JACQUES BENVENISTE AND "THE MEMORY OF WATER": *FROM ULTRA-HIGH DILUTIONS TO TRANSFER OF BIOLOGICAL ACTIVITY OF CHEMICAL COMPOUNDS VIA ELECTRONIC NETWORKS ON WATER.*

Vladimir Voeikov

Lomonosov Moscow State University, Faculty of Biology, Moscow, Russia;

In 1988, the journal Nature published an article by a team of scientists lead by a prominent French immunologist **Jacques Benveniste** (1935-2004) which reported that the solution of extremely diluted biologically active substance (BAS) could induce a biological reaction in living cells.

They suggested that "water could act as a 'template' for the molecule".

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SCIENTIFIC PAPER

NATURE VOL. 333 30 JUNE 1988

Human basophil degranulation triggered by very dilute antiserum against IgE

E. Dayenas, F. Beauvais, J. Amara*, M. Oberbaum*, B. Robinzon t, A. Miadonna t, A. Tedeschit, B. Pomeranz§, P. Fortner§, P. Belon, J. Sainte-Laudy, B. Poitevin & J. Benveniste||

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t Department of Animal Sciences, Faculty of Agriculture, PO Box 12, The Hebrew University of Jerusalem, Rehovot 76100, Israel
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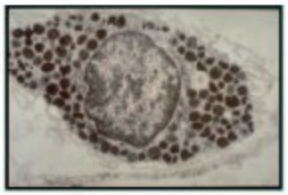
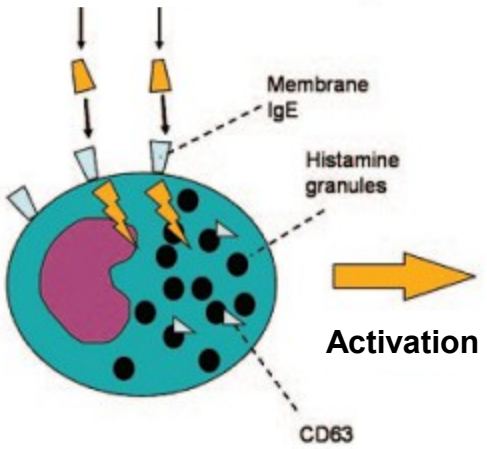
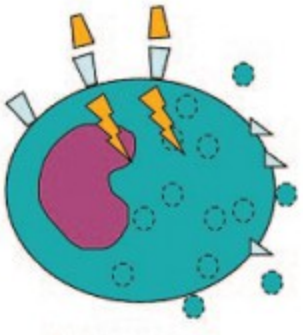
This publication triggered the hot discussion about the reality of homeopathy and about the ability of water to be the subject for "memory".

+ Anti IgE or allergic compounds at conventional doses (micrograms)





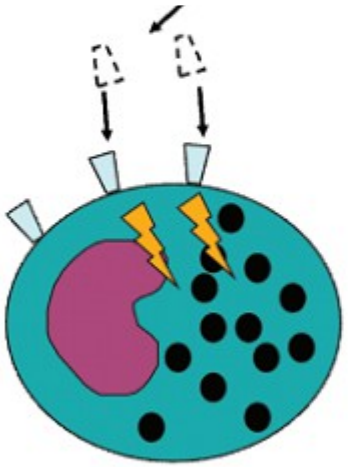
Activation



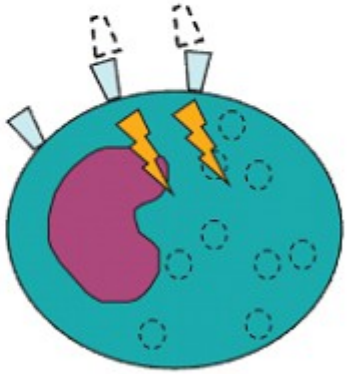
Resting basophil

Activated cell: degranulation

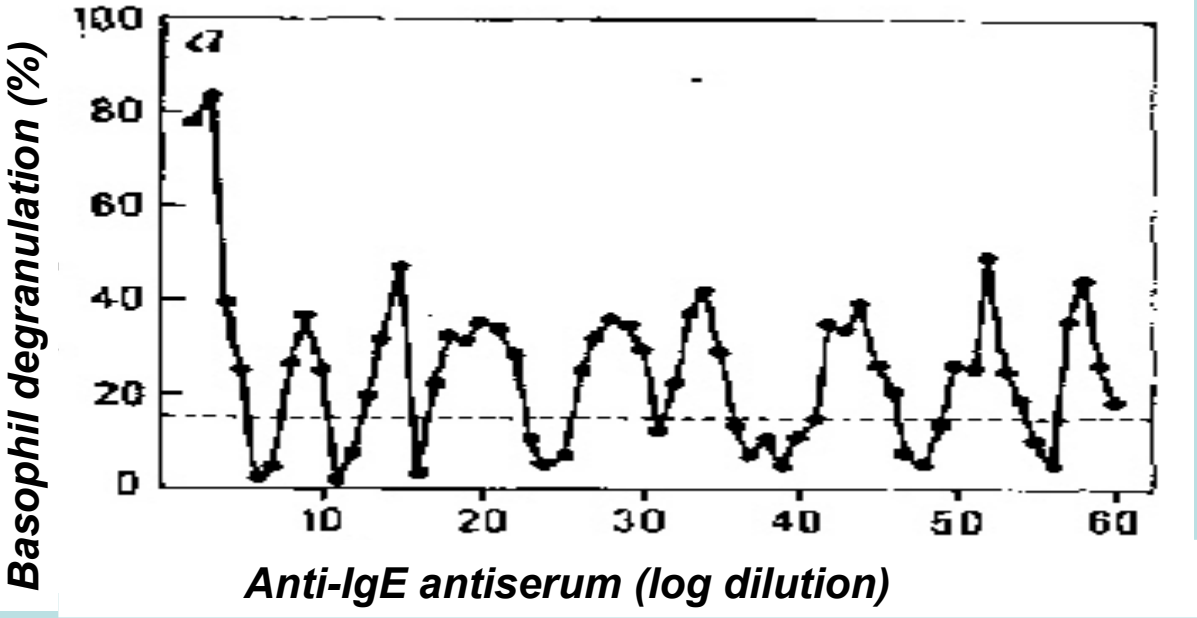
Ultra-high dilution (up to 10^{-120} Moles/l) of Anti-IgE



Activation



Activated cells – degranulation (metachromasia)



Transmission of information needs vigorous agitation of the samples

Activity of UHD is lost after:

Heating to 70-80 °C
Freezing-thawing
Ultrasonication

Rejection of Benveniste's EXPERIMENTAL DATA and assaults upon him

From the "Editorial reservation" to Benveniste's Nature paper:

"…there is a negligible chance of there being a single molecule in any sample. There is no physical basis for such an activity".

«Refutation»:

Maddox J, Randi J, Stewart WW. 'High-dilution' experiments a delusion. *Nature* 1988;334:287–90.

…« homeopathic dilutions" and "The Memory of Water" are two expressions capable of turning a peaceful and intelligent person into a violently irrational one".

