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Protective effects of uncultured adipose derived stromal vascular fraction on testicular injury

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Introduction: Torsion-detorsion (T/D) induced testicular injury may lead to male subfertility and even infertility. Stem cell therapy provides an alternative to attenuate testicular injury and promote spermatogenesis. Adipose derived stromal vascular fraction (SVF) can be acquired conveniently without *in vitro* expansion, which may avoid the potential risks of microbial contamination, xenogenic nutritional sources, etc., during cell culture. In this study, we investigate the protective effects of autologous uncultured SVF on testicular injury and spermatogenesis in a rat model of T/D.

Methods: Animals were randomly divided into sham, T/D+ phosphate-buffered saline (PBS) and T/D+SVF groups (eighteen rats in each group). SVF was isolated, labeled with lipophilic fluorochrome chloromethylbenzamido dialkylcarbocyanine (CM-DiI) and transplanted into T/D testis by local injection. At 3, 7, 14 and 28 days after surgery, testicular tissue and serum samples were harvested for histopathological, immunohistochemical, Western blot and enzyme-linked immunosorbent assay.

Results: Histopathological findings demonstrated severe injury in testis with decreased Johnsen's score led by T/D, while uncultured SVF reduced testicular injury and elevated the decreased score. Injected SVF cells were mainly integrated into interstitial region and seminiferous tubules, enhanced the secretion of basic fibroblast growth factor and stem cell factor in testis, contributed to the declining level of malondialdehyde and restoration of hormonal homeostasis and then reduced the injury of Leydig cells and germ cells, as well as promoting spermatogenesis.

Conclusion: Our findings demonstrated that autologous uncultured SVF could protect testis from testicular I/R injury and promote spermatogenesis, which provide significant clinical implications for the prevention of infertility induced by testicular T/D.

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