

Thus, all five materials studied had the cytotoxicity, which caused the death of no more than 30 % of the cells. When MSC were cultured with "Osteomatrix", "Collapan granules" and "Lyostipte" the lowest toxicity of these materials in relation to the cells was revealed.

While increasing the cultivation period up to 7 days, cells adapted and started to proliferate under experimental conditions, both at culturing with supernatants and in the direct contact with materials.

Therefore, the studied biocomposite materials have an inconciderable toxicity in relation to human mesenchymal stromal cells in vitro and can be used as a bone replacement matrix in spondylosyndesis.

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### CHARACTERIZATION OF BIOCHEMICAL PROPERTIES AND BIOLOGICAL ACTIVITY OF COMPOUNDS OF A CARBOHYDRATE NATURE OF SOME OF BASIDIOMYCETES

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**N. Isakova, N. Ikonnikova**

*Belarusian State University, ISEI BSU,  
Minsk, Republic of Belarus  
natanatasha10@mail.ru*

The study of physico-chemical and biological properties of polysaccharides of basidiomycetes is the basis for the development of new therapeutic and prophylactic preparations. Biological action of medicinal mushrooms is largely determined polysaccharides.

*Keywords:* fungoterapy, basidiomycetous fungi, macromycetes, polysaccharides, phagocytic activity.

Traditional use of mushrooms for medical purposes has developed into a new close to medicine branch called fungoterapy. In the composition of mushrooms contain biologically active polysaccharides lentinan, lanostane, hantaran, lanofil, grifolan, which affect the human body much softer than the synthetic means, it is better tolerated and usually do not possess cumulative properties. Preparations based on mushrooms are characterized by a wide spectrum of biological activity: immunostimulate, antitumor, antioxidant, hepatoprotective, antimicrobial, etc.

Many species of wood-destroying fungi of the class Basidiomycetes are enough to grow well in artificial culture methods. Of particular interest are the representatives of the genera *Schizophyllum*, *Trametes* and *Herichium*.

Melanistic ordinary (*Schizophyllum commune*) has antitumor, antimicrobial, anti-inflammatory and antiviral properties. Melanistic recently attracted the attention of specialists of the pharmaceutical industry.

The prickly herichium (*Herichium erinaceus*) has antitumor activity, helps in chronic gastritis, ulcer and cancer of stomach and esophagus, chronic bronchitis, used to treat Alzheimer's disease, because it has the ability to repair the nerve cells.

*Coriolus multicolored* (*Trametes versicolor*) contain antibiotic and anti-cancer substances, strengthens the immune system, has antiviral, antibacterial properties, antioxidant. This fungus is used in various chronic diseases.

We used the fungi belonging to the division Basidiomycota, class Basidiomycetes, genera *Schizophyllum*, *Herichium*, *Trametes*.

Deep mushroom mycelium was grown in Erlenmeyer flasks on rocking (180 rpm) on the following media: glucose-peptone, the beer wort (70 Balling), whey. As inoculum used culture daily 10–12 mushrooms, grown deep in the beer wort. After the cultivation, the mycelium was separated from culture liquid by filtration through a thick cloth, was washed with distilled water and used to carry out the relevant tests.

The content of total protein in *S. commune*, *H. erinaceus* и *T. versicolor* ranged from 15,0 to 22,4 %, respectively, of the polysaccharides from 11,8 to 22,0 %, lipids – from 3,1 to 4,4 %.

The study of the carbohydrate composition of polysaccharides showed that they all were heteroglycans. In most of the polysaccharides was dominated by glucose (75,3–91,1 %), was also attended by galactose (5,6–13,4 %) and mannose (4,5 to 17,8 percent).

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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**U. Ivut<sup>1</sup>, M. Zafranskaya<sup>1</sup>, T. Kandratovich<sup>2</sup>**

*<sup>1</sup>Belarusian State University, ISEI BSU,  
Minsk, Republic of Belarus*

*<sup>2</sup>Belarusian Medical Academy of Postgraduate Education,  
Minsk, Republic of Belarus  
ivuts.ulyana@gmail.com*

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].