Chapter 2

Homeopathy

The following abbreviations are used in this chapter:

BAS—Biologically Active Substance

ULD—Ultra-Low Dose

The homeopathic remedies used nowadays represent dilutions of D30 and higher. Note that the probability of the event that a D30 dilution of 1 mole of a substance contains at least one molecule will be ~ 0.001%.

Note. The introduction of a substance in doses of 10^{-12} – 10^{-13}M into an organism will result in about 10 down to 1 molecules of the substance contained in a cell. That is, at concentrations of less than 10^{-13}M there will be, from the point of view of classical physics, no molecules from the substance in a cell.

This concentration makes impossible an explanation of the efficacy of highly diluted homeopathic remedies in the framework of existing physical conceptions: chemical reaction, electric or/and magnetic interaction, thermodynamic process.

Therefore, one of the first explanations of the effect of highly diluted remedies on organisms was the explanation based on the placebo effect. The latter can have place due to two reasons: first, therapeutic action caused by suggestion or autosuggestion inducing a positive response of the immune system; secondly, “therapeutic” reaction of an organism on introducing of any foreign substance into the organism.

However, the successful using of homeopathic remedies in veterinary proves that their successful use is not connected with placebo effect. First, the therapeutic effect caused by suggestion can apply to humans only. Secondly, positive results of homeopathic treatment of animals, for example of cows, as described below, are often achieved by using the same homeopathic medicines that are used in treating similar diseases in humans, though the characteristics of the immune systems of cows and humans are not the same. The equal effectivity of using the same homeopathic medicines in treating diseases in human and animal organisms indicates that a physical process must exist determining the efficacy of treating an organism with a highly diluted homeopathic remedy.

It is shown in this chapter that spin supercurrent emerging between virtual photons created by quantum objects of BS, on the one hand, and virtual

photons created by quantum objects of homeopathic remedies, on the other hand, is a physical process which fulfills homeopathic treating.

Let us consider the features of action of BAS in ULD on BS and compare them with the properties of spin supercurrent (see also [22,23]).

2.1. The Features of the Action of Biologically Active Substance in Ultra-Low Dose on a Biological System

The schema of the action of BAS in ULD on BS is shown in Fig. 2.1. $\mathbf{S}_{BAS}$ and $\mathbf{S}_{BS}$ are spins, $\boldsymbol{\omega}_{BAS}$ and $\boldsymbol{\omega}_{BS}$ are the spin precession frequencies, β_{BAS} and β_{BS} are the deflection angles, α_{BAS} and α_{BS} are the precession angles relative to a reference line (r.l.), and I_{SSZ} is the spin supercurrent component aligned with axis **z**. In accordance with Eq. (1.12), I_{SSZ} is determined by expression:

$$I_{SSZ} = -b_1\left(\alpha_{BS} - \alpha_{BAS}\right) - b_2\left(\beta_{BS} - \beta_{BAS}\right). \qquad (2.1)$$

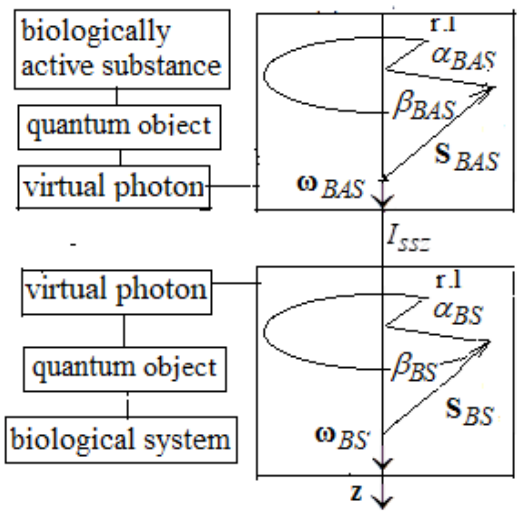

Figure 2.1. The characteristics of virtual photons created by the quantum objects of BAS and BS: $\mathbf{S}_{BAS}$ and $\mathbf{S}_{BS}$ are spins, $\boldsymbol{\omega}_{BAS}$ and $\boldsymbol{\omega}_{BS}$ are precession frequencies, β_{BAS} and β_{BS} are deflection angles, α_{BAS} and α_{BS} are the precession angles relative to a reference line (r.l.), and I_{SSZ} is the spin supercurrent aligned with axis **z.**

Below the features of the action of BAS in ULD on BS are listed.

