Interferons: an experimental study of informational mechanisms of antiviral action

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Interferons (IFNs) belong to the group of cytokines and are proteins of a globulin nature, which are multifunctional bioregulators of a wide spectrum of action. IFNs have antiviral, immunomodulatory, antiproliferative and antitumor effects.

IFN, interacting with specific receptors on the cell surface, initiate a cascade of reactions for the synthesis of specific cytokines and enzymes, leading to a disruption in the synthesis of viral proteins and RNA in the cell, which underlies the development of antiviral defense of the cell. Almost all viruses are sensitive to the action of IFN.

In the last decade, the number of domestic and foreign medicines based on IFN has increased significantly. According to the production technology, IFN preparations are divided into natural (first generation IFN) and recombinant (second generation IFN). Natural IFNs are obtained by exposing the leukocytes of healthy donors to viruses - interferon inducers. The reduction in the use and production of natural drugs in recent years is associated with a shortage of raw materials for production (donated blood) and the high cost of the final product. In addition, drugs of leukocyte origin, like any other blood products, are potentially unsafe in terms of viral contamination. Therefore, at present, there is a rapid expansion of the scale of the use of recombinant IFNs [1]. Recombinant IFNs are derivatives of E cellsscherihia coli or Pseudomonas putida, inthe genetic apparatus of which the human IFN gene is embedded.

Antiviral activity is inherent primarily in interferons alpha (IFN-α), both natural and recombinant.

Previously, the possibility of information transfer of medicinal properties of medicines to various carriers has been repeatedly shown experimentally and clinically [2, 3]. Clinicians working in the field of bioresonance therapy potentiate (“target”) the interferon indicators to level the information indicators of the patient's pathological condition, which, according to a number of experts, allows them to be successfully used for the treatment of various diseases of viral etiology.

Therefore, it is of interest to assess the presence of an information component in

the antiviral action of IFN-α using a standard method for assessing the antiviral (specific) activity of IFN preparations in a cell culture sensitive to IFN, to protect against the cytopathic action of the indicator virus in comparison with the international standard sample (ISS) [1].

The purpose of this study: to experimentally evaluate the antiviralthe effect of information copies of interferon preparations in the conditions of its study by the standard method recommended by the European Pharmacopoeia (EP) for assessing the specific antiviral activity of IFN-α preparations.

Materials and methods

To determine the antiviral (specific) activity, a biological method on cell culture recommended by the European Fund was used [4]. The method is based on comparing the ability of the IFN preparation to protect cells from the cytopathic effect of the virus with the same ability of the corresponding standard, calibrated in international units (IU). The experiment used a cell / virus combination: Madin-Darby bovine kidney cells (MDBK) / vesicular stomatitis virus (VSV).

Accounting for interferon activity was carried out by the instrumental method recommended by the EF, using selective staining of living cells protected by interferon from the action of the virus, followed by computer processing of the results [1].

The transfer of information from a solution of a commercial preparation of recombinant interferon alpha-2b (IFN-α2b) with an activity of 300 IU / ml was carried out in the "Transfer" mode of the hardware-software complex (APC) "IMEDIS-EXPERT" from the second container to the first to ampoules with 2 ml saline solution (0.9% sodium chloride solution) at various positions of the "Gain / potentiation factor" (KU) handle: 7.0; 6.0; 5.0; 4.4; 3.8; 3.2; 2.0; 0; the sum of all the specified gains. To record the last version, the information was previously transferred from commercial IFN-α2b to 2 balls of sugar crumbs separately for all the indicated CUs. Then, all the copies recorded on the balls of sugar grains were placed in a second container and, at KU = 7.0, they were rewritten onto an ampoule with saline, which was in an aluminum cup in the first container.

In an independent series of experiments on ampoules with saline in an aluminum cup in the first container, information was recorded from the indicators of the drug selector:

- "Interferon D30 "(separately with the KU handle positions: 7.0; 4.6; 3.7; 1.0; 0.5; 0);

- "Interferon alpha 15CH "(separately with the KU handle positions: 7.0; 5.5; 4.6;

3.7).

The choice of KU for recording IFN information preparations was carried out arbitrarily within the range of the KU knob position (7.0 ÷ 0), taking into account the working range of potentiation practically used by doctors.

IFN information preparations were recorded 1 day before the assessment of their antiviral activity.

The antiviral activity of IFN information drugs was assessed in two ways:

- own antiviral activity of the information copy of the drugIFN;

- modulation of the antiviral activity of the original drugrecombinant interferon alfa-2b by adding informational IFN (1: 1) to it.

Results and discussion

After processing the research results, within the sensitivity of the technique, no antiviral effect of IFN-α2b information copies recorded from the original preparation was found in any of the potentiation options used: neither for individual potencies, nor for their sum. Similar results were obtained for IFN information preparations recorded from a drug selector (Interferon D30, Interferon alpha 15CH).

V quality possible option antiviral activity
For informational IFNs, their modulating effect on the activity of endogenous IFNs in the human body was considered, which is noted by a number of specialists in the experience of clinical use of potentiated IFN preparations, recorded from a drug selector. Based on this information, it was decided to check with a biological methodin vitro on cell culture, the presence ofinformational IFN ability to modulate the antiviral activity of the original IFN-α2b. In this model, possible other effects of interferons at the level of the organism are excluded, but the data obtained in this case do not raise doubts in terms of assessing the antiviral activity by the standard method. The research results did not confirm the hypothesis of the presence of a modulating effect of informational IFNs on the antiviral activity of the original IFN.

conclusions

1. It has been shown that there is no specific antiviral effect in

informational copies of a commercial preparation of recombinant interferon alfa-2b, if available in the original preparation. Informational copies of IFN, when added to the original drug, did not change its antiviral activity.

2. Informational preparations "Interferon D30", "Interferon alpha 15CH ", introduced into the drug selector of APK" IMEDIS-EXPERT ", do not have their own antiviral effect and do not change the antiviral activity of the original IFN-α2b when added to it.

3. The data obtained do not confirm the antiviral effect informational copies of IFN preparations under standard assessment methodsin vitro, however, do not exclude the fundamental possibility of modulatingantiviral activity of endogenous IFN in humans and animals by other physiological mechanisms.

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