Experimental Research in Homeopathy (Literature Review)

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RESUME

The article provides an overview of modern basic research of the biological activity of homeopathic medicines and substances at ultra-low doses performed using a variety of techniques and experimental conditions. It's shown that in the future it is reasonable to conduct systematic research aimed at understanding the nature of the phenomenon of homeopathic medicines and possibilities of their wider use.

Keywords: homeopathic remedies, basic research, potentiation, ultralow doses, polymodal effects, postconditioning experiments.

SUMMARY

The article provides an overview of modern fundamental research on the biological activity of homeopathic medicines and substances in ultra-low doses, identified using a variety of techniques and experimental conditions. It is indicated that in the future it is advisable to conduct systematic research aimed at understanding the nature of the phenomenon of homeopathic medicine and the possibility of its wider application.

Keywords:homeopathic medicines, fundamental research, potentiation, ultra-low doses, polymodal nature of action, situational conditions of the experiment.

Introduction

The homeopathic method of treatment has been known for over 200 years. During this time, a great deal of experience has been accumulated in the application of the method at the patient's bedside, including in infectious pathology. The creator of homeopathy F.H.S. Hahnemann contributed to the fight against the cholera epidemic in the 19th century. Domestic infectious disease specialist, academician N.E. Gabrilovich was a representative of the USSR in the International Homeopathic League and under his leadership in 1937 two Ph.D. theses were defended on the treatment of complications of diphtheria with the help of homeopathic medicines. The plague epidemic in India (1995) was extinguished rather quickly, including with the participation of homeopaths. Thus, there is an empirical found opportunity to influence homeopathic medicines on infectious and non-infectious processes, presumably due to the influence on the adaptive forces of the body. It is known that 32% of family doctors in France use homeopathic medicines, 42% of British doctors recommend that patients visit a homeopath; in India, where homeopathy has the status of state medicine, more than 100,000 homeopaths work, and 600 million visits are registered annually. In many countries, for example, the USA, Germany, the method of homeopathy is fully or partially paid by insurance companies.

Despite this, skeptics do not believe in the very possibility of the action of a homeopathic medicine, declaring it to be an artifact. What is homeopathy, the controversy around which has not subsided for so many years?

When the creator of the F.H.S. Hahnemann moved to France in his declining years, the medical community became agitated, and a letter was written to the Minister of Health, Herr Guizot, asking him to ban Hahnemann's practice in France. The minister refused to do this, saying that “if homeopathy is a chimera or a system without inner meaning, then it will disappear by itself, and if not,

it will develop to the delight of the Academy. " 200 years have passed since then, homeopathy "has not disappeared like a chimera", but "develops for the joy" of people who are trying to understand the phenomenon underlying this phenomenon - the amazing effectiveness of specially prepared natural medicines in small, ultra-small and even "imaginary"[1] doses. The attitude to homeopathy has divided scientists into two groups: those who do not recognize this phenomenon a priori and do not want to study it, and those who carefully and gradually begin to explore this natural pattern. It is about fundamental research that one should mainly talk about in connection with homeopathy.

ON. Tushmalova [25] in her article "On the biological significance of ultra-low doses" writes: "Without considering the general biological content of the phenomenon of ultra-low doses, it is impossible to understand the purely medical aspect ... And consideration of the biological significance of ultra-low doses allows us to classify modern homeopathy as a science reflecting the basic pattern of environmental tactics - minimization of external influences of the environment while maintaining the predicted optimal effect. " A.M. Kuzin [12], considering the role of ultra-low doses of radiation, writes: "The evolution of life on our planet has revealed a remarkable feature of living organisms to use for their prosperity ultra-small amounts of many physical and chemical factors - harmful and poisonous in large quantities."

Researchers of homeopathy must take into account the peculiarities of homeopathy and the those patterns that have already been identified in our time when working with ultra-low doses of substances and weak effects of physical factors. Ignorance or non-recognition of these features when setting up a study and analyzing the results always distorts the real picture. The main problems of misunderstanding and non-recognition of homeopathy are associated with medicinal technology (potentiation), the use of drugs, often in ultra-small and "imaginary" doses, and their polymodal nature of action.