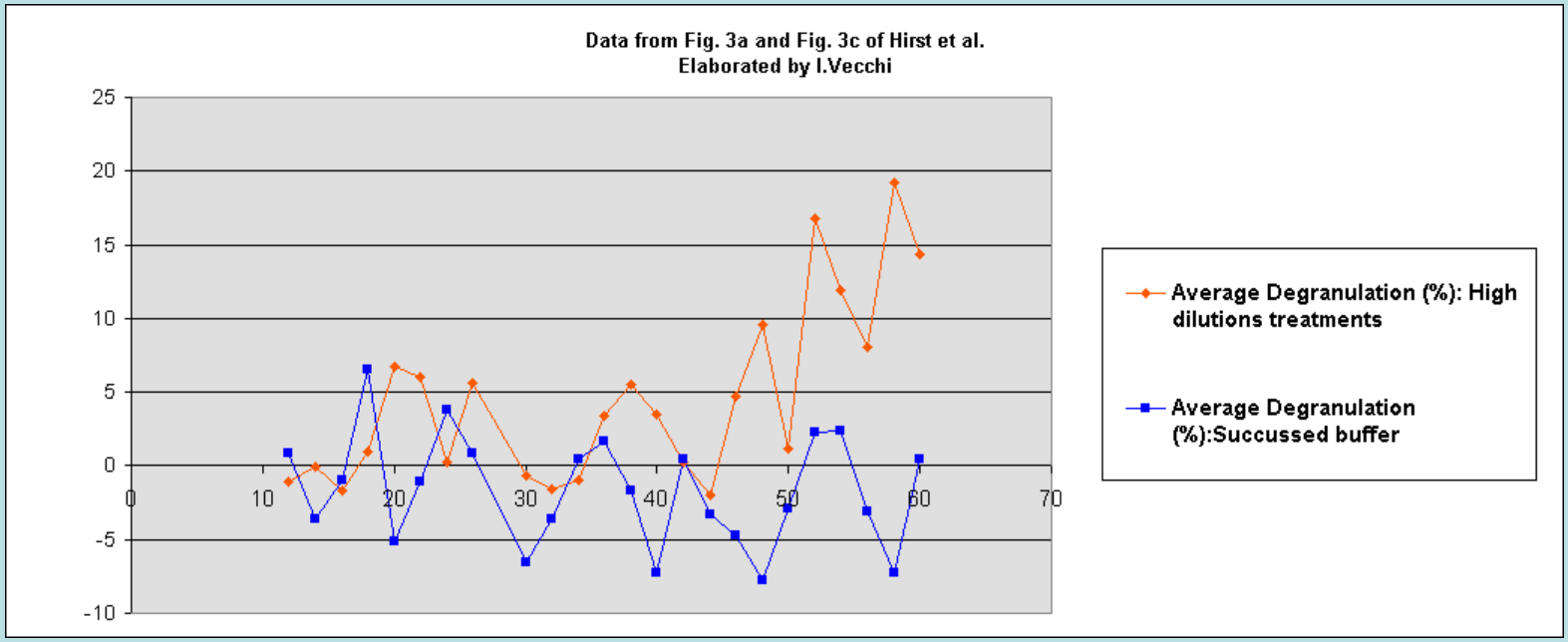
Michel Schriff "The Memory of Water: Homeopathy and the battle of Ideas in the New Science" 1998

In 1993 Nature PUBLISHES THE « REFUTATION » OF BENVENISTE'S CLAIMS THAT INDEED SUPPORTS BENVENISTE'S CONCLUSIONS

*Hirst SJ, et al. Human basophil degranulation **IS NOT** triggered by very dilute antiserum against human IgE. Nature. 1993 Dec 9;366(6455):525-7.*

... Our results contain a source of variation for which we cannot account, but no aspect of the data is consistent with the previously published claims.

Data from Hirst et al. (Table 2)	Fischer p-value	Null-hypothesis rejected %
Succussed high dilution	0.0027	99.73
Unsuccussed high dilution	0.086	91.4
Control	0.85	15



Confirmation of Benveniste results by independent researches:

Belon P, Cumps J, Ennis M, Mannaioni PF, Sainte-Laudy J, Roberfroid M, et al.
Inhibition of human basophil degranulation by successive histamine dilutions: results of a European multi-centre trial.
Inflamm Res 1999;48: S17–8.

Brown V, Ennis M.
Flow-cytometric analysis of basophil activation: inhibition by histamine at conventional and homeopathic concentrations.
Inflamm Res 2001; 50(Suppl 2):S47–S48

Lorenz I, Schneider EM, Stolz P, Brack A, Strube J.
Sensitive flow cytometric method to test basophil activation influenced by homeopathic histamine dilutions.
Forsch Komplementarmed Klass Naturheilkd 2003;10:316–24.

+ several other studies of the same authors.

Large-scale studies of biological effects of Ultra-Low Doses of BAS have been initiated in USSR in 1983 by Professor Elena Burlakova at the Institute of Biochemical Physics of USSR Academy of Sciences

The first published paper: maximal effect of a BAS at 10^{-15} M

Бурлакова Е.Б., Греченко Т.Н., Соколов Е.Н., Те-рехова С.Ф. **Влияние ингибиторов радикальных реакций окисления липидов на электрическую ак-тивность изолированного нейрона виноградной улитки // Биофизика. 1986. Т. 31. № 5. С. 921 - 923.**
(Burlakova E.B. et al. The Effect of Inhibitors of Radical Reactions of Lipid Oxidation on Electrical Activity of Isolated Neuron of the Edible Snail. Biofizika, 1986)

ДЕЙСТВИЕ СВЕРХМАЛЫХ ДОЗ БИОЛОГИЧЕСКИ АКТИВНЫХ ВЕЩЕСТВ И НИЗКОИНТЕНСИВНЫХ ФИЗИЧЕСКИХ ФАКТОРОВ

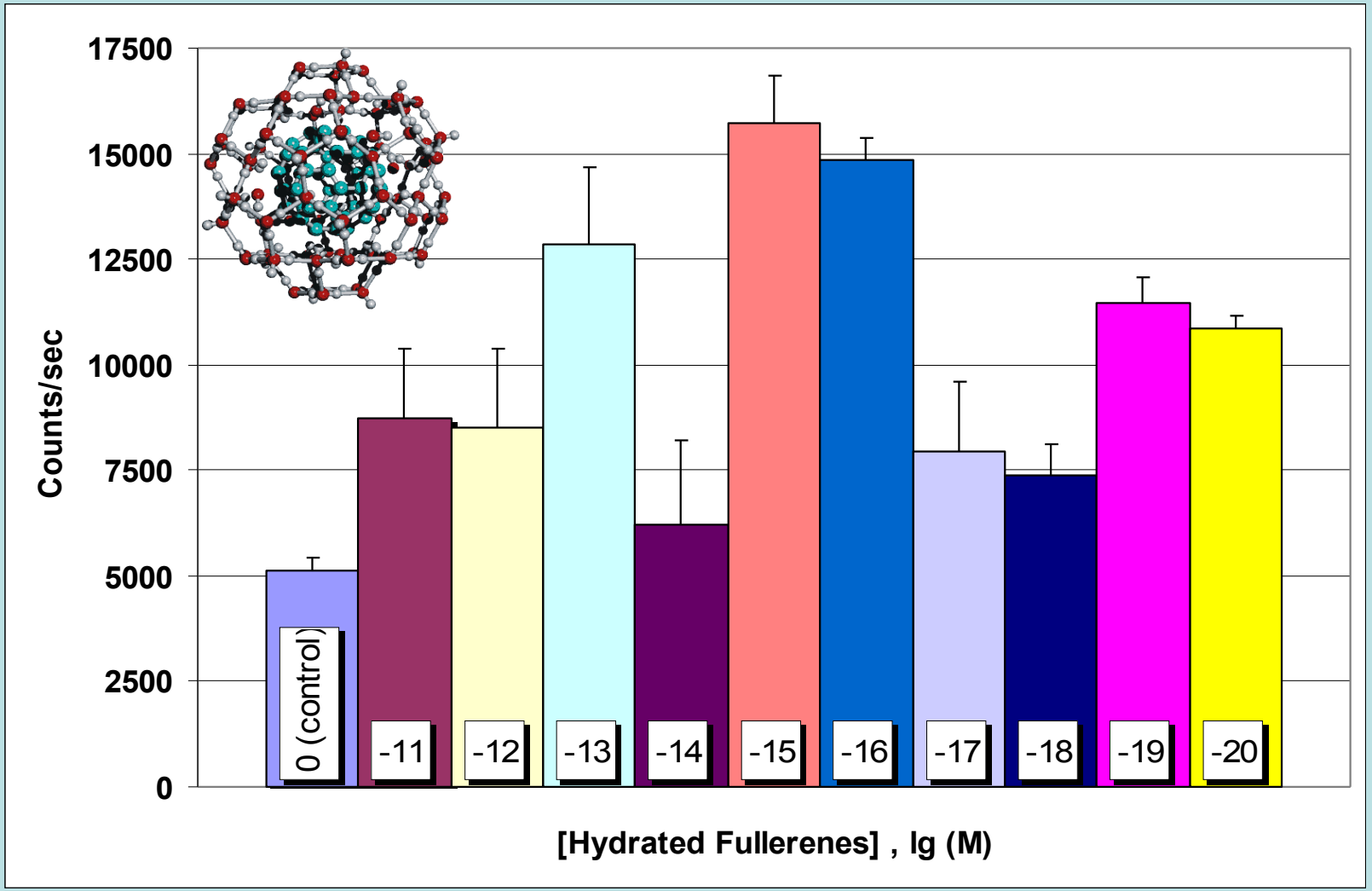
Е.Б. Бурлакова, А.А. Конрадов, Е.Л. Мальцева

