



Expanded autologous adipose derived stem cell transplantation for type 2 diabetes mellitus

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Abstract

Introduction: Type 2 diabetes mellitus (T2D) is the most common form of diabetes mellitus, accounting for 90% of diabetes mellitus in patients. At the present time, although T2D can be treated by various drugs and therapies using insulin replacement, reports have shown that complications including microvascular, macrovascular complications and therapy resistance can occur in patients on long term treatment. Stem cell therapy is regarded as a promising therapy for diabetes mellitus, including T2D. The aim of this study was to evaluate the safety and therapeutic effect of expanded autologous adipose derived stem cell (ADSC) transplantation for T2D treatment; the pilot study included 3 patients who were followed for 3 months. **Methods:** The ADSCs were isolated from stromal vascular fractions, harvested from the belly of the patient, and expanded for 21 days per previously published studies. Before transplantation, ADSCs were evaluated for endotoxin, mycoplasma contamination, and karyotype. All patients were transfused with ADSCs at 1-2x10⁶ cells/kg of body weight. Patients were evaluated for criteria related to transplantation safety and therapeutic effects; these included fever, blood glucose level before transplantation of ADSCs, and blood glucose level after transplantation (at 1, 2 and 3 months). **Results:** The results showed that all samples of ADSCs exhibited the MSC phenotype with stable karyotype (2n=46), there was no contamination of mycoplasma, and endotoxin levels were low (<0.25 EU/mL). No adverse effects were detected after 3 months of transplantation. Decreases of blood glucose levels were recorded in all patients. **Conclusion:** The findings from this initial study show that expanded autologous ADSCs may be a promising treatment for T2D.

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