Research on the technology of preparation of homeopathic medicines (potentiation)

The greatest importance in understanding this problem is acquired by the study of the physical characteristics of solutions of homeopathic medicines and water itself - a participant in the potentiation process. The difference between the spectra of infraslow fluctuations in the intensity of light scattering of the solvent from the spectra of homeopathic preparations in the dilution of D24, i.e. in a situation where the chemical composition of the drug and the solvent become almost identical, but differ in the spectra of light scattering. These facts indicate the presence of a physical basis for the biological effects of large dilutions, in particular, they speak about the rearrangement of the electronic subsystem of the liquid [28]. B. Ya. Hurwitz [6], studying the properties of blood plasma subjected to multiple serial dilutions with potentiation, showed that the resulting solutions retain the qualitative and quantitative characteristics of the images of the gas-discharge glow of the whole plasma. It is concluded that diluted and potentiated solutions reflect the properties of the original integral object.

V.P. Kaznacheev, L.P. Mikhailova [8] believe that physical, physicochemical effects and homeopathic remedies can be used by cells for information interaction of biosystems. Resch G., Gutmann V. [70, 71] believe that speaking about homeopathic solutions, it is time to discuss their supramolecular systemic organization.

Recently, a group of researchers [46], studying potentiated solutions of metals in dilutions of 30 C and 200 C by electron microscopy and atomic emission spectroscopy, discovered the presence in these high dilutions of material metal particles in the form of nanoparticles and their aggregates with nanobubbles. One of the hypotheses put forward by the authors is related to the fact that the potentiation process creates conditions for a non-uniform distribution of the initial substance.

Systematic study luminescence aquatic solutions homeopathic preparation Natrium muriaticum in dilutions from D1 to D30 ("Weleda" in Moscow) [16, 61]. It is shown that the dependence of the luminescence intensity on the degree of dilution is a non-monotonic function with several maxima, the main of which corresponds to

13-14 decimal dilutions. The change in luminescence in a series of dilutions was compared with their biological activity, which was studied by the motor activity of ciliates with Spirostom. A significant negative correlation was established between the mobility of ciliates and the intensity of luminescence, as well as the difference in the spectra of potentiated and non-potentiated water used as two controls. Analyzing the properties of water, V.I. Lobyshev [15] writes that water, as a non-equilibrium system, sensitive to weak influences and possessing the properties of self-organization, can structurally and chemically change during the preparation of a homeopathic medicine and be the cause of the arising primary biological effects.

When discussing the meaning of water, one cannot but cite the Nobel laureate A. Szent-Gyorgyi [21]. “Water is not onlymatter of life, but the matrix of life, and biology may not have succeeded so farsince then in understanding the most obvious functions due to the fact that she focused her attention on matter in the form of particles, separating them from two matrices - water and an electromagnetic field "

Studies of the biological action of ultra-low doses of substances and homeopathic medicines [2]

Cell-free and cellular models

In the fundamental works on the effects of ultra-low doses, it is emphasized that the level of biological organization for recording the effect of ultra-low doses can be very different. Some patterns of this phenomenon have been formulated. For example, the complex polymodal nature of the "dose" dependences, the fundamental possibility of influencing different biological systems, the instability of the effect size, etc. are indicated [2, 3, 4]. Some researchers [56] have studied the effect of ultra-low doses and homeopathic medicines on intact animals, cell cultures, and cell-free systems. They showed a change in the enzymatic activity in the liver of animals under the influence of the tested agents, an adequate effect on other selected models, a non-linear nature of changes in the action of substances depending on its dilution. Harisch G., Dittman I. [56] believe

The effect of the potentiated antioxidant phenosan, synthesized at the Research Institute of Biochemical Physics, in dilutions D15, D20, D25, on the motor activity index of spirostoma, the viscosity of the cell membrane, and the acetylcholinesterase-acetylcholine interaction was studied. It was shown that phenosan diluted with D25 significantly increased the viscosity of the membrane, the activity of the enzyme-substrate complex, and the locomotor activity of the spirostoma [5].