Институт биохимической физики им. Н.М. Эмануэля Российская академия наук, Москва

The review of E.B. Burlakova et al. (2007) contains >100 references to publications demonstrating biological effects of Ultra-Low Doses of BAS (except for J. Benveniste)

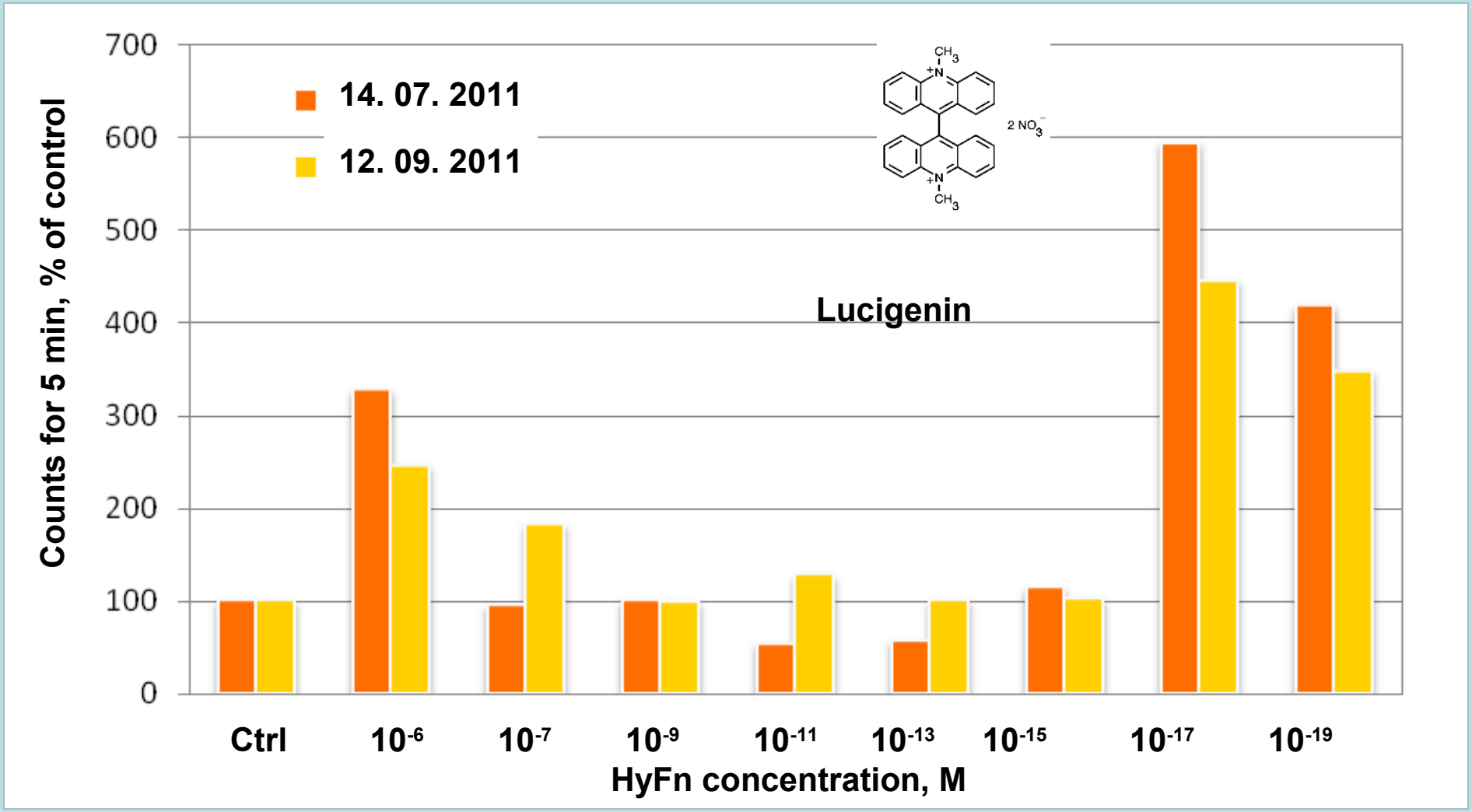
Results of our studies of the effects of Hydrated Fullerene* in wide concentration range on aqueous and biological systems

