Stem cells therapy in infertility

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Foreword. Worldwide, infertility affects 8-12% of couples of reproductive ages. In recent years, stem-cell therapy raised new hope in the field of reproductive disability management. Infertility is a major health problem, and the data presented in this review suggest that the treatment of infertility with stem cells seems to be plausible, because some types of treatments have already been tested in humans, achieving live births, while others show great potential only in animal studies.
Material and methods. Was provided scientific research of the preclinical and clinical studies for the last 15 years in order to determine the effects of stem cell-based therapy in the treatment of infertility. Articles were selected from the PubMed, Scopus, and ScienceDirect databases.
Results. Studies using the experimental model have shown that stem cell therapy for infertility treatment gives positive results. The main types of used stem cells are embryonic stem cells (ESCs), mesenchymal stem cells (MSCs), spermatogonia stem cells (SSCs), and induced-pluripotent stem cells (iPSCs).
ESCs can produce germ cells and thereby treat infertility. ESC-derived PGCs are susceptible to ethical controversy because the process involves the destruction of human embryo. Sperm/oocyte-like cells can now be produced from embryonic stem cells. SSC transplantation is presented as a novel and promising strategy, based on the premise of spermatogenesis and stem cell self-renewal. SSCs are responsible for the continuous production of male sperm. This technology can also be used to treat human infertility and does not cause ethical or immune problems. These results strongly suggest that SSC transplantation can be a successful treatment for male infertility caused by premature chemotherapy. Some studies have recently reported that both human iPSCs can differentiate into male germ cells. Functional tests showed that sperm produced by iPSCs were able to fertilize oocytes after intra-cytoplasmic injection and generate fertile offspring after embryo transfer. Ovarian failure is inevitable with age. In addition, injecting BM stem cells can stimulate ovarian function, restore normal ovaries and hormone levels, and possibly allow pregnancy.
Conclusion. Several aspects of stem cell therapy remain unexplored. Thus, vast untapped potential still exists regarding applications in treating diseases such as infertility. We are confident that science will be able to cure infertility once the right approach is found. The reason for great promise is that stem cell treatment can be utilized on many different levels, from direct transplantation of stem cells, or their paracrine factors into reproductive organs, to in vitro differentiation into germ cells or gametes.
Keyword: Infertility; stem cells; fertilization; infertility treatment.

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