Nobel laureate Montagnier L. et al. [64] studied the electromagnetic signal of decimal dilutions of bacteria and viruses. It turned out that in the process of dilution, DNA fragments disappeared from the solution, but the detected electromagnetic signal remained high as before. They registered a similar signal in plasma and DNA extracts from plasma of patients with Alzheimer's disease, Parkinson's disease, multiple sclerosis and rheumatoid arthritis.

A group of works is devoted to the study of the pharmacodynamic effects of homeopathic medicines. Most notorious is the work by Davenas E. et al. [48], on the induced degranulation of anti-IgE basophils in dilutions D2 – D120. The maximum degranulation was 40-60%. In a cellular model of basophils [74, 75, 76], activated by the antigen of worms (D. Pteronys-sinus) or potentiated immunoglobulin E, the inhibitory effect of histamine in potencies C5 – C20 on degranulation of basophils was studied. The peak of this action was observed in the C15 – C17 dilutions. The effect of the potentiated histamine was terminated in the presence of cimetidine 10-5 M in the incubation medium, as well as histaminase in the C7 dilution. For 20 years, the authors have shown the reproducibility of these effects, studying the properties of basophils with more and more modern methods.

Despite the results of this long-term work, some researchers are critical of basophils as a model for studying various influences [51], arguing that this model gives results that are difficult to reproduce, which may explain the history surrounding the study by J. Benvenist. British pharmacologist M. Ennis [51] proposes to work out a standard protocol for this technique and conduct a multicenter study on the effect of the listed potentiated biologically active substances on the state of basophils in order to put an end to this “endless story”.

The effect of acetisalicylic acid in C5, C9 and C15 on platelet aggregation, the release of prostacyclin from the vascular wall and the process of thrombus formation has been studied in detail. The effect on these parameters was shown, opposite to the effect of acetylsalicylic acid in pharmacological doses [49].

The effect of homeopathic medicines has been studied in relation to the proliferative activity and apoptosis of blood cells in vitro [22]. It was shown that Thuya, Lycopodium, Arsenicum album, as well as the G-CSF peptide in dilutions C6 and C30 increased the proliferative potential of granulocyte-macrophage progenitor cells, Aurum met. did not possess such an effect. The drugs Aurum met., Lycopodium, Arsenicum album, G-CSF showed a pronounced antiapoptotic effect on mononuclear cells. Thuya did not have such an effect in this setting of the experiment. According to Thangapazham et al. [77], Thuya in C1000 dilution exhibited pro-apoptotic action.

The bacterial toxin isolated from Staphylococcus aureus, potentiated from D1 to D48, showed bimodal activity against leukocytes with a complete lack of effect in potencies D9, D15, D18, D42 and with the most pronounced effect in D48 [46].

A number of authors report on the inhibition of lymphoblastic transformation by homeopathic preparations Phytolaca americana in dilutions C6, C12, C30 [45], on inhibition of lymphocytes in cell culture when using the homeopathic preparation Mercurius chloridum [63]. Poitevin B., Aubin M., Royer JF [69] reported the inhibitory effect of potentiated Beladonna and Ferrum phosphoricum on the chemiluminescence of human polymorphonuclear neutrophils. Palermo C. et al. [65] showed that the homeopathic preparation Calcarea fluorica stimulates osteogenesis in vitro in a model of shin osteoblasts.

O. Yu. Tretyakov, B.L. Hurwitz [24] reported that the immunosuppressor FK506 at concentrations of 10–10–10–9 M does not inhibit but, on the contrary, stimulates cells. It is reported that pheromone diluted to 6 x 10-17 M fully retains the biological effect on bacteria [53].