1) An ultra-low concentration of the initial substance in a homeopathic powder or solution lets one to consider the homeopathic powder or solution as an information matrix.

Note. The information matrix can be a light beam. The light beam, in particular laser beam, passing through a BAS can be modulated by frequency ω_{BAS}. In this case the interaction of information matrix with BAS and BS is accomplished through photons, not virtual photons.

Let us consider the example of using an information matrix for transfer of properties of BAS to BS (Figure 2.2). I_{BAS-im} is the spin supercurrent between the virtual photon created by the quantum object of a BAS, on the one hand, and the spin vortex (a virtual photon created by the quantum object of the information matrix, or a photon, depending on the type of information matrix), on the other. I_{im-BS} is a spin supercurrent between the above-mentioned spin vortex of the information matrix, on the one hand, and the virtual photon created by the quantum object of a BS, on the other. ω_{BAS} and ω_{BS} are the frequencies of precession of the spins in virtual photons created by quantum objects respectively of BAS and BS, ω_{im} is a frequency of precession of the spin of spin vortex created by the quantum object of information matrix.

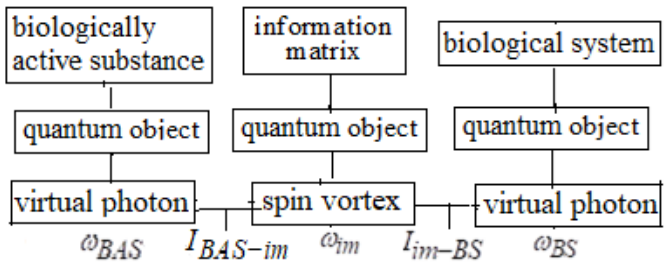

Figure 2.2. A diagram showing the use of an information matrix in the action of a BAS in ULD on a BS. I_{BAS-im} and I_{im-BS} are spin supercurrents; ω_{BAS} and ω_{BS} are the frequencies of precession of the spins in virtual photons created by quantum objects respectively of BAS and BS, ω_{im} is a frequency of precession of the spin of spin vortex (photon or virtual photon) created by information matrix.

According to Eq. (1.17), as a result of the action of spin supercurrent I_{BAS-im}, the following takes place: $\left|\omega_{BAS}-\omega_{im}\right| \geq \left|\omega_{BAS}^{'}-\omega_{im}^{'}\right|$, where $\omega_{BAS}^{'}$ and $\omega_{im}^{'}$ are the values of the frequencies of precession of respective ω_{BAS} and ω_{im} after the action of a spin supercurrent. Let us assume that the difference $\omega_{im}-\omega_{im}^{'}$ is associated with ω_{BAS} and introduce the following denotation:

$$k_{BAS-im}=\left(\omega_{im}-\omega_{im}^{'}\right)/\omega_{BAS}. \qquad (2.2)$$

As a result of the action of spin supercurrent I_{im-BS}, the following takes place: $\left|\omega_{im}^{'}-\omega_{BS}\right| \geq \left|\omega_{im}^{''}-\omega_{BS}^{'}\right|$, where $\omega_{im}^{''}$ and ω_{BS} are the values of the frequencies of precession of respective $\omega_{im}^{'}$ and ω_{BS} after the action of a spin supercurrent I_{im-BS}. Using Eq. (2.2), the latter inequality can be written in the following form:

$$\left|\omega_{im}-k_{BAS-im}\omega_{BAS}-\omega_{BS}\right| \geq \left|\omega_{im}^{''}-\omega_{BS}^{'}\right|.$$

Thus, the value of precession frequencies $\omega_{BS}^{'}$ will be connected with precession frequency ω_{BAS}. Consequently, the information matrix can take part in the transfer of the characteristics of BAS (in particular, the values of precession frequencies) to BS by means of spin supercurrent.

