

To determine the ability of polysaccharides to stimulate the phagocytic activity of neutrophils was used "phagocytic test." As the test culture used in bacterial culture of *Staphylococcus aureus*.

It is established that in the experiment in vitro antipolysaccharide obtained from submerged mycelium of *S. commune*, actively stimulate the phagocytic activity of neutrophils against *S. aureus* at a concentration over 100 mcg/ml. Lower concentrations (1 and 10 µg/ml) also affect the intensity of phagocytosis, but differences from control were not statistically significant.

As well as antipolysaccharide, extracellular polysaccharides are synthesized by the fungus in a culture medium, have a stimulating effect on the intensity of phagocytosis. A statistically significant increase in phagocyte numbers compared to control was obtained for both fractions of exopolysaccharides also at a concentration of 100 µg/ml.

Thus, the studied mushroom polysaccharides in composition and physico-chemical properties similar to the polysaccharides known medicinal mushrooms, which will allow the development of powerful new functional products based on mycelium, medicinal mushroom extracts and their compositions.

## ASSESSMENT OF ANTIPROLIFERATIVE EFFECT OF BONE MARROW MONONUCLEAR CELLS

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Immunosuppressive and immunomodulatory effects of MSC allow us to consider these cells as a means for the therapy of autoimmune diseases, they are also used to ensure immune tolerance in organ transplantation and to overcome pathological inflammatory processes. However, the features of obtaining and culturing MSC limit the possibility of their use for the treatment of acute inflammatory conditions. An alternative to the MSCs are unfractionated bone marrow mononuclear cells (BMMCs). BMMCs are a heterogeneous cell population, including: hematopoietic stem cells, MSC, various types of progenitor cells. Preparation of BMMC for transplantation takes several hours and does not require precultivation. Transplanted BMMC are known to migrate to the lesion site, secrete cytokines and trophic factors such as vascular endothelial growth factor (VEGF), fibroblast growth factor (FGF), which are involved in the process of neovascularization of tissue and improve the oxygen supply of tissue.

**Keywords:** bone marrow mononuclear cells, cell therapy, acute ischemic nephropathy, mesenchymal stem cells.

21 laboratory rats of the Wistar line, female, body weight 260 (200–335) g and freshly isolated uncultivated BMMC and MSC cultures were chosen to be the materials for the research. The animals were divided into 2 groups: control (n=10) and experimental (n=11) with acute ischemic neuropathy. All cell suspensions at a concentration of  $1 \times 10^7$  cells / ml were painted with 7 µM 5- (and-6) -carboxyfluorescein diacetate succinimidyl ester (CFSE, Fluka, Slovakia). Splenocytes were cultured at a concentration of  $2 \times 10^5$  cells / well in medium with the 1 µg / ml concanavalin A (Con A, Sigma, Germany) in the presence of MSC or freshly isolated BMMC or in their absence for 4 days at 37 C in an atmosphere with 5 % content of CO<sub>2</sub>. The results of cell proliferation were performed by flow cytometer FC 500 (Beckman Coulter, Germany). To characterize the inhibitory effect of MSC on the splenocytes proliferation the formula for calculating the coefficient suppression (CS) was proposed:

$$CS = \frac{P_{SP+MSC/BMMC} \cdot 100}{P_{SP}}$$

where  $P_{SP+MCC/BMMC}$  – the number of proliferating splenocytes stimulated by mitogen, in the co-culture with MSC or BMMC, %;  $P_{SP}$  – the amount of proliferating splenocytes stimulated by mitogen, %. The comparison of two groups and the determination of the statistical significance of the differences were carried out using the non-parametric Wilcoxon test (in the case of dependent variables) and the Mann-Whitney test (in the case of independent variables). The differences were considered significant at  $p < 0.05$ . The results were presented in the form of a median (25<sup>th</sup>–75th percentile) [1].