Tumor cell culture

Interesting observations were made by Safrit J. et al. [72], Bonavida B. [1]. They studied the cytotoxicity of cytostatics, diphtheria toxin, cytokine TNFα in dilution C7. These studies noted the synergistic cytotoxicity of anticancer drugs such as adriamycin or cisplatin in combination with TNFα, and this effect was also revealed on drug-resistant cells. The combination of TNFα with diphtheria toxin showed the same results. It is concluded that it is possible to regulate cytotoxicity, leading to cell apoptosis, by nonspecific agents of the endogenous type and chemotherapeutic agents in low doses. On cell cultures of Dalton's ascites lymphoma, Ehrlich's ascites carcinoma, lung fibroblasts, and Chinese hamster ovary cells, the proapoptotic effect and the effect on genes that induce apoptosis were assessed. a number of homeopathic preparations in dilutions of C30 and C200 [76]. Inhibition of colony formation of ovarian cells, inhibition of thymidine uptake in L929 cells was observed. Thuya, Hydrastis, and Carcinosinum preparations induced apoptosis of DLA cells and expressed p53 expression. The cytotoxicity of some homeopathic preparations on tumor cells and their ability to induce apoptosis have been shown.

Homeopathic remedies were studied for the detection of anti-cytotoxic, antigenotoxic and antioxidant effects using modern techniques,

including blotting, immunofluorescence, UV spectroscopy, high performance liquid chromatography, nuclear magnetic resonance, polymerase chain reaction, etc. [58]. It was shown that the preparations Arnica montana C30, Ruta graveolens C30, C200, Ginseng C30, C200 prevented radiation damage.

Carcinogenic liver damage was prevented with Chelidonium, Lycopodium, Carduus, Hydrastis in C30 and C200 dilutions, and Myrica in the form of matrix tincture. A similar skin damage caused by croton oil was prevented by the preparations Secale, Gelsemium, Kalium arsenicosum, Arsenicum album, the latter being the least effective. In case of damage to the lung of a mouse with benzpyrene, the preparations Senega, Silicea, Phosphorus were used. However, their effect was not statistically different from the control.

A number of authors [9, 18, 19, 27, 33] on different cell models confirm the positive effect of ultra-low doses and potentiated chemotherapy drugs on the course of the oncological process. Ryabykh T.P. and co-authors [19] showed that melatonin at concentrations of $10^{-eleven-ten-13}$ M retained the ability to inhibit the growth of malignant cells in vitro.

Plant Models

A synergistic effect of the homeopathic preparation Calcarea carbonica and potentiated indoleacetic acid on plant growth has been reported [43]. The author explains this effect by the influence on the balance of bound and free calcium. A homeopathically prepared preparation of gibberellic acid (plant hormone) in dilutions of 4, 30, and 200 CH had the same effect on growth acceleration as gibberellic acid in measurable doses [55].

A review of studies on the effect of a number of homeopathic medicines in different dilutions (Argentum nitr. D24, Sulfur C3-1 LM, Arsenicum album D23-45, Cuprum met. C5, C7, C9, Phosphorus C3, Arnica C3, Silicea 1 LM, etc. .) on the growth dynamics of various healthy plants - seed germination, the size of shoots, the number of leaves, the water content in them, etc. [59, 62]. Another review provides data from a number of studies on the effect of homeopathic medicines on phytopathological (various fungal attack) models. The use of a number of homeopathic medicines inhibited the development of fungal colonies both in vitro and significantly improved the condition of the plant [39].

Nitrosomethylurea concentration $10^{-24-ten-29}$M proved to be more effective for germination of spruce and tomato seeds than the commonly used 10^{-8} M [10, 29].

Animal models

Intact animals. There is evidence that ultralow doses of phenazepam $10^{-ten-ten-eleven}$ M / kg showed selective anxiolytic and moderate anticonvulsant effects, without side effects characteristic of the dose used $10^{-5-ten-6}$ M / kg [17].