2) In the book by P. Bellavite and A. Signorine “The Emerging Science of Homeopathy” [24], we find that: “There is some preliminary evidence demonstrating a homeopathic effect not only of solutions but also of closed ampoules containing solutions and placed in contact with the system to be regulated (human or animal).” Consequently, the process accomplishing the effect of homeopathic powder or solution on BS cannot be screened by a molecular substance.

This observation is an accordance with property 6 of spin supercurrent (see Section 1.2).

3) One of the main properties of the effect of an ULD is “kinetic paradox”: the effect of a BAS in ULD on a cell or an organism is the strongest when the latter contains the same substance but in doses that are some orders of magnitude greater than the ULD used. For example, Greek doctors frequently treated people by remedies prepared from human’s organs [25].

If the BAS's substance is contained in the BS in a sufficiently high dose then, among the values of the spin's precession frequencies of the virtual photons produced by the BS's quantum objects there will be a value close to ω_{BAS}. The effect of BAS in ULD on BS by means of spin supercurrent is most pronounced if the difference $\Delta\boldsymbol{\omega} = \boldsymbol{\omega}_{BAS} - \boldsymbol{\omega}_{BS}$ meets Condition (1.20), that is:

$$\boldsymbol{\omega}_{BAS} - \boldsymbol{\omega}_{BS} \to 0 . \qquad (2.3)$$

4) A change in the sensitivity (generally, an increase) of the BS with respect to a subsequent exposure to a biologically active substance in ultra-low dose.

The action of spin supercurrent is oriented on equalizing precession's frequencies of spins of interacting systems, that is on fulfilling Condition (1.20). Consequently, the sensitivity of BS to the action of BAS is determined by difference $\left|\omega_{BAS} - \omega_{BS}\right|$: with its decrease, the sensitivity increases. As follows from Condition (1.18), after the action of a BAS in a ULD on a BS the spin's precession frequencies of the virtual photons created by the quantum objects of a BS and a BAS acquire values (respectively ω'_{BS} and ω'_{BAS}) satisfying the following Condition:

$$\left|\omega_{BAS} - \omega_{BS}\right| \geq \left|\omega'_{BAS} - \omega'_{BS}\right| \qquad (2.4)$$

The Eq. (2.4) can be rewritten as:

$$\left|\omega_{BAS} - \omega_{BS}\right| \geq \left|\left(\omega_{BAS} - \omega'_{BS}\right) + \left(\omega'_{BAS} - \omega_{BAS}\right)\right| .$$

If $\left(\omega'_{BAS} - \omega_{BAS}\right) < 0$, then $\left|\omega_{BAS} - \omega_{BS}\right| > \left|\omega_{BAS} - \omega'_{BS}\right|$. The last inequality means that the sensitivity of BS to a subsequent exposure to the same BAS in ULD is increased if, for example, during the first exposure of BS to the BAS the value of ω_{BAS} was changing to ω'_{BAS} and Condition $\left(\omega'_{BAS} - \omega_{BAS}\right) < 0$ was fulfilled.

5) The dependence of the "sign" of the effect (inhibition or stimulation) on the initial state of the BS being treated.

According to Eq. (1.6), at a change (as a result of the action of the spin supercurrent) in precession frequencies of spins of interacting virtual photons, the energies of these virtual photons are changed as well. The "sign" of the change in the energy of virtual photons determines the character of the effect

of spin supercurrent. According to Eq. (1.6), as a result of the action of spin supercurrent the change in energy ΔU_q of quantum object (constituting BS) and consequently in the energy of virtual photon created by it is determined as $\Delta U_q = \hbar\left(\omega_{BS}^{'} - \omega_{BS}\right)$, where ω_{BS} and $\omega_{BS}^{'}$ are the precession frequencies of the virtual photon respectively before and after the action of spin supercurrent. Consequently, the "sign" of the change in the energy of virtual photons as a result of the action of spin supercurrent is determined by the initial value of BS precession frequency, ω_{BS}.

6) An increase in side effects at an increase in the BAS dose.

An increase in the dose of a BAS in ULD can lead to appearance of several precession frequencies characterizing the BAS. When fulfilling Condition (1.20), a number of these BAS precession frequencies in ULD can effectively act on different BSs at the same time.