original *HyFn preparation obtained from G.V. Andrievsky



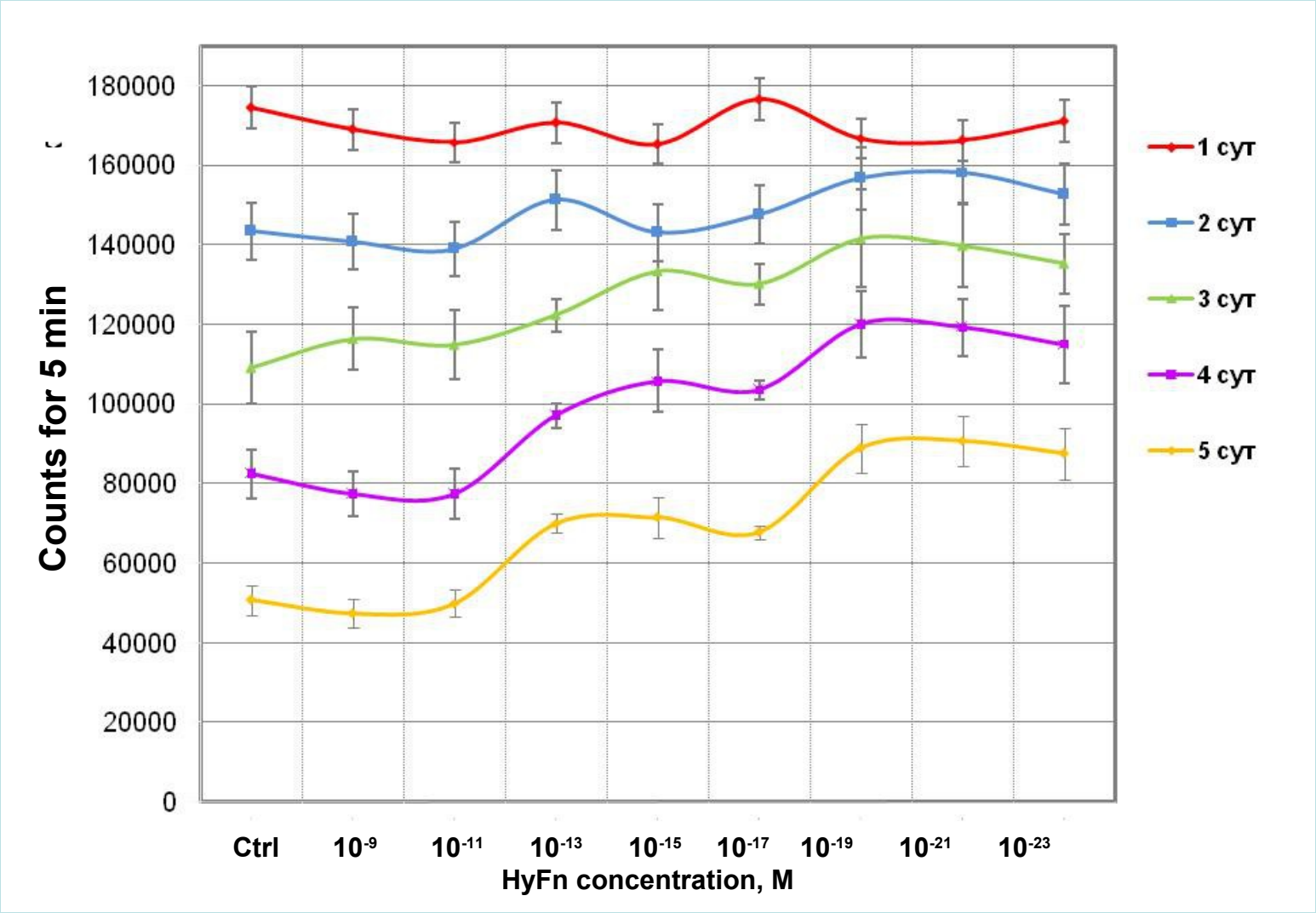
Dependence of permanent photon emission from hydrogen peroxide activated bicarbonate solutions upon HyFn concentrations has a multi-phase pattern.

HyFn in Ultra-Low Doses amplifies Lucigenin-dependent photon emission from human blood



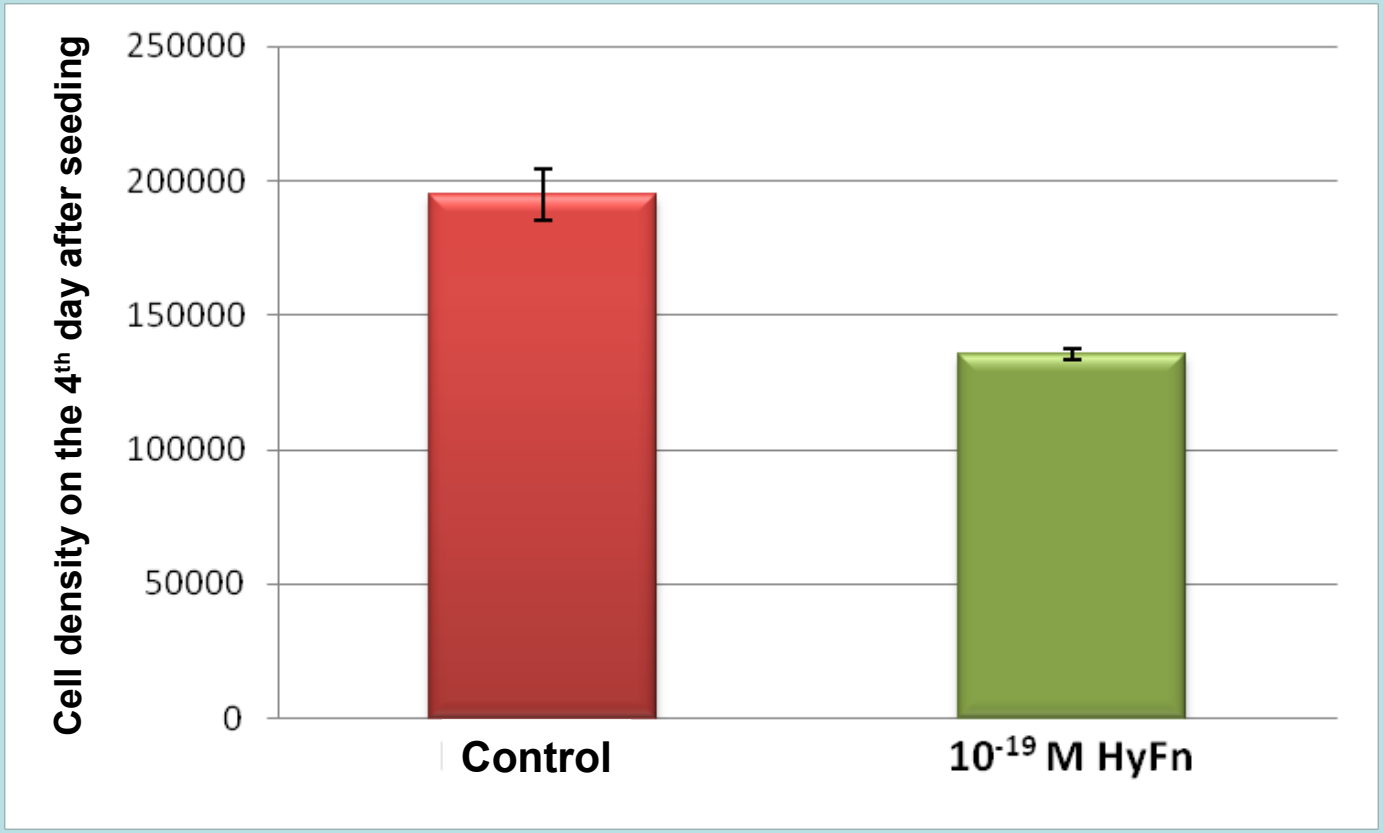
Dose-effect dependence of photon emission from healthy donor's blood hydrogen upon HyFn concentrations has a multi-phase pattern. The pattern for one and the same donor reproduces in blood tests performed on different days.

Hydrated Fullerene* in doses 10^{-19} – 10^{-23} M most significantly stabilizes enzymes in solution against thermal and oxidative inactivation



Dependence of residual activity of luciferase kept in aqueous solution at room temperature for several days upon HyFn presence in indicated concentrations.

Hydrated Fullerene* in doses 10^{-19} M retard growth of transformed Chinese hamster cells in vitro.



Hydrated Fullerene* in doses 10^{-19} M accelerate aging of the transformed Chinese hamster cells in vitro and decreases the efficiency of their colony forming.