The effect of potentiated morphine on the dopamine content in the brain of experimental animals has been shown [30]. Morphine in this design of the experiment in the dilution of C30 reduced the content of dopamine in the septum, and in the dilution of C200 increased it. The latter position was studied by O.I. Epstein [31], who observed the effects of simultaneously administered drugs in a pharmacological dose and in homeopathic dilution (for example, prednisolone, morphine and ethanol), registered in the experiment the presence of actions characteristic of these substances and a decrease in toxic manifestations during dilution.

Taking into account the importance of water in the process of homeopathic technology, experiments were carried out on aquatic organisms - ciliates and fish of various species. It has been shown that a number of homeopathic preparations - Arsenicum album, Calcarea carbonica, Ignatia, Nux vomica in dilutions C6 C12 C30 - influenced the locomotor activity of ciliates [13].

J. Boiron [41], analyzing 40 years of scientific research in homeopathy, M. Bastide [34] write that the biological effect of homeopathic medicines is disproportionate to the degree of dilution, retains the activity specific to the original substance.

Experimental situational conditions

In 1957, Wilder E. [82] noticed that the response of a cell, tissue or organism depends on the initial state of the function. Burlakova E.B. [3] describes the dependence of the effect on the initial state of the biological object. Apparently, this was Hahnemann's empirical pattern when he proposed studying the properties of drugs on healthy people and then using them in patients with the development of similar symptoms, i.e. according to the similarity rule. In such experiments to identify the sign of the drug's therapeutic effect, special conditions (postconditioning) are created, let's call them situational.

Boiron J. [41] reports on the protective effect of the homeopathic preparation Mercurius chloridum, determined by the mitotic index of cell culture when cells are exposed to toxic doses of mercury. A similar protective effect of ultra-low doses of glutamate was shown in the study of the neurotoxicity of glutamate [56]. Shown a protective effect on cells of homeopathic dilutions of cadmium, mercury, lead, arsenic from the toxic effects of large doses of the same substances [45, 54, 68]. All experiments of this kind have shown that preparations of high dilutions of metals (up to C200) reduce intoxication caused by large doses of the same metals [52].

An indirect confirmation of these data sounds in the article by Wiegant F., van Wijk R. [81]. They developed an experimental cell model to assess the isopathic effect of homeopathic medicines against the background of cellular stress caused by high doses of heavy metals. The criteria for cell damage were their ability to survive and different ways of induction of heat shock proteins. Shows a protective effect on the cell, the acceleration of its return to normal when using homeopathic preparations of lead, mercury, arsenic and cadmium.

In another study, using a model of germination of wheat seeds pretreated with arsenic trioxide, a positive effect of the homeopathic preparation Arsenicum album in a dilution of D45 was shown, neutralizing the effect of its toxic doses [60]. Khuda-Buksch A. et al. [59] write about the mass arsenic intoxication of people living in West Bengal (India), where the homeopathic preparation Arsenicum album C30 is used to remove the toxicant with good results.

One of the experiments confirming the specific effect of homeopathic medicines was a study conducted by a group of authors [23] to study the effect of four drugs - Ignatia, Nux vomica, Argentum nitricum, Hyosciamus in D30 dilution in psychopharmacological studies in rats. The control groups received diazepam at a dose of 1 mg / kg and a dilution of D30. At the same time, the preparations Ignatia and Nux vomica showed anxiolytic effect on the “conflict situation” model, without showing activity on other models. Argentum nitricum reduced fear of heights when tested on the “high altitude maze” model, and Hyosciamus had a universal anxiolytic effect on the above models as well as the “open field” model. Bellavite P. et al. [37] report a pronounced effect of Gelsemium in dilutions C5, C7, C9,

Lebedeva N.E. et al. [13, 14] conducted a study of a potentiated preparation from fish skin on the behavior of different fish species (carp, tilapia, salmon) on a stress model (handling, transportation). It turned out that the effect of a concentration of 10 g / l and homeopathic dilutions of the substance is opposite. A dose of 10 g / l against the background of stress worsens stress indicators, homeopathic dilutions prevent its development, promoting anxiolytic action, which was reflected in the biological and physiological parameters of fish [13].

The protective effect of the homeopathic preparation Aconite on an isolated eel heart perfused with a solution of aconitine has been shown [67].