7) A non-monotonic, polymodal dose-response (or dose-effect) dependence. In most cases, the activity maxima are observed within definite ranges of doses, which are separated by so-called "dead zones". In some cases, the same effects are produced by doses of biologically active substances differing in 5 to 8 orders of magnitude. There are also cases where a change in the "sign" of the effect is observed in the dose dependence.

An example of non-monotonic dose-effect dependence is shown in Figure 2.3: the dependence of the normalized (to the maximum value, at $D = 10^{-4}$ mole/kg) value *V* of content of protein p53 and protein bl2 in serum of blood and spleen with mice of lines F1(CBAxC57BL) and AKR (differing in radio-sensibility and in probability of emerging of unexpected lymphocytic leukemia) as a function of dose *D* of the injected antioxidant phenosan [26].

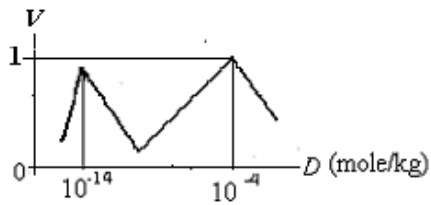

Figure 2.3. The type of dependence of the normalized (to the maximum value, at $D = 10^{-4}$ mole/kg) value *V* of content of protein p53 and protein bl2 with mice F1(CBAxC57BL) and AKR (differing in radio-sensibility and in probability of

emerging of unexpected lymphocytic leukemia) as a function of dose *D* of the injected antioxidant phenosan

The nonmonotonic character of the effects of BAS in ULDs on BS is in accordance with property 5 of spin supercurrent. The curve which is shown in Figure 2.3 is analogous to the type of dependence of the spin supercurrent on the precession angle (phase) under the phase slippage (see Figure 1.2).

8) In homeopathy, the BAS acting on BS is in ULD.

It should be noted that it is the spin supercurrent which effectively acts on BS when BAS is in ULD. Otherwise, Condition (1.21) takes place (see property 7 of spin supercurrent in Section 1.2), which means that spin supercurrents cease to be the predominating factor that governs the effect of BAS on BS and the latter will be determined by other physical factors.

2.2. Homeopathy in Veterinary: Treatment of Cows

The experiments were carried out on two large farms of the Moscow region by Dr. Elena Boldyreva (Russia, 1999). Out of date equipment (e.g., dairy machines), wear-out of ventilation systems, wear-out of the barn premises led to a high incidence of various diseases of cows and calves. In these "extreme" conditions homeopathic remedies were used in the therapy of milking cows with mastitis [27,28,29].

A great advantage of the use of homeopathic remedies over the administration of antibiotics in the case of mastitis is that after the treatment milk can be used without any restrictions. In the research conducted, conventional and homeopathic methods of treating cows with serous and catarrhal mastitis were studied. Mastitis was caused mainly by improper milking machine functioning and had traumatic etiology. In summer period cows were also fetched to pasture, which increased the incidence of traumatic mastitis. There was a loss in milk production; milk had a watery appearance and flakes in it. The affected udder quarters were reddened, edematous, painful and hot to the touch. California Mastitis Test was conducted additionally to estimate somatic cell count that proved to be elevated.

Two experiments were conducted at an interval of six months, that is, in different seasons and under different weather conditions. In the first experiment, 44 lactating cows with mastitis were equally allocated to the

control and experimental groups; in the second experiment, 32 cows with mastitis were divided into two equal groups, the control and experimental ones. At the beginning of both experiments the cows of both the control and experimental groups had the same symptoms of mastitis described above.

Table 2.1 shows the schedule of administering antibacterial medications to cows of the control group in both experiments, and homeopathic remedies to cows of the experimental group in the 1st experiment, and the experimental group in the 2nd experiment.

