

# Review: The Use of Umbilical Cord Stem Cells as a Form of Treatment

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## Introduction

Stem cells are a type of cells that can self-renew and undergo lineage differentiation – this is what is known as “developmental plasticity”. Once regarded as a waste product, the umbilical cord was found to be a good source of hematopoietic and mesenchymal stem cells in 1974, with the first successful transplantation occurring in 1988.

The use of umbilical cord as a source of hematopoietic stem cells for transplantation has many advantages over other sources of haematopoietic stem cells, namely the bone marrow. Advantages include a larger amount of stem cells per unit volume, decreased risk of transmission of Epstein-Barr virus and cytomegalovirus infections, greater tolerance of Human Leukocyte Antigen (HLA) mismatches and the ability to be stored in a bank.

In this review, we assessed the safety and efficacy of using umbilical cord blood-derived stem cells as treatment for different diseases by looking into some of the latest clinical cases.

## Method

A 26-year-old female suffering from primary systemic lupus erythematosus and secondary Sjögren’s syndrome (Case Study 1); a 56-year-old gentleman with a known case of idiopathic pulmonary fibrosis (Case Study 2); and 34 patients, with ages between 20 and 60 years, suffering from moderate-to-severe atopic dermatitis (Case Study 3) were all treated by transfusions of human umbilical cord-derived mesenchymal stem cells (hUC-MSCs). The patients were then followed up and their progress reported.

## Results

In all the three case studies, treatment with hUC-MSCs was shown to be effective:

In Case Study 1, the patient reported improvements in multi-joint pain and stiffness after 3 months post-treatment. During the same time, the patient was also able to start tapering the anti-inflammatory and immunosuppression drugs she was on before the treatment with the stem cells, which had proved to be of limited efficacy. 8 months post-treatment, the patient had a complete resolution of her symptoms [1].

In Case Study 2, 12 months post-treatment, improvements in the quality of life, physical performance and respiratory parameters (lung-function, 6 MWD and CT fibrosis score) were reported, as well as a substantial reduction in the need of long-term oxygen therapy [2].

In Case Study 3, after 12 weeks of treatment, a dose-dependent therapeutic effect was observed, with improvements being seen both visually and in the EASI, IGA and SCORAD scores [3].

No adverse effect due to the treatment was reported in any of these case studies.

## Conclusion

The studies discussed in this review clearly demonstrate the efficacy and safety of umbilical cord blood-derived stem cells transplantation in the treatment of different diseases. While these studies have their limitations, mainly that the sample size is too small for results to be statistically significant, they are nonetheless important pioneering studies which can form the basis for further research in this field.

## References

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- [3] Kim, H.S., Lee, J.H., Roh, K.H., Jun, H., Kang, K.S. and Kim, T.Y. (2017) Clinical Trial of Human Umbilical Cord Blood-Derived Stem Cells for the Treatment of Moderate-to-Severe Atopic Dermatitis: Phase I/IIa Studies. *Stem Cells*, **35**, 248-255.