstrual Blood for Regenerative Medicine

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Description

The field of regenerative medicine has seen a surge in interest surrounding Multilineage Differentiating Stress-Enduring (Muse) cells due to their remarkable properties. Muse cells exhibit exceptional homing capabilities, prolonged viability in adverse conditions, and the ability to differentiate into all three germ layers, surpassing their parent Mesenchymal Stem Cells (MSCs). Among the various sources of Muse cells, human Menstrual Blood-Derived Endometrium Stem Cells (MenSCs) have garnered considerable attention for their abundance, non-invasive collection procedure, and periodic availability. Despite the potential of MenSCs, there has been no established method for isolating Muse cells from MenSCs, and the differences in gene expression profiles between the two cell types remain poorly understood. In this study, researchers aimed to address these gaps by isolating Muse cells from MenSCs using a long-time trypsin incubation method.

Therapeutic applications

The isolated muse cells were characterized by the expression of pluripotency markers and demonstrated multilineage differentia -- tion capacity *in vitro*. Compared to MenSCs, Muse cells exhibited enhanced homing ability and superior therapeutic efficacy in animal models of Acute Liver Injury (ALI) and Intracerebral Hemorrhage (ICH). These findings suggest that Muse cells derived from MenSCs hold great promise for regenerative medicine applications. Furthermore, RNA-seq analysis provided insights into the mechanisms underlying the differences in trypsin resistance and migration ability between Muse and MenSCs cells. This deep dive into the molecular profiles of Muse cells sheds light on their unique properties and potential therapeutic applications. Overall, this research lays a significant foundation for further exploration of cell-based therapies using Muse cells derived from Menstrual blood in various human diseases. The promising results highlight the potential of MenSCs-derived Muse cells in regenerative medicine, offering hope for the development of innovative treatments for a range of conditions. The isolation of Muse cells from MenSCs using the long-time trypsin incubation method represents a significant advancement in the field. By successfully identifying and characterizing Muse cells within the MenSC population, researchers have unlocked a valuable resource for regenerative medicine. One of the key advantages of Muse cells is their ability to express pluripotency markers and differentiate into multiple cell types. This multilineage differentiation potential holds immense therapeutic promise, as it enables Muse cells to contribute to tissue repair and regeneration in various disease conditions. Additionally, their superior homing ability makes them well-suited for targeted delivery to sites of injury or pathology.

Regenerative therapy

The enhanced therapeutic efficacy of Muse cells compared to MenSCs in animal models of acute liver injury and intracerebral hemorrhage underscores their potential clinical utility. Muse cells demonstrated the ability to promote tissue repair and functional recovery in these models, highlighting their effectiveness as a regenerative therapy. Moreover, the RNA-seq analysis provided valuable insights into the molecular mechanisms underlying the unique properties of Muse cells. By elucidating the differences in gene expression profiles between Muse and MenSCs cells, researchers gained a deeper understanding of the biological processes that govern trypsin resistance and migration ability. This knowledge paves the way for further optimization of Muse cell-based therapies and the development of targeted interventions to enhance their therapeutic potential. Overall, this study represents a significant step forward in the field of regenerative medicine. The identification and characterization of Muse cells derived from MenSCs offer new opportunities for the development of innovative cell-based therapies for a range of human diseases. As research in this area continues to advance, Muse cells hold the promise of revolutionizing the treatment landscape and improving outcomes for patients worldwide.