(in collaboration with Dr. A.S. Khohlov, MSU)

Beginning from 2006 academician Alexander Konovalov (Kazan branch of RAS) studied physical-chemical properties of Ultra-High aqueous dilution of different BAS using standard high precision laboratory equipment

Malvern Instruments, UK

I. Dynamic Light Scattering

Zetasizer Nano ZS high sensitivity analyzer.

- **He-Ne laser, 632.8 nm**
- **size range 0,6nm - 6μm**

II. Precision conductomentry

Conductometer inoLab Cond Level 1 (EcoInstrument)

-relative measurement error of 0.5%

-A cell of 0.1 cm-1

-Cell constant C = 0.472 cm^{-1}

III. pH measurement

pH-meter inoLab pH 720

-accuracy +/-0.005

Effects of ultra-high dilutions of BAS and of electromagnetic fields on physical chemical properties of high-diluted water solutions were discovered:

✓Nano-sized (100 – 400 nm) associates («nano-associates») are present in high-diluted water solutions. The main part of such «nano-associates» is water.

✓Size of nano-associates, their ζ-potential, electrical conductivity, surface tension, pH vary in multi-phase pattern with serial dilutions

✓High-diluted water solutions characterized with these peculiar properties demonstrate biological activity in bio-test systems.

✓There are substances either able or not able to develop this effect.

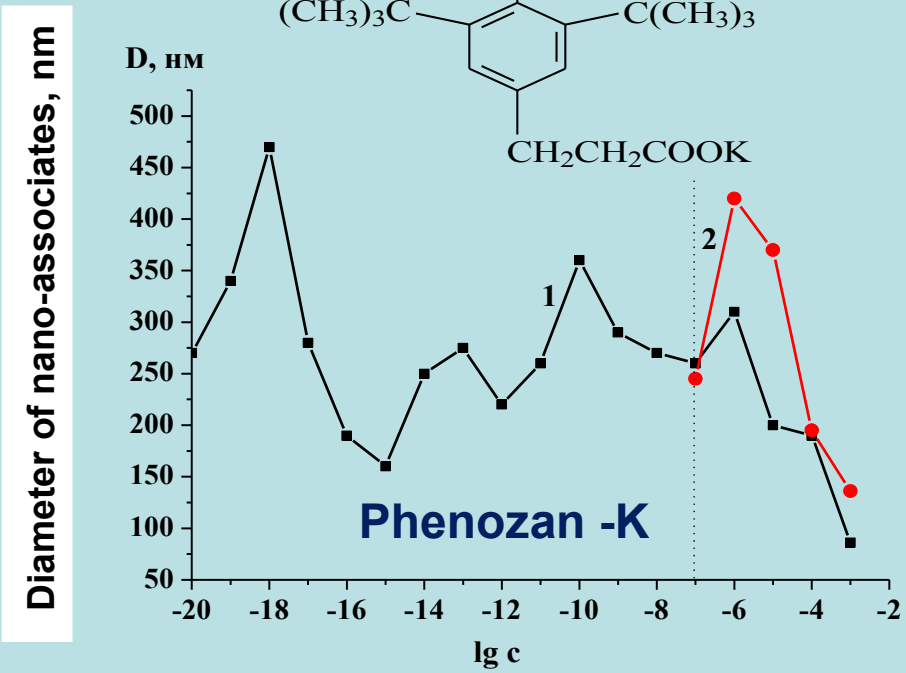
✓Peculiar properties of high-diluted water solutions emerge ONLY in the PRESENCE OF EXTERNAL ELECTROMAGNETIC FIELDS.

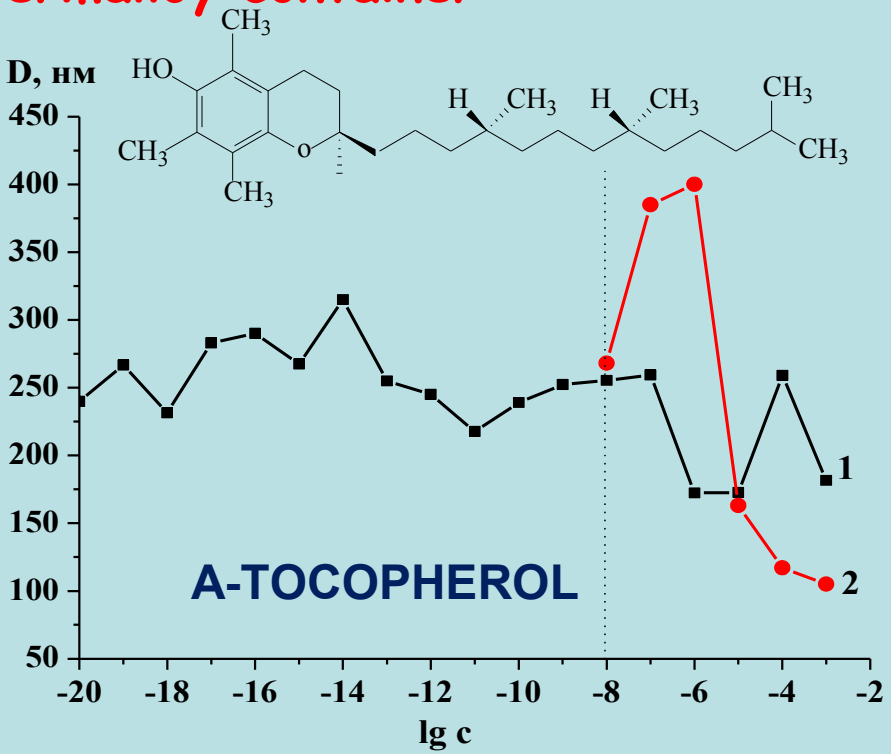
EMF are necessary for the formation of nanoassociates

18 hrs laboratory table

18 hrs permalloy container

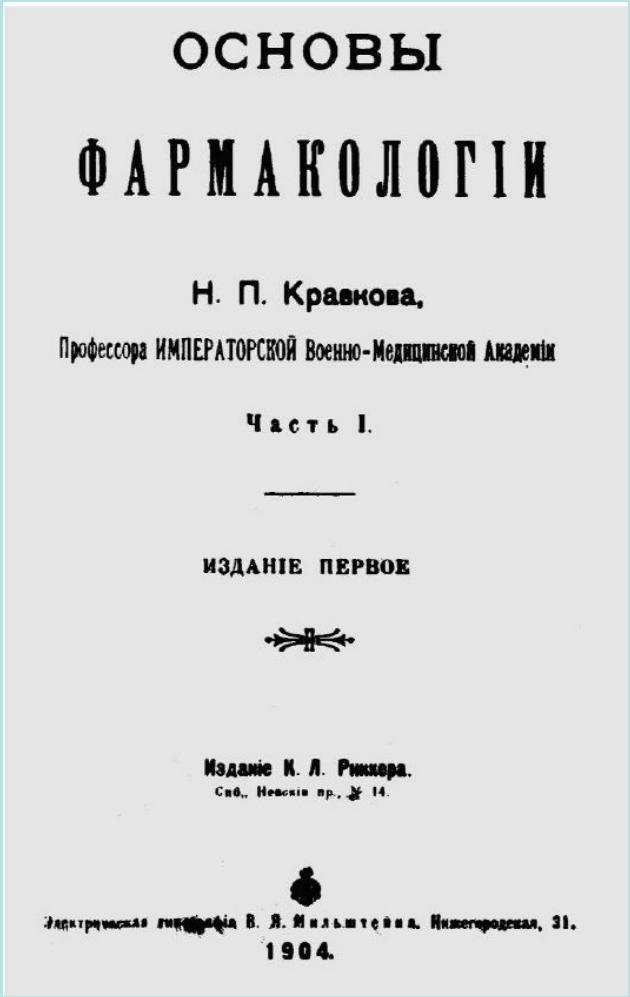
1-Laboratory table 2-Permalloy container





One of the first scientific proofs of biological activity of Ultra-High Dilutions of BAS

NIKOLAI PAVLOVICH KRAWKOW
(1865-1924).
Николай Павлович Кравков
Corresponding member of RAS, Academician of Medical-Military Academy in St.Petersburg


ОСНОВЫ

ФАРМАКОЛОГІИ

Н. П. Кравкова,

Профессора ИМПЕРАТОРСКОЙ Военно-Медицинской Академіи

Часть I.

