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Transplantation of FLDSC Represented a Potential Therapeutic Approach for Acute Renal Damages

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Purpose : Recently we have isolated and characterized unknown stem cell clones from human fetal liver. These cells named FLDSC (fetal liver-derived stem cell) share gene expressions of MSCs and of ESCs but none of hematopoietic origin. FLDSC proliferated almost indefinitely in vitro and were capable of transdifferentiation. In this study, it is considered if FLDSC could be ameliorating Type 1 diabetes mellitus and renal damages. In alloxan induced diabetic dogs, they have renal damages simultaneously. So, FLDSC was candidated for those disease conditions.

Methods : Diabetes was induced by an IV injection of 70 mg/kg of alloxan monohydrate. 13 female dogs with blood glucose above 400 mg/dL, and significant increase of water intake and urine output on two successive determinations (3 and 7 day after alloxan administration) were included in this experiment for 4 months.

Results : Alloxan induced diabetic dogs (group C) displayed clinical and metabolic abnormalities, maintaining poor health and appetite, progressive body weight loss, weakness and cachexy with significant increase in glucose, blood urea nitrogen and creatinine levels. In contrast, transplantation group (group T) showed no evidence of clinical and metabolic abnormalities, maintaining good health, appetite and body weights, and normal values for water intake, urine output, and blood glucose. Especially the group T showed drastically stabilization of values of blood urea nitrogen and creatinine into normal levels. Despite hyperglycemia, all dogs in the group T demonstrated improvement in all clinical and laboratory parameter even when compared with the group C ($p<0.05$). Compared to normal kidney, the group C showed thickening of glomerula, dilatation of renal tubule and enlargement and bleeding of capillary wall. But the group T showed the changes of kidney organelles were significantly reduced. Group C showed swelling of renal corpuscle that can not differentiate among mesangial cells, epithelial cells and podocytes. Epithelial cell of Bowman's capsule showed slightly damaged wall and widened urinary space. But group T showed that the degree of swelling of renal corpuscle was significantly reduced.

Conclusion : the data support the hypothesis that FLDSC ameliorated acute renal damage. Transplantation of FLDSC represented a potential therapeutic approach for acute renal damages.