



Information for research project

Call: Competition for financial support of basic research projects – 2021
Main scientific area: Biological sciences
Contract No:
Initial date and duration of the project:
Project title: Effect of mesenchymal stem cells of non-ovarian origin on functionally uncompromised and damaged human granulosa cells
Research organization: Institute of Biology and Immunology of Reproduction, Bulgarian Academy of Sciences
Partner organizations:
Principle investigator: Associate Professor, PhD, Ivan Miladinov Bochev



Abstract of the research project

Premature ovarian failure (POR) is one of the main causes of female infertility, for which there is still no treatment that can lead to a real recovery (or partially positive effect) of the normal ovarian function. Autologous heterotopic mesenchymal stem cell (MSC) transplantation is considered as a promising therapeutic approach. Encouraging data have been published from several clinical trials about the restoration of the menstrual cycle with subsequent successful pregnancy after MSC application in patients with premature ovarian failure. Based on these initial clinical data, as well as on the well-known and scientifically proven properties of MSC, it is logical and reasonable to assume they have a regulatory activity on somatic ovarian cell elements controlling the processes of folliculogenesis and oogenesis.

The main goal of the project is a detailed study of the effect that mesenchymal stem cells have on the growth and function of human granulosa cells; the conditions under which this influence occurs, as well as the mechanisms determining the implementation of their modulating activity. The work program envisages optimization of the methods and conditions for isolation and in vitro cultivation of human granulosa cells, followed by their phenotypic and functional characterization. Changes in the growth, vitality, and function of granulosa cells occurring after culture under stress conditions (inflammation and hypoxia) will be studied. The main focus of the study will be the influence of human bone marrow mesenchymal stem cells on the growth, vitality, and steroidogenesis of granulosa cells, cultured under both optimal and stress conditions.

Confirmation of the modulation effect of MSC on the growth and function of granulosa cells will contribute to a better understanding of the complex processes and intercellular signaling interactions involved in the regulation of folliculogenesis and ovogenesis. Moreover, this fact will be a scientific justification for the reports of the successful recovery of ovarian function after heterotopic transplantation of autologous MSC in women with premature ovarian failure.