ИЗДАНІЕ ПЕРВОЕ

Изданіе К. Л. Рикхера.
Спб., Невскій пр., № 14.

1904.

One of the founders of pharmacology in Russia.

N.P .KRAWKOW

About the sensitivity limits of living protoplasm.

“Uspekhi Eksperimentalnoi Biologii", 1924 г., V.3, No 3-4

(Zeitschrift für die Gesamte Experimentale Medizin, 1923, 34 pp. 279–306).

The effect of "poisons"* in a wide range of concentrations on the bloodstream in the isolated rabbit's ear is studied.

"... The effect of a poison becomes stronger and stronger as it is more diluted..."

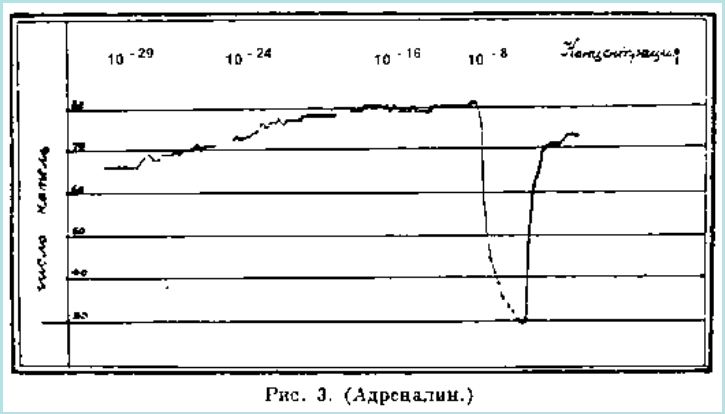


Рис. 3. (Адреналин.)

* "Poisons": epinephrine, histamine, nicotine, strychnine, cocaine, quinine, chloroform, ether, gedonal

"The dilution of poisons in which they are still active was 10^{-32}, but, apparently, this concentration is not the limit of the action of poisons"

"The action of poisons in huge dilution, apparently, loses its specific character .... Poisons become special stimulants of a protoplasm, causing it to vibrate in one direction or another, with one or the other of energy in the limits of it physiological life. "

Poisons in concentrations down to 10^{-24} changed the distribution of a pigment in frog skin.

"... Frog skin color became like a panther skin. This color lasts sometimes for days, and then returns to normal. ... Coloring often manifested at 10^{-24} sharper than, e.g. at 10^{-23} ... ".

After a stay of frogs 5-24 hours in a solution of KCN (down to 10^{-24}) "... the autopsy showed characteristic pink blood not only in the dermal vessels, but also in the heart and art. femoralis ».

*"Combining all these data, we have to come to the conclusion that **the observed phenomena do not depend on the material effects of substances on the protoplasm,** but probably on the electrical energy released in the form of electrons from these materials at their gradual dilution."*

"ACTION AT A DISTANCE"

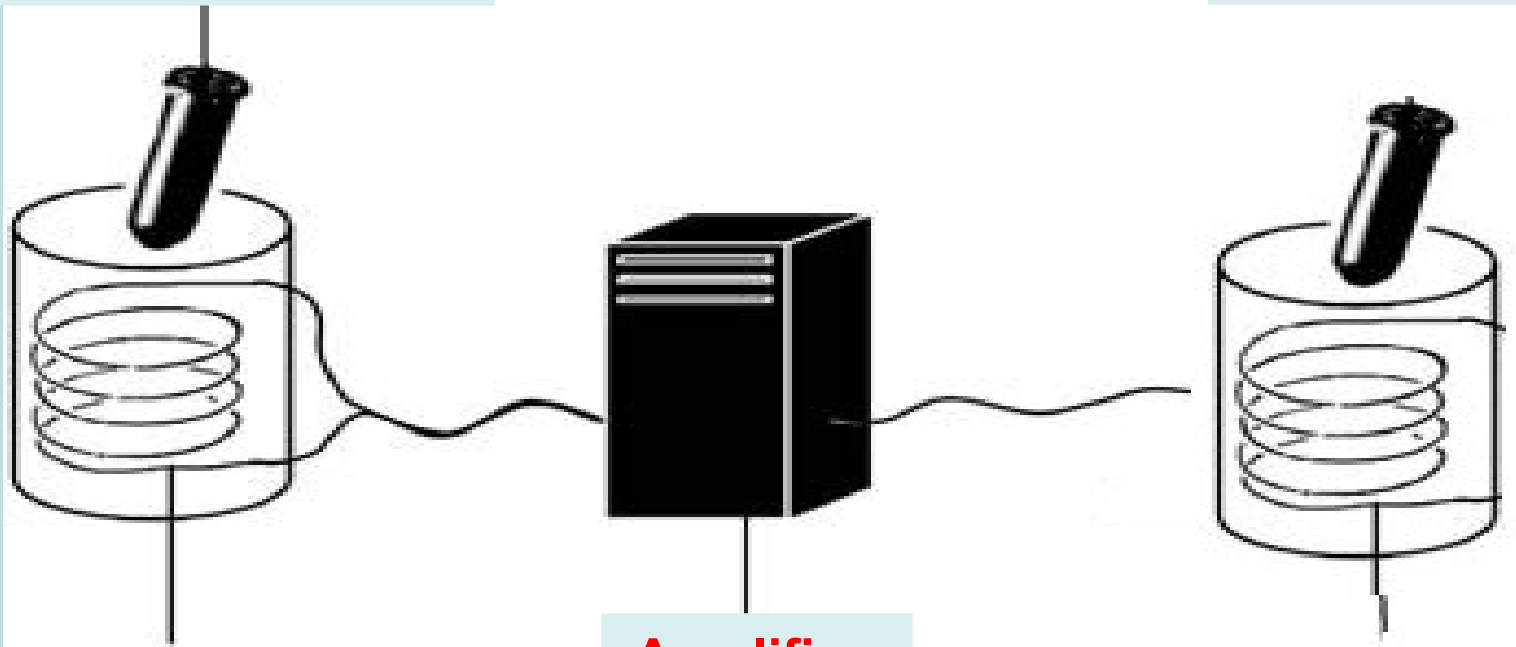
If a copper plate is placed at a distance of 0.5-1 cm from the ear "vessels constrict, and when it is removed immediately begin to expand and reach to the original tone."

"... We have the right to assume the actual effect of metals on the distance and the transfer of energy through a layer of air"

Basing on the observations that effects of "Ultra-High Dilutions" were abolished by magnetic fields Benveniste suggested that signaling might involve EM waves potentially transmittable to cells and water by electromagnetic means.

In 1991 he implemented Electronic Transmission of "Informational Copies" of biologically active substances to water.

