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## Functional germ cells from mesenchymal stem cells: A dream or reality

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Here we describe our three different research experiences in the field of generation of male germ cells (GCs) from mesenchymal stem cells (MSCs). In the first research, ram bone marrow (BM)-MSCs, were induced to differentiate into male GCs by different methods; treatment with different concentrations of retinoic acid (RA) for 14 and 21 days, 100 ng/ml BMP4 and BMP8b and also 10 ng/ml TGFb1, all for 21 days (all in separate groups). Results showed that, the most efficient methods were 21 days treatment with 10 µM RA and 10 ng/ml TGFb1. Transplantation of the induced GCs into testes revealed that, after 2 months, although, a number of cells could home in the seminiferous tubules, they could not differentiate farther from spermatogonia state. In the second study, we evaluated the potency of intact autologous rat BM-MSCs for regeneration of testis germinal epithelium after induction of infertility with busulfan injection. Evaluations after 4, 6 and 8 weeks showed that a number of BM-MSCs was located in the germinal epithelium and expressed spermatogonia specific markers. In our third study, we treated mouse amniotic membrane MSCs with 50 ng/ml BMP4 for 5 days and immediately with 10 µM RA for 12 days. Eventually, there were some germ-like cells in the culture. Finally, although, in all of our experiments, a number of treated cells differentiated into the GCs, the efficiency was very poor. It seems it is still too soon to have developed functional GCs from MSCs *in vitro*.

### Biography

Mohammad Ghasemzadeh-Hasankolaei has graduated in Veterinary Medicine in 2005 and joined PhD program in Veterinary Reproductive Sciences in 2006; simultaneously, he started his studies on stem cells at Royan Institute, Iran. He has published a number of papers in the field of stem cells and germ cells. He is working as an Assistant Professor at Babol University of Medical Sciences, Iran since 3 years. He has founded the "Stem Cells Research Lab." in the "Infertility and Reproductive Health Research Center" of the university in 2013.

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