Table 2.1. The schedule of administering antibacterial medications (Control groups of the 1st and 2nd experiments) and homeopathic remedies (Experimental group in the 1st experiment, and Experimental group in the 2nd experiment)

Day of the experiment	Control group (both experiments)	Experimental group 1	Experimental group 2
1 day of treatment	Mastijet Forte, intramammary infusions	Traumeel ad us. vet. injected subcutaneously	Traumeel ad us. vet. and Echinacea compositum ad us. vet. injected subcutaneously
2 day of treatment	Mastijet Forte, intramammary infusions	Traumeel ad us. vet. injected subcutaneously	Traumeel ad us. vet. and Echinacea compositum ad us. vet. injected subcutaneously
3 day of treatment	Streptomycin injected intramuscular	Traumeel ad us. vet. injected subcutaneously and then every other day	Traumeel ad us. vet. and Echinacea compositum ad us. vet. injected subcutaneously and then every other day
4 day of treatment and other days	Streptomycin injected intramuscular and then every day	Streptomycin injected intramuscular and then every day	Streptomycin injected intramuscular and then every day

The homeopathic remedies used were as follows. Traumeel ad us. vet. and Echinacea compositum ad us. vet. are complex homeopathic remedies, produced by Biologische Heilmittel Heel GmbH, Germany (www.heel.de). Traumeel ad us. vet. contains fourteen plant, mineral and metallic ingredients in homeopathic dilutions from D4 to D8

(see https://www.heel.de/de/traumeel%C2%AE-lt-ad-us-vet-ampullen.html). Its characteristic "symptom picture" includes pain, inflammation, swelling and fever; this remedy is widely used in veterinary and human medicine in trauma-related conditions. It explains the choice of this remedy for the treatment of cows with mastitis, taking into account such dominant predisposing factor as trauma.

Echinacea compositum ad us. vet. contains eight ingredients of plant and animal origin, minerals and metals in homeopathic dilutions from D3 to D10 (see https://www.heel.de/de/echinacea-compositum-ad-us-vet-ampullen.html). Its characteristic "symptom picture" is associated with inflammation, fever, swelling, reddening; this remedy is prescribed for the stimulation of an organism's defense mechanisms.

A cow was considered to be cured clinically if symptoms resolved completely (udder not swollen or painful, not hot), milk had normal organoleptic properties (normal color and consistency), and California Mastitis Test did not reveal an elevated level of somatic cells.

The percentage of animals cured in the 1st experiment in various time intervals, in days (the day number is counted off from the beginning of the experiment), is shown in Figure 2.4.

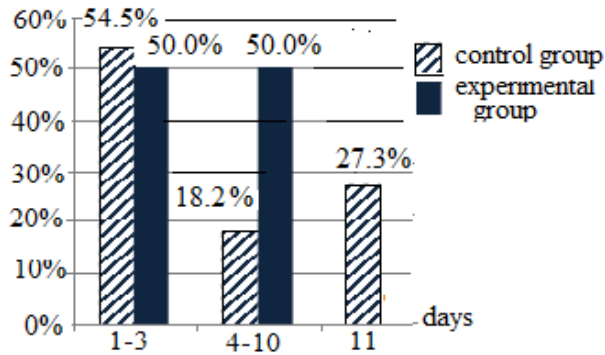

Figure 2.4. Percentage of animals cured in the 1st experiment in various time intervals. The day number is counted off from the beginning of the experiment

A similar trend for the 2nd experiment is shown in Figure 2.5.

An average duration of mastitis in the experimental groups of the 1st and the 2nd experiment was 2.4 and 1.9 days less than that in the control groups correspondingly. In the control groups of the 1st and 2nd experiments 27.3%

and 25.0% of cows recovered only after the 10th day (up to 3 weeks) respectively, while in both experimental groups all animals were cured by the 10th day. A peculiarity of Echinacea compositum ad us. vet. is that in many cases at the beginning of its use a temporary exacerbation of the symptoms is noticed (1-2 days), but after that a quick recovery takes place. This is likely to be able to explain the lower percentage of recovered animals of the experimental group in the 2nd experiment in the first three days of treatment in comparison with that in the 1st experiment. The different percentages can also be associated with the circumstance that the experiments were conducted in different seasons.