The Principle Scheme of a device for Electronic Transmission of "Informational Copies" of biologically active substances



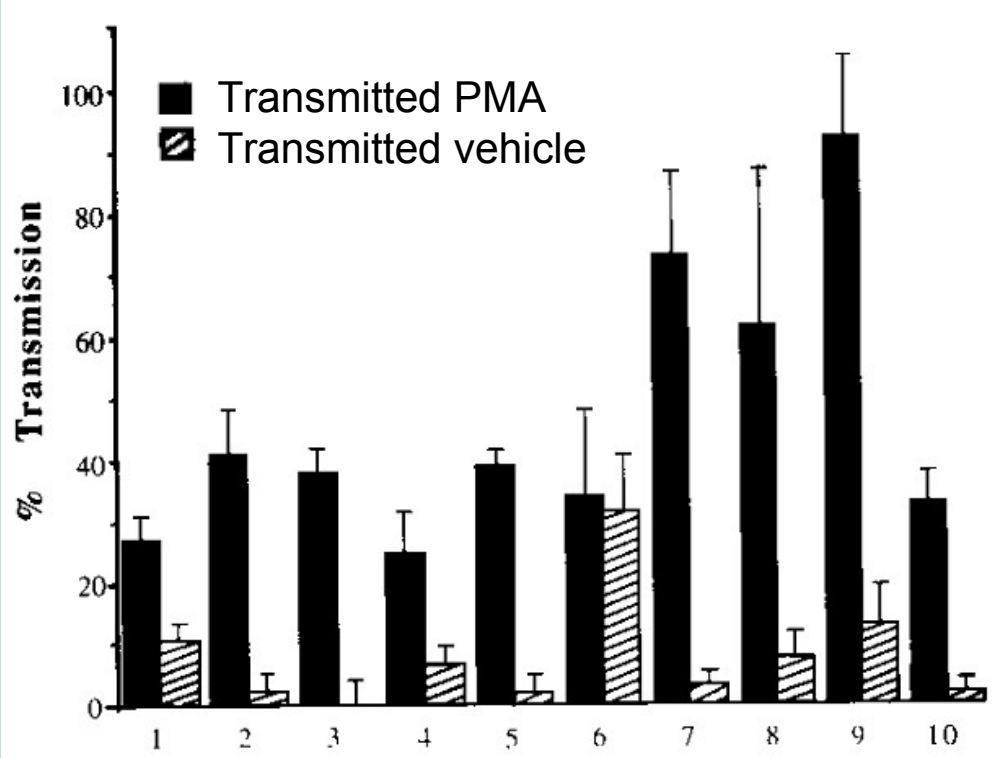
Medical Hypotheses (2000) 54(1), 33–39

Article No. mehy.1999.0891, available online at http://www.idealibrary.com on IDEAL

Activation of human neutrophils by electronically transmitted phorbol–myristate acetate

Y. Thomas,[1] M. Schiff,[2] L. Belkadi,[1] P. Jurgens,[1] L. Kahhak,[1] J. Benveniste[1]

[1]Institut National de la Santé et de la Recherche Médicale, (INSERM) U200, and Digital Biology Laboratory, Clamart, France
[2]CNRS, Centre de Recherche en Histoire des Sciences et des Techniques, Paris, France



"…normal human neutrophils reacted to PMA transmitted via an electronic oscillator by reducing cytochrome c as though they had been directly exposed to PMA. This phenomenon was not observed when the oscillator was turned off…, when protein kinase inhibitors were added to neutrophils…, when active PMA in the input solution was substituted by its inactive analogue

The results of 10 independent blind experiments

“Informational copies” of acetylcholine, histamine, ovalbumin and other BAS had been transmitted to distant addressees using communication networks including Internet.

Water treated with "informational copies" of BAS exerted specific effects on the biological test systems.

Benveniste, J. et al. TRANSATLANTIC TRANSFER OF DIGITIZED ANTIGEN SIGNAL BY TELEPHONE LINK. J. Allergy Clin. Immunol., 99:S175 (1997).

REFERENCES ON ELECTRONIC TRANSMISSION OF DRUG BIOLOGICAL ACTIVITY ON WATER AND AQUEOUS SYSTEMS

Thomas Y., et al. (2000) **Activation of human neutrophils by electronically transmitted phorbol–myristate acetate**. Med. Hypotheses. **54**, 33-39.

Ruzic R., et al. (2008) **Effects of electrically transferred molecular information on the germination of garden cress.** Int. J. High Dilution Res., **7(24)**

Montagnier L., et al. (2009) **Electromagnetic signals are produced by aqueous nanostructures derived from bacterial DNA sequences**., Interdiscip. Sci. Comput. Life Sci., **1**: 245-253.

Montagnier, L., Aissa, J., Del Giudice, E., Lavallée, C., Tedeschi, A. & Vitiello, G. 2011. DNA waves and water. Journal of Physics: Conference Series. 306: 012007.

Foletti A., et al. (2011) **Differentiation of human LAN-5 neuroblastoma cells induced by extremely low frequency electronically transmitted retinoic acid.** JACM **17(8),** 701-704.

Heredia-Rojas J. A., et al. (2011) **Entamoeba histolytica and Trichomonas vaginalis: Trophozoite growth inhibition by metronidazole electro-transferred water**, Exp. Parasitology, **127(1),** 80-83.

Foletti A., et al. (2012) **Experimental finding on the electromagnetic information transfer of specific molecular signals mediated through the aqueous system on two human cellular models.** JACM **18(3),** 258-261

Heredia-Rojas A.J., et al. (2012) **Antimicrobial effect of amphotericin B electronically-activated water against Candida albicans.** African J. Microbiol. Res. 6(15), 3684-3689, 2012

"…. Most drugs have some associated toxicities, including the most commonly used, counter-top drugs like aspirin. A digitally transmitted medicine [based on the discovery made by Jacques Benveniste] may have all the benefits but little adverse effect, not mentioning its convenience: Doctors could prescribe and apply medicine via computer or phone to the patient."

In memoriam Jacques Benveniste

Prof. Wei Hsueh, 2004


Thank you
Gracie
Спасибо

2012: Informational copies of genes are transferred via electronic networks at any distance and are fixed on water.

File with "Informational copy" of DNA HIV1 LTR (194 bp) sent to Benevento University, Molecular Biology Laboratory.

DNA is replicated. Analysis of the primary structure detected 100% match with the original

File with "Informational copy" of Borrelia burgdorferi DNA (499 bp) sent to the Laboratory of Chronix Biomedicals University of Gottingen.

DNA is replicated. Analysis of the primary structure detected 100% match with the original

Н. П. Кравков,

О ПРЕДЕЛАХ ЧУВСТВИТЕЛЬНОСТИ ЖИВОЙ ПРОТОПЛАЗМЫ.

"Успехи экспериментальной биологии", 1924 г., Т.3, № 3-4

(Zeitschrift für die Gesamte Experimentale Medizin, 1923, 34 pp. 279–306).

Изучено действие «ядов»* в широком диапазоне концентраций на кровоток в изолированном ухе кролика.

«…действие яда проявляется все сильней и сильней по мере его большего разведения …».

«Степень разведения ядов, при которой они еще проявляют активность в наших опытах равнялась 10^{-32}, но, по-видимому, эта концентрация еще не является пределом действия ядов»

«*Действие ядов в громадных разведениях, по видимому, утрачивает свой специфический характер …. Яды становятся как бы особыми стимуляторами протоплазмы, заставляя ее вибрировать в ту или другую сторону, с той или другой энергией в пределах ее физиологической жизни.»*

* «Яды»: адреналин, гистамин, никотин, стрихнин, кокаин, хинин, хлороформ, эфир, гедонал

Н. П. Кравков,

О ПРЕДЕЛАХ ЧУВСТВИТЕЛЬНОСТИ ЖИВОЙ ПРОТОПЛАЗМЫ.

