OPEN ACCESS Freely available online

Journal of Cell Science & Therapy

ISSN: 2157-7013

Commentary

Human Mesenchymal Stem Cell Therapy: Challenges and Problems

Jeaan Batutta*

Department of Transplantation Surgery, Mohamed Ben Abdallah University, Fes, Morocco

DESCRIPTION

The possibility of using Mesenchymal Stem Cells (MSC) in autologous transplantation makes them of clinical interest. Many clinical trials with MSCs have been completed, and many more are currently being investigated. More than 2000 individuals got autologous or culture-expanded allogeneic MSCs for the treatment of various diseases, according to recent publications.

MSC treatment was generally extremely effective. But considering the long-term data, the possible risk of MSC transplantation should be taken into account. The data concerning MSC differentiation into specific cell types was supplied by numerous reports from *in vitro* and *in vivo* research. Instead of concentrating on MSC direct differentiation and cell replacement, a growing body of evidence from recent studies strongly suggests focusing on MSC paracrine properties, such as the release of extracellular vesicles containing numerous mRNAs, regulatory miRNAs, multiple bioactive proteins and compounds, and the production and secretion of a large number of regulatory substances.

The primary therapeutic benefits of MSCs are now thought to be the *in vivo* stimulation of a number of endogenous repair mechanisms in damaged tissues by secreted factors as well as the control of immune response, which results in a successful outcome of MSC-based therapies.

The cellular heterogeneity of MSCs is another crucial factor, which makes it challenging to draw conclusions regarding their therapeutic potential because the results are usually inconsistent and may depend on the origin of the MSCs as well as the harvesting and culture techniques.

In addition, because of their complexity, MSCs are a very interesting type of cell to study. MSCs have not yet been given a specific definition, and those that do exist only partially take into account their functional characteristics. Numerous papers examine the biological characteristics of MSCs because of the widespread interest in these cells.

The definition of chemical and overlapping molecular pathways that may be implicated in therapeutic MSC action *in vivo* is the goal of several *in vitro* investigations. In addition to these facts, the outcomes of numerous additional *in vitro* investigations open the door to prospective changes to the *ex vivo* growing environment and MSCs themselves in order to boost their regeneration potential and, as a result, provide superior outcomes in *in vivo* trials.

According to reports, the age, genetic characteristics, and medical background of the donor, in addition to the procedures used for isolation and culture, affect the quality of the human MSC product. The age of a donor appears to be the most crucial element to take into account, therefore autologous transplantation may be limited in some cases. How to increase MSCs from elderly patients to produce a enough quantity of therapeutic cells is a difficult problem.

Furthermore, it is challenging to isolate an efficient population of MSCs from patients with certain diseases such as diabetes, rheumatoid arthritis, and other inflammatory diseases. For autologous reasons (where the patient's own cells may be impacted by the disease), the researchers speculate that these cells may lose their therapeutic function.

We should take immunological features of allogeneic MSC transplantation into account, nevertheless, due to some issues with autologous sources. MSCs have historically been found to have low immunogenic potential *in vitro* due to the low levels of costimulatory molecules, MHC I molecule expression, and MHC II molecule expression. Recent research raises the possibility that MSCs may not be as "immune privileged" as once thought. It was demonstrated that *in vivo*, MSCs are no longer regarded as immunologically silent. Additionally, there are some restrictions on the usage of allogeneic MSCs when risk factors such immunological response are taken into account.

Cardiovascular Diseases (CVDs), which affect the blood vessels and heart tissue as well as the circulatory system, are currently one of the leading causes of death in Western nations. The American College of Cardiology reported that in 2008, CVDs were responsible for almost 17.3 million deaths worldwide, and that number is expected to rise to about 25 million fatalities annually by 2030.

One of the main causes of death in Western countries today is Cardiovascular Disease (CVD), which affects the heart, blood

Correspondence to: Jeaan Batutta, Department of Transplantation Surgery, Mohamed Ben Abdallah University, Fes, Morocco, E-mail: jbbat23@yahoo.com

Received: 28-Mar-2022; Manuscript No. JCEST-22-22901; **Editor assigned:** 01-Apr-2022; Pre-Qc No. JCEST-22-22901 (PQ); **Reviewed:** 15-Apr-2022; Qc No. JCEST-22-22901; **Revised:** 26-Apr-2022, Manuscript No. JCEST-22-22901 (R); **Published:** 03-May-2022, DOI: 10.35248/2157-7013.22.S12.379.

Citation: Batutta J (2022) Human Mesenchymal Stem Cell Therapy:Challenges and Problems. J Cell Sci Therapy.13:379.

vessels, and circulatory system. According to the American College of Cardiology, about 17.3 million deaths globally in 2008 were attributable to CVDs; by 2030, this number is predicted to increase to about 25 million deaths annually.

CONCLUSION

Recent studies have shown that MSC therapy has only modest therapeutic benefits, which raises the possibility that these cells' capacity for direct regeneration may not be as strong as once thought. A well-established and standardized set of optimized methods for MSC extraction and *ex vivo* preparation for clinical application is required since a number of external factors may have a significant impact on the MSC biological properties and ultimately on their therapeutic powers.

In order to prepare MSC-based products for patient therapies that are more effective, a scientific community should make a complete effort to take into account the practical MSC applications in tissue healing. The benefits of MSC applications in tissue repair, such as their safety, relatively wide differentiation capacity, and high paracrine ability including EV release, make these cells an important material for additional research and the development of new methods for cell-based therapies in the future. However, further preclinical and clinical research studies need to be carried out. The effectiveness of cells given to patients as a therapeutic method will be determined by new understanding about MSCs. A significant contribution to stem cell biology generally would also come from more research.