



## Mesenchymal Stem Cell Therapy for Liver Disease

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### DESCRIPTION

Mesenchymal stem cells are multipotent adult stem cells that exist in various tissues, including umbilical cord, bone marrow and fat tissue. Mesenchymal stem cells can self-renew by separating and can divide into multiple tissues including cartilage, bone, muscle and fat cells, and connective tissue. Since MSCs were found to exhibit strong immunoregulatory function, a considerable body of literature has examined the interactions between MSCs and immune cells. It has been commonly known that MSCs use anti-inflammatory effects on several chief immune cells, such as T and B lymphocytes, natural killer cells and dendritic cells, by inhibiting their proliferation and activation while promoting their apoptosis.

Liver disease is a major health issue that imperils human health worldwide. Presently, whole organ allograft transplantation is the gold standard for the cure of end-stage liver disease. A lack of suitable organs, high costs and surgical difficulties limit the application of liver transplantation. Mesenchymal stem cell therapy has been considered as a favourable alternative approach for end-stage liver disease. Some clinical trials have confirmed the usefulness of MSC therapy for liver disease, but its application has not been promoted and permitted. There are still many problems that should be solved prior to using MSC therapy in clinical applications. The types of liver disease that are most appropriate for MSC application should be determined, and the research and engraftment of MSCs should be consistent. These may be blocks that limit the use of MSCs.

With high morbidity and mortality, liver disease represents a major risk to human health. Numerous stimuli, such as viral hepatitis, alcohol abuse, drugs, metabolic diseases, and autoimmune attack, can activate chronic or acute liver injury and inflammation, which leads to liver failure, cirrhosis and associated hepatocellular carcinoma. Orthotopic liver transplantation is the one and only effective treatment for liver

liver cirrhosis and failure. However, the number of suitable donor organs is very rare. Adults on the waiting list for liver transplantation suffer from a death rate of almost 11%. Patients are too weak to wait for appropriate donor organs. In addition, liver transplantation is costly and unavailable for all patients. There is a crucial need to search for a more effective and practicable treatment for patients with liver cirrhosis and liver failure.

At present, cell therapy with hemopoietic cells, hepatocytes, immune cells, mesenchymal stem cells and endothelial progenitor cells has been proposed to be a promising candidate therapy for liver diseases. A huge body of studies examined their advantages and disadvantages. MSCs have been the most promising cells among the cell types, because of many benefits like MSCs can be isolated simply from a large variety of tissues and can be prolonged *in vitro* without changing their properties, MSCs can be inoculated into patients by allogeneic transplantation because of their low immunogenicity. Therefore, we can produce reserves of MSCs that we can give to patients at any time. MSCs contain properties of self-renewal and can differentiate into multiple cell types.

### CONCLUSION

Therefore, MSCs have been used to treat many tissue injuries and immune-related diseases in clinical trials. Among them, bone or cartilage, brain or Nero and immune-related diseases account for almost 50% of all MSC-based clinical trials. For liver diseases, however, both tissue damage and overactivation of inflammation always go hand in hand. Therefore, from every viewpoint, MSCs would be the best candidate for cell therapy of liver diseases. However, there are still many disputes, and any confusion should be determined before MSC application in the clinic.

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