Experimental models used to study the effects of homeopathic medicines

For many years, the method of homeopathy existed only in clinical applications, the tactics of using homeopathic medicines have been well studied during this time. However, this direction

treatment for a number of reasons remained on the sidelines of scientific research. In our country, the study of ultra-low doses and weak effects has been carried out for more than 20 years thanks to the initiative of scientists from the Research Institute of Biochemical Physics of the Russian Academy of Sciences and the Research Institute of Theoretical and Experimental Biophysics of the Russian Academy of Sciences. Research into the effects of homeopathic medicines has been minimal. In Europe, over the past 20 years, the flow of research on the effects of homeopathic medicines has been actively growing, thanks to the active funding of these studies. There are more and more new models for studying the effect of homeopathic medicines, the optimal conditions for studying and understanding the basic principles - the problems of homeopathy - are analyzed. Considerable experimental material has been accumulated, but there is still no acceptable explanation for the phenomena of homeopathic medicines [7].

Table 1

List of parameters used to study the effects of homeopathic drugs in acellular systems, cells, tissues according to [50] with the author's additions

№ п.п.	Модель	Изучаемые гомеопатические препараты в разведениях свыше D23
1	Активность диастазы	Mercurius bichloride
2	Активность кислой фосфатазы	Ubichinone
3	Активность кислой фосфатазы	CAMP
4	Активность альфа-амилазы	Mercurius dichloride
5	Активность ацетихолинэстеразы	Фенозан
6	Вязкость мембраны клеток	Фенозан
7	Клетки нейробластомы	Tumor necrosis Factor
8	Водоросли Хлорелла	Cuprum sulfuricum
9	Прорастание семян пшеницы	Argentum nitricum
10	Прорастание семян пшеницы, обработанных большими дозами мышьяка	Arsenicum album
11	Рост карликовых бобов	Gibberellic acidum
12	Прорастаемость семян пшеницы	Gibberellic acidum
13	Базофилы	anti-IgE
14	Базофилы	Apis mellifica
15	Базофилы	Histaminum
16	Лимфоциты	Phytolacca americana
17	Лимфоциты	N-methyl-N- nitro-N-nitrosoguanidine
18	Сократимость изолированной кишки	Belladonna
19	Метаморфоз амфибий	Thyroxinum, thyroidinum
20	Образование тромба	Acetylsalicylici acidum

Table 1, 2 and 3 summarize the experimental models described in the literature for studying the effect of homeopathic medicines.

Bonamin L., Endler PC [42] analyzed about 90 studies on laboratory animals (rats, mice) with positive results of the action of homeopathic medicines (Table 2).

table 2

The list of parameters changed by the influence of homeopathic medicines, in experiments on warm-blooded animals over the past 12 years according to [44, 51] with additions by the author

	Функция, параметры и объект	Изучаемые гомеопатические лекарства и разведения
1	**Поведение крыс**	
	Электроэнцефалограмма	Coffea матричная тинктура, C30 , C200
	Стресс и депрессия	Chamomilla C6
	«конфликтная ситуация»	Ignatia C30, Nux Vom.C30, Argentum nitricum C30, Hyosciamus C30, Diasepam C30
	«высотный лабиринт»	Ignatia C30, Nux Vom.C30, Argentum nitricum C30, Hyosciamus C30, Diasepam C30
	«Открытое поле»	Ignatia C30, Nux Vom.C30, Argentum nitricum C30, Hyosciamus C30, Diasepam C30, Gelsemium C30
2	**Интоксикация (мыши)**	
	Отравление мышьяком	Arsenicum album C30, C200
	Отравление четырех-хлористым углеродом	Phosphorus C30, C200
	Отравление свинцом	Plumbum met. C30, C 200
3	**Воспаление**	
	Острое воспаление	Dexamethasone C7, C15; Causticum C30; Arnica C6; Rhus tox C6, C12; C30, C200
	Индукция кариеса	Kreosotum 6 CH
	Перитонит (вызываемый липополисахаридами)	Belladonna C6, C30, Echinacea C6, C30
4	**Канцерогенез**	
	Гепатокарциногенез	Chelidonium 30CH, 200 CH; Carcinosinum 200 CH
5	**Рост и дифференциация тканей**	
	Метаморфоз	Thyroxinum 6 DH, 30 DH; Thyroid 6 DH
	Инокуляция опухолевой тканью	Sabal serulata 200 CH; Thuya 1000 CH
	Восстановление костной ткани	Calcarea phosphorica 6 CH
6	**Экспериментальные инфекции – взаимодействие «гость-хозяин»**	
	Plasmodium – мыши	Eupatorium 6 CH; Arsenicum album 30 CH
	E.coli – цыплята	Nosode E.coli 30 DH
	Salmonella – цыплята	Nosode Salmonella 30 DH

