Therefore, the best intensity of bioluminescence of bacteria was observed at a temperature of +4°C in a polypropylene container, which was 50% filled with a mixture of *P. phosphoreum* IMV B-7071 in 3% NaCl solution and the concentration of the gel composition D (70% EPAA + 30% EPS) which was 2% in the ratio of 1:1. In addition, the preservation in the proposed concentration of the gel composition D of the bioluminescent activity of *P. phosphoreum* IMV B-7071 used in microbial biosensors, allows prolonging the term of use of the receptor element to 40 days. So, gel compositions based on natural xanthan and a copolymer based on its EPAA (EPAA-M) are promising components for improving the properties of microbial bioformulations by extending their shelf life and the stability of individual biosynthetic properties, for example, increasing the intensity of bacterial bioluminescent over time.

Conclusions. Studies have shown that the use of aluminium hydroxide and calcium phosphate reduces the total luminosity of bacteria in the medium to 20–70%. These results correlate with the data we obtained according to which the glow of *P. phosphoreum* IMV B-7071 on steel and aluminium is a much less intense and longer process compared to a similar process on glass and polypropylene.

It is known that biolumiscence is a kind of form of energy release in oxidative processes. The stronger the flow of oxygen, the stronger the glow of bacteria. This explains in our opinion the fact that 100% filled vials have a worse glow intensity *Photobacterium phosphoreum* B-7071 compared to similar filled 50% where there is access to oxygen.

Thus, the results of previous studies and ours data support the effectiveness of the use of gel compositions containing EPAA-M and EPS for the development of gel forms of microbial bioformulations.

CREATION OF VACCINES TO PREVENT HEPATITIS C

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Hepatitis C virus (HCV) is a global healthcare problem. The World Health Organization (WHO) estimates that 58 million people, about 1% of the world's population, are living with the disease, with approximately 40% of people unaware of their infection status. There are approximately 1.5 million new cases of infection each year. Among HCV carriers, 75–85% are likely to have chronic infection; in the remaining 20%, the virus is detected spontaneously. Among chronic carriers, 5–20% develop cirrhosis, with the likelihood of developing hepatocellular carcinoma or end-stage liver disease being up to 25%.

Over the past decade, HCV treatment has changed significantly. After 2014, a second generation of direct-acting drugs became available for the treatment of HCV,

which dramatically increased the cure rate to more than 95%. In this regard, in 2016, WHO set a goal of reducing the rate of new cases of HCV infection by 90% by 2030, and the ultimate goal is the complete elimination of HCV.

Although treatment with direct-acting antivirals against HCV is highly effective, it is unlikely that the virus will be completely controlled without a prophylactic vaccine. Therefore, the development of a safe and effective vaccine to prevent HCV remains a top global health priority.

Vaccine development is a long and complex process that often requires years of research and testing before it is approved for human use.

The difficulty in creating a vaccine to prevent HCV is determined by the high genetic diversity of the virus. As of December 29, 2023, HCV is classified into 8 genotypes and 93 subtypes, which significantly complicates the creation of a universal vaccine. The difference between genotypes, mutagenicity, multiple mechanisms of HCV persistence, combined with the relatively weak immune response of the infected host against the virus, remain important factors when considering treatment regimens and when creating vaccines. In addition, the lack of reliable and convenient model systems (both in vitro and in vivo) further complicates the development of an effective vaccine. In vivo studies can only be replicated in chimpanzees because their infection is similar to that in humans. Nevertheless, ethical and financial concerns limit medical research with these animals. Therefore, classical approaches to vaccine development (live attenuated or whole inactivated) are not applicable to HCV.

Trials to develop a vaccine against hepatitis C began in the early nineties using viral vectors to induce viral proteins (glycoproteins) that can stimulate the immune system to mount a T-cell response against HCV. However, the first preventive vaccines developed did not reach phase III of development.

The development of current vaccine candidates for the prevention of HCV uses a variety of strategies to elicit an immune response. These strategies include many combinations of proteins (structural and nonstructural proteins): use of neutralizing antibodies (nAbs) that target E1/E2 envelope proteins, induction of T cell responses against core protein or nonstructural proteins (alone or in combinations), use of peptides, development of multi-epitope proteins using various technologies such as RNA interference and nanotechnology. There is another direction - the creation of a bivalent vaccine to prevent both hepatitis B and C simultaneously (HepVax² - University of Tours, France). The project is still at the stage of laboratory research. This method has significant potential for patients at increased risk of developing both diseases simultaneously. Some authors are considering the use of new vaccination platforms such as mRNA and viral vector technologies.

Additionally, when developing a vaccine candidate, it is critical to explore individual vaccination strategies specifically designed to target specific HCV genotypes or subtypes that are widespread in different geographic regions. For example, Uvax Bio's vaccine candidate targets structural proteins of common viral subtypes in the United States (in phase 1 research).

Modern etiotropic antiviral drugs are quite effective but, unfortunately, expensive, and in many countries, especially with low economic standards of living, inaccessible to the general population. Therefore, the creation of an effective vaccine aimed at overcoming the huge diversity of HCV must induce a broad immune response capable of responding to numerous variations and building immunity in the population, especially from risk groups. Only an integrated approach - effective prevention, improvement of diagnostic and treatment methods will contribute to the implementation of the program for the complete elimination of HCV.

CLINICAL LABORATORY JUSTIFICATION OF LYMPHOTROPIC ANTIBIOTIC THERAPY IN CRANIO-BRAIN INJURY

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Despite the large-scale efforts of specialists, the problem of effective treatment of infectious complications in patients in intensive care units still remains acute throughout the world [10,12,18,19]. Patients with traumatic brain injury are especially at high risk of infectious complications (TBI) [2,14], and according to some authors, up to 73% of cases, complicating the course of the acute period of TBI and increasing the length of stay in the intensive care unit and hospital [1,3,18].

The frequency of infectious complications in patients with TBI is due to prolonged immobility, immunosuppression, and neurodystrophic syndrome, which increases the risk of nasocomial infections [2,11,17].

In addition to the fact that the intestinal microbiota is extremely vulnerable to antibiotic therapy. The eradication of a specific spectrum of microorganisms indirectly leads to a reduction in the number of microbiome representatives responsible for the disposal of toxic fermentation products of other microorganisms [16,20].

The proven relationship between critical condition and changes in the morphology and microbiocenosis of the intestine in neurosurgical patients justifies the need to continue research aimed at developing a strategy for their treatment, including the prevention of secondary damage to the brain and other body systems and, first of all, issues of rational antibiotic therapy [7,9].

It is also important to note that the problem of secondary infection and infectious complications in TBI is especially relevant in cases of prolonged comatose state of victims. No less significant is the issue of antimicrobial therapy of nosocomial meningitis (NM) due to the special anatomy of the brain, the difficulty of delivering drugs to the site of infection [5 ,6,13,15].

Unfortunately, traditional methods of administering antibiotics (intramuscular, intravenous, intraperitoneal, etc.) do not provide therapeutic concentrations in the lymphatic system. This requires frequent repeated injections of antibiotics, which is