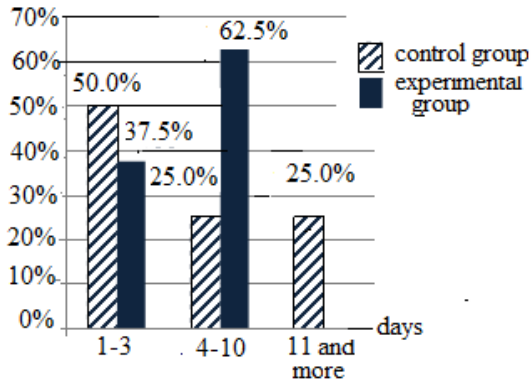

Figure 2.5. Percentage of animals cured in the 2nd experiment in various time intervals, in days. The day number is counted off from the beginning of the experiment

It is noteworthy that the positive results of homeopathic treatment of animals, i.e., cows, as described in this Section, are often achieved by using the same homeopathic medicines that are used in treating similar diseases in humans. Thus, both for humans and for animals there seems to be the same mechanism of "correcting" the organism's functions.

2.3. The Methods of Increasing "Effectivity" of Action of Biologically Active Substance in Ultra-Low Dose on a Biological System

The term “effective action” used in this Section means that, as a result of the action of a BAS in ULD on a BS, the respective characteristics of the spins in the virtual photons created by quantum objects of BAS in ULD and BS become identical. The most pronounced effect in the action of BAS in ULD on BS takes place while Condition (1.20) holds. Consequently, when selecting a BAS in ULD for effective action on a BS it is necessary to know the precession frequencies, ω_{BAS} and ω_{BS}, of the spins in the virtual particles created by the quantum objects that constitute respectively the BAS in ULD and the BS.

There are known three methods for determining the precession frequencies ω_{BAS} and ω_{BS} [10,30].

1) The determination of the frequencies of photons that are effectively acting on BS (this method is considered in detail in Section 3.1).

2) The fulfillment of the spin-flip effect (this method is considered in detail in Section 10.3).

3) The use of the energy levels of the quantum objects that constitute BS and BAS. Let us consider it in detail in this section.

According to Eq. (1.6), the precession frequency ω_v of spin of virtual photon created by a quantum object is related to the energy U_q of the quantum object as: $\omega_v = U_q / \hbar$.

Generally, a quantum object (for example, an electron in atom) is characterized by energy levels:

$$\left(U_q\right)_1,\ldots,\left(U_q\right)_i,\ldots,\left(U_q\right)_n,\ldots\left(U_q\right)_0 \text{ - the zero level.}$$

A diagram of the energy levels of a quantum object is shown in Figure 2.6.

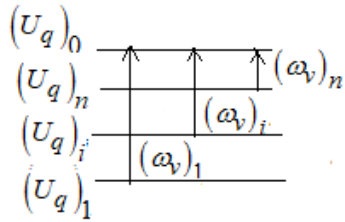

Figure 2.6. The energy levels of a quantum object: $\left(U_q\right)_1,\ldots,\left(U_q\right)_i,\ldots,\left(U_q\right)_n,\ldots$ ($\left(U_q\right)_0$ is the zero level); $\left(\omega_v\right)_1,\ldots,\left(\omega_v\right)_i,\ldots,\left(\omega_v\right)_n,\ldots$ are the spectrum of the possible values of the spin precession frequencies of the virtual

photons created by a quantum object. The arrows show the transitions between the energy levels.

From Figure 2.6 it follows that the possible values of spin precession frequencies that characterize the virtual photon created by the quantum object: ,…, $(\omega_V)_i$,…, $(\omega_V)_n$ are, respectively, equal to

$$(\omega)_1 = (U_q)_1 / \hbar, \quad (\omega)_i = (U_q)_i / \hbar, \quad (\omega)_n = (U_q)_n / \hbar .$$

Generally, a BS and a BAS are characterized by a spectrum of the possible values of the spin precession frequencies of the virtual photons created by the quantum objects that constitute the BS and the BAS. That is, the spin precession frequency $(\omega_{BS})_i$ of a virtual photon created by a quantum object of energy $(U_{BS})_i$ that constitutes BS is determined to be $(\omega_{BS})_i = (U_{BS})_i / \hbar$. Similarly, the spin precession frequency $(\omega_{BAS})_i$ of the virtual photon created by a quantum object of energy $(U_{BAS})_i$ that constitutes the BAS is determined to be $(\omega_{BAS})_i = (U_{BAS})_i / \hbar$.

Therefore, knowing the energy levels of quantum objects constituting BAS and BS it is possible to determine the frequencies of the spin precession of the virtual photons produced by the BAS's and the BS's quantum objects.