Секция «Тезисы на английском языке»

The Application of a Novel Biomaterial Based on the Secreted Products of Human Mesenchymal Stromal Cells for Spermatogenesis Restoration in the Model of Experimental Cryptorchidism

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Couple infertility is a severe social and medical problem and it is often caused by male infertility. Development of novel approaches to recover spermatogenesis is actual due to the lack of effective therapeutic instruments. Multipotent mesenchymal stromal cells (MSC) can be the promising instrument to restore spermatogenesis. MSC play crucial role in reparation and regeneration processes in an organism as they secrete many biological factors activating endogenous tissue-specific stem and progenitor cells. MSC secrete a wide spectrum of growth factors and cytokines crucial for viability maintenance of spermatogenic stem cells and supporting cells (Leydig and Sertoli cells). Hence, the development of novel instruments based on MSC secreted products to recover spermatogenesis is an important task. To enhance clinical efficacy of these products it is necessary to provide optimal delivery and release of secreted active factors. The development of combined biomaterial based on human MSC secreted products for spermatogenesis recovery was the aim of our study.

We showed that biomaterial based on concentrated MSC secreted products combined with collagen gel stimulated spermatogenesis restoration on the model of rat experimental cryptorchidism. Sub-perididymal material administration led to decrease of hypotrophy of cryptorchidic testicles and stimulated spermatogenesis by increase of both total and moving spermatozoa count. By the use of histologic analysis we found the decrease of number of sclerous/atrophic seminiferous tubules and increased recovery of Sertoli and Leydig cells after an injection of biomaterial based on concentrated MSC secreted products compared with collagen injection alone and untreated animals. The injection of biomaterial based on concentrated MSC secreted products demonstrated superior spermatogenesis recovery efficacy compared with biomaterial with non-concentrated medium, and these effects were similar to effects of direct sup-epididymal adipose-derived MSC injection. Thus, the use of combined biomaterial based on concentrated MSC secreted products can be the promising instrument for spermatogenesis recovery. Furthermore, this therapeutic approach can be even more preferable than direct cell therapy as it helps to overcome ethical limitations and clinical risks.

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