



Short Article

Stem Cell Congress 2018: Application of clinical grade hUC-MSCs in the treatment of uterine scars in rats - Shuzhen Wu and Xin Luo - Southern Medical University, China

Shuzhen Wu and Xin Luo

Southern Medical University, China, E-mail: szwu041@126.com

Abstract

Full thickness injuries of the uterus may trigger uterine scar formation after cesarean section, ultimately leading to a variety of obstetrical complications or infertility. The main mechanisms of uterine scar formation involved in acute or chronic inflammatory response, collagen deposition and muscle fiber regeneration. Now-a-days, few methods have adequately solved these problems. Human umbilical cord derived mesenchymal stem cells (hUC-MSCs) have excellent function in immune regulation, tissue regeneration and functional reconstruction and have shown great promise in clinical applications. The objective of this study was to investigate the effect of hUC-MSCs construct on inflammation regulation, collagen degradation and functional regeneration in rat uterine scars following full thickness excision of uterine walls. In our research, the clinical grade hUC-MSCs would be prepared strictly following the international standards of the International Society for Stem Cell Research (ISSCR).

In order to establish a rat model of uterine scars, a 2.0 cm in length, full thickness incision of uterine walls was performed around 0.5 cm from each uterine horn. A total of 100 rats were randomly assigned to five groups, including a normal group (n = 20), eutocia group (n = 20), cesarean group (n = 20), control group (saline n = 20) and hUC-MSCs group (n = 20) to investigate the effect of clinical grade hUC-MSCs treatments on the structure and function of uterine scars. Saline or hUC-MSCs were injected surrounding each uterine scar, respectively. At days 15, 30, 60 and 90 post-transplantation, the superparamagnetic iron oxide nanoparticles (SPIONs) labeled hUC-MSCs were detected and traced in vitro by MRI. The planting, distribution and migration of hUC-MSCs in uterine scar were dynamically detected by MRI and fluorescence tracing of the living image of a small animal. Haematoxylin eosin staining, Masson's trichrome staining, immunofluorescence staining, western blot and real-time PCR for collagen, matrix metallo proteinases, inflammatory factors, chemokine, bFGF, PDGF-BB and VEGF were performed. We would like to find out the value of hUC-MSCs according to the research mechanism.