Table 3

List of parameters used to study the effect of homeopathic medicines,
in experiments on cold-blooded animals according to the author's data

№ п.п.	Функция, параметры и объект	Препараты
1	Икра вьюна	Thyroxinum C30, Calcarea carbonicum C30, Arsenicum album C 30
2	Головастики	Thyroxinum C9, Thyroidinum
3	Брыжейка лягушки	Adrenalinum C15-C30
4	Инфузория спиростома	Ignatia C30, Nux Vom.C30, Argentum nitricum C30, Hyosciamus C30,
5	Рыбы разных видов	Циприн (препарат из кожи рыб)

Intact animals (more often mice and rats) are the object of testing potentiated substances in different dilutions. However, for a complete understanding of homeopathy as a method of treatment, it is necessary to look for models that create the possibility of research based on the principle of similarity [52, 80].

Conclusion

Research in homeopathy should fundamentally differ from the existing approaches to the screening study of the biological activity of substances and their subsequent introduction into

clinical practice. Homeopathy was introduced 215 years ago. The empirically found rules allowed all this time to use homeopathic medicines to treat patients, and experience - the best criterion of truth - confirmed the viability, effectiveness and safety of the method.

Why now, two centuries later, have many scientists begun to study the interesting features of homeopathy? In our opinion, this is due to the fact that the homeopathic medicine itself reflects natural laws unknown to science, which can be conditionally called the phenomenon of homeopathic medicine. The very fact of the existence of this phenomenon, in our opinion, is quite convincingly confirmed by the research results presented in this review. One often comes across the view of a homeopathic remedy as a placebo. The various learning models presented challenge this view.

It is a worthy task for a researcher to understand the phenomenon of a homeopathic medicine, come closer to understanding its mechanisms, and not blindly believe or blindly deny. However, an unsystematic approach to the formulation and conduct of such studies - testing of individual dilutions, the absence of consistently set observations, an integral comprehensive research program, etc. - does not allow us to approach an understanding of the phenomenon and mechanism of action of a homeopathic medicine. Consecutive studies in the field of a new class of compounds - potentiated biologically active substances, the so-called endoisopathy, are known to the author only on the example of potentiated antibodies [33], which ensured the emergence of a new class of homeopathic medicines.

In our opinion, now that the question of the biological activity of a homeopathic medicine can be answered with confidence, the subsequent systematic formulations of research should, on the one hand, be aimed at understanding the nature of the phenomenon of homeopathic medicine, and on the other hand, at the possibilities of a broader applied application of this phenomenon. In this we see the meaning and perspective of fundamental and applied research in homeopathy.

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[1] Imaginary dose / concentration - molecules of a substance in solution, presumably absent, the calculated concentration exceeds Avogadro's number.

[2] In the available literature, the author did not find a comparative study of the action of ultra-small doses (SMD) of substances with and without potentiation. In addition, it is impossible to prepare a solution at an ultra-low concentration without dilution and stirring. We can say that it is not as standardized as in homeopathy. In the text, for the designation of potentiated solutions, the usual for homeopathy designations of the scales "D", "C", "Q" are given, and in the case of SMD, the accepted designations of concentrations.

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