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DEVELOPMENT OF INNOVATION METHODS BY THE AFFECTION AT EXTREME IMPACT ON THE BASIS OF LASER, NUCLEAR AND BIOLOGICAL TECHNOLOGIES

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For new method efficiency monitoring we have compare it with other protection methods from viruses, toxins and radiation effects.

It is known that different intensity stress- factors are able to neglect the protective mechanisms in the human's body. For example - cross-adaptation and cross-protection. These processes are activating innate immune receptors. (TLR) to activate TLR there is used:

- Microbial lipopolysaccharide - structural components of bacterial cell wall. Increase resistance to infection. But in practice it is rarely used alone because of its high toxicity.
- Extracellular heat shock proteins (BSHT70) - is an active protein when the heat is exposed to it. It activates universal protective mechanisms against lethal infections, toxic and radiation damage.

Modified MPLS (this reduces toxicity) and activated BSHT70 are taken from food yeast and are used for new generation vaccines creation . MPLS and BSHT70 modification and activation are carried out with the help of laser with its power from 10 W to 15 kW, and neutrons with energy of at least 190 keV.

Experiments

In order to test the resistance theory to various influences in the combined preparation use of the modified MPLS and activated BSHT70 there were conducted series of experiments:

- Antiviral protection

There were used mice for the experiment conduction. The mice were infected a lethal kind of influenza virus (H3N2). In result there was revealed a MPLS and

BSHT70 protective effect when MPLS and BSHT70 were used together and individually for 1 hour and 14 days before the infection. The graph shows that the greatest effect was in their joint application of up to 14 days before infection. It turns out that MPLS and BSHT70 have a directly protective effect and can strengthen the immune system.

- Protection under the toxic substances influence

To conduct this experiment the experimental mice breathe phosgene, which was the main cause of the lungs swelling and almost one hundred percent fatal. Introduction MPLS and BSHT70 has increased mice survival by 5-6 times. It is quite clear from the experimental results which are given in the table. It turns out that the MPLS and BSHT70 application has an anti-inflammatory effect.

- Radiation protection

In this experiment, the experimental mice were irradiated with gamma radiation. The total gamma irradiation was 10 gr. (1000 rad.). As the figure shows that mice get the MPLS for 30 minutes before irradiation survival was 72% , with HSP70 - 61%. If the experimental mice obtained BSHT70 and MPLS together survival rate was 93%. Mice without the irradiated vaccine were completely dead. As a result of the experiments it was found out that the combined MPLS and BSHT70 use prevents immune disorders increases organism's survival rate and life expectancy.

Also, the use of activated BSHT70 can increase the organism's endurance. This was revealed in an experiment in which mice were subjected to extreme physical stress in the form of running on the treadmill. BSHT70 application increased mice performance by almost 26%.

Now it's necessary compare MPLS and BSHT70 with other methods of protection:

For the viruses protection efficient demonstration we also applied two drugs: rimantadine hydrochloride and oseltamivir phosphate. They were inputted for 4 hours before the infection and for 5 days after infection. Results are given in the table. The survival rate was 0% with the infection in fatal doses. Average life expectancy is equal 4 days. However, with joint use of MPLS and BSHT70 the survival rate was 80%.

The protection efficiency from toxins we can see when there was compared the N-acetylcysteine upon exposure phosgene. The survival rate is 52%, but upon MPLS exposure it is equal 55% and upon BSHT exposure is 70-65%

For the radiation protection comparison there were taken the experiment results upon the Mentha Piperita Linn exposure. In the experiment the mice were irradiated with the gamma-irradiation of 8 gr. The drug enlarged a life time , but it didn't prevent the further mice death. For 20 days the 50% of mice were dead, for 50 days-100%. However, with MPLS and BSHT use the survival rate was 93%.

Joint and individual BSHT 70 and MPLS application can show excellent results for protection from viruses, toxins and radiation. Preclinical test results on animals has showed a high efficiency of the innovation protection methods.

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METHODS FOR RECYCLING OF SOLID PRECIPITATE

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Silt (pulp) is dense, water-insoluble component, which is deposited on the bottom of the tank and forms a thick layer with variable consistency. Exactly pulp is the most complex substance for recycling and disposal. The complexity is that it is difficult to dissolve because it consists from Al and SiO_2 .The pulp recycling is necessary for the safe liquid high-level radioactive waste storage.
There are three kinds of pulp layer: the upper movable layer; intermediate layer of an inactive (plastic) the pulp. Hydroaluminate solid precipitate is a key pulp's component. There are some kinds of the pulp's recycling: traditional method and method which is based on the cavitation-activated water.
The first is traditional pulp recycling method.

This includes three experimens. At the end of each experiment, the residue of the solid phase was dissolved in concentrated nitric acid. Acid contained 10 g/l of ammonium fluoride and 10 g/l of hydrogen peroxide at a temperature of 95 C. Then the solution was intensively mixed with the compressed air. The experiments were carried out alternately: at the conclusion of the first experiment there immediately was started the next one. Such experiments sequence was allowed to do the correct pulp's processing modes in the subsequent experiments.

In the first experiment the pulp was processed with a concentrated nitric acid solution. Acid contained 10 g/l of ammonium fluoride and 10 g/l of hydrogen peroxide.

In the second experiment the pulp was processed with the solution, which contained 200 g/l of sodium hydroxide.

In the third experiment for the destruction of the structure of the porous layer of the solid phase and its dissolution it was alternatingly processed with a solution,