In the control group statistically significant differences in the number of proliferating cells in the presence of MSC and BMMC in the above cultures were absent. In the experimental group, the number of splenocytes proliferating in response to ConA were not statistically significantly different from the control group ( $p > 0,05$ ), the medians in the groups were 57,1 % ( $35,4 \div 88,3$ ) and 58,4 % ( $47,6 \div 77,1$ ), respectively. A statistically significant decrease of splenocytes mitogen-induced proliferation in co-cultures with both MSC 28,8 % ( $9,9 \div 47,4$ ) and BMMC 30,7 % ( $3,0 \div 52,8$ ) was observed. So the suppression coefficients ranged from 8,7 to 94,2. In the control group CS of MSC-induced suppression was 64,9 % and BMMC-induced suppression was 42,5 % ( $p > 0,05$ ). In the experimental group CS of splenocytes ConA-stimulated proliferation in the co-culture with BMMC was 60,3 % ( $17,1 \div 89,9$ ) and did not statistically significantly differ from CS MSC-induced suppression of 55,2 % ( $44,5 \div 58,2$ ).

To conclude, BMMC have an immunosuppressive effect comparable to the effect of mesenchymal stem cells. This suggests the possibility of using BMMC in the treatment of acute inflammatory conditions.

## BIBLIOGRAPHY

1. *Zafranskaya, M. M.* Influence of bone marrow mononuclear cells and mesenchymal stem cells on the proliferation of rats splenocytes in vitro / *Zafranskaya M. M. et al. // News of the National Academy of Sciences of Belarus. – 2015. – № 4. – P. 32–33.*

2. *Zafranskaya, M. M.* In vitro assessment of mesenchymal stem cells immunosuppressive potential in multiple sclerosis patients / *Zafranskaya M. M., Nizheharodova D. B., Yurkevich M. Y // Immunol. Lett. – 2013. – P. 9–18.*

## THE HEALTH OF CHILDREN BORN AS A RESULT OF ASSISTED REPRODUCTIVE TECHNOLOGY

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A research has been made of the causes of infertility of couples and the health of their newborn children. It has been found that the use of Assisted Reproductive Technologies does not always favorably affect newborns.

**Keywords:** assisted reproductive technologies, in vitro fertilization, intracytoplasmic injection.

Real opportunities to manage the processes of human reproduction with the use of assisted reproductive technologies (ART), which are one of the variants of population reproduction, have appeared [1].

The success of ART methods largely depends not that much on the technical difficulties and thoroughness of performing microsurgical manipulations as on the health of the pregnant woman and the primary causes of infertility, as well as on the number of implanted embryos [2].

In the course of this research, IVF and ICSI programs, the health of couples with infertility, as well as the health of their newborn children have been studied.

It has been found that the risk factors for reproductive health disorders in women are: age, tubular peritoneal factor 20,5 %, endocrine infertility 11,7 %, endometriosis 26,4 %, PCOS 15,7 %.

Infertility factors in men are: oligospermia 20,0 %, asthenospermia 36,0 %, teratospermia 28,0 %, azoospermia 16,0 %.

When studying the state of newborns in the IVF group, it was found that 32,0 % of children had a delay in intrauterine development, 45,0 % had asphyxia, and 3,6 % had developmental abnormalities. The course of the neonatal period was complicated by a post-hypoxic condition of 29,1 % and infectious pathology in 12,0 %.

When studying the state of newborns of the ICSI group, it was found that 35,4 % of children had a delay in intrauterine development, 68,0 % had asphyxia, and 6,4 % had large developmental abnormalities. The course of the neonatal period was complicated by a posthypoxic condition of 22,5 % and infectious pathology in 25,8 %.

A comparative assessment of the state of newborn of ECO and ICSI has revealed that the number of newborn ICSI children with asphyxiation was higher than that of newborn ECO children (68,0 % and 45,4 %, respectively); ( $X^2 = 0,0323$ ,  $p < 0,05$  Pirsan correlation analysis with Yates corrections).

The children of the ICSI group have more developmental anomalies than in the IVF group (6,4 % and 3,6 %, respectively); ( $X^2 = 0,0211$ ,  $p < 0,05$  Pirsan correlation analysis with Yates correction). Infectious pathology in the neonatal period in children ICSI was diagnosed more often than in children with IVF (25,8 % and 12,0 %, respectively); ( $X^2 = 0,0222$ ,  $p < 0,05$ , the Pearson correlation analysis with the Yates correction).