"Успехи экспериментальной биологии", 1924 г., Т.3, № 3-4
(Zeitschrift für die Gesamte Experimentale Medizin, 1923, 34, pp. 279–306).

Изучено действие солей тяжелых металлов ($CuSO_4$, $Pl(NO_3)_2$, Fe_2Cl_6, $AgNO_з$, $HgCl_2$, $PtCl_4$, $V_2(SO_4)$, металлов (медь, ртуть, никель, алюминий, золото, серебро, платина).

«…соли тяжелых металлов (и настои физ. раствора на металлах) даже в колоссальных разведениях оказывают действие на сосуды изолированного уха…».

«…эти разведения проявляют действие уже в первые минуты пропускания через сосуды; хотя "доза" действующего вещества уже почти не поддается вычислению. …при таких условиях действие на протоплазму вещества обусловливается не его нейтральной молекулой, а вероятно, продуктами её расщепления с их электрическими зарядами Таким образом мы, имеем здесь дело с превращением материи в энергию, которая чувствуется живой протоплазмой. »

«*Сопоставляя все указанные данные, приходится притти к мысли, что наблюдаемые нами явления зависят не от материального воздействия металлов на протоплазму, а вероятно от электрической энергии, освобождающейся в виде электронов их веществ при их постепенном разведении.»*

Н. П. Кравков,

О ПРЕДЕЛАХ ЧУВСТВИТЕЛЬНОСТИ ЖИВОЙ ПРОТОПЛАЗМЫ.

"Успехи экспериментальной биологии", 1924 г., Т.3, № 3-4

(Zeitschrift für die Gesamte Experimentale Medizin, 1923, 34 pp. 279–306).

Изучено действие органических ядов $NaNO_2$ в диапазоне концентраций до 10^{-24} на распределение пигмента в коже лягушки.

«…кожа лягушки по окраске становилась похожей на кожу пантеры. Такая окраска держится иногда сутками, а затем возвращается к норме. …зачастую окраска проявляется резче при 10^{-24}, чем, напр., при 10^{-23}…».

После пребывания лягушек 5-24 ч. в растворе KCN (до 10^{-24}) «… после вскрытия наблюдалась характерная алая кровь не только в кожных сосудах, но и в сердце и art. femoralis».

При изучении действия на кровоток медной пластинки, помещенной на расстоянии 0,5-1 см от уха «сосуды суживаются, а после ее удаления тотчас же начинают расширяться и доходить до первоначального тонуса».

«…мы вправе предполагать действительное влияние металлов на расстоянии и передачу энергии через слой воздуха»

THUS,

THE PRINCIPLE OF ELECTRONIC TRANSMISSION OF BIOLOGICAL ACTIVITY OF SPECIFIC SUBSTANCES ON AQUEOUS SYSTEMS IS CONFIRMED BY QUITE A FEW OF INDEPENDENT RESEARCHES.

Пример: запись на воду информации от Direct thrombin inhibitor (DTI) и влияние этой воды на индуцированную тромбином коагуляцию фибриногена

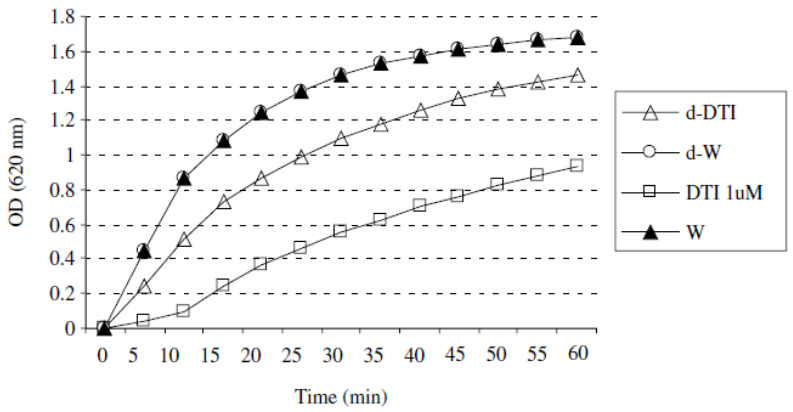


Figure 4. Effects of a Direct thrombin inhibitor on thrombin induced fibrinogen coagulation. Direct thrombin inhibitor (DTI) and water (W) were recorded. Files were digitally amplified and the signal of digital EMF DTI (d-DTI) or W (d-W) was replayed for 10 min, as described in Materials and Methods. Water, appropriately exposed to d-DTI is added to fibrinogen along with thrombin (Thr). W, d-W and DTI (1 uM) were used as negative and positive controls respectively. After different time periods, coagulation is assessed by spectrophotometry and expressed as OD_{620}. One representative experiment is shown

DTI – Direct thrombin inhibitor
d-DTI – digital (цифровой) DTI
W – вода
d-W – «цифровая» вода

Результат:

Table 2. Effects of direct thrombin inhibitor on thrombin induced fibrinogen coagulation (Consecutive blind experiments performed: April 16–June 26, 2004)

		Mean ± SD [n]
d-W	0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1	0.09 ± 0.29 [22]
d-DTI	38, 25, 39, 31, 36, 61, 44, 40, 35, 35, 65, 30, 26, 26, 31, 24, 28, 26, 81, 16, 35, 20	36.00 ± 15.36 [22]
DTI 1uM	65, 70, 68, 72, 75, 75, 69, 71	70.62 ± 3.42 [8]

Water, appropriately exposed to the digital EMF signal of DTI (d-DTI) is added to fibrinogen along with thrombin. Water (W), digital EMF water (d-W) and DTI (1 uM) were used as negative and positive controls respectively. Coagulation is assessed by spectrophotometry at OD_{620}. Results are presented at 30 min and expressed as percent (%) inhibition coagulation as defined in Materials and Methods. Data are mean ± SD, nb of experiments.

Вода и «цифровая вода» не влияют на коагуляцию фибриногена

«Цифровой» DTI ингибирует действие тромбина ~ вдвое хуже, чем сам DTI

African Journal of Microbiology Research Vol. 6(15), pp. 3684-3689, 23 April, 2012
Available online at http://www.academicjournals.org/AJMR
DOI: 10.5897/AJMR12.171

Antimicrobial effect of amphotericin B electronically-activated water against *Candida albicans*

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Противомикробное действие электронно активированной Амфотерицином В воды в отношении Candida albicans

The activation of water by physical means stimulates a new scientific approach to microbiology, in particular, antimicrobial methods. However, many of these methods are unproven or have not been properly tested. Since the 1980s, a promising procedure known as biophysical-information therapy or bioresonance therapy (BRT) has emerged as an alternative method against microbial diseases, but it has not yet been properly evaluated. It was demonstrated that by transferring amphotericin B (125 µg·ml^{-1}) information to water samples by an electronic amplifier (BRT device), the growth of cultured *Candida albicans* was significantly (*P<0.05*) inhibited (46% growth inhibition), compared with those cultures treated with sham electro-activated water samples (0% growth inhibition), and a positive control of amphotericin B (125 µg·ml^{-1}; 80% growth inhibition). Evidence for a measurable biological effect by electro-activated water samples that somehow acquires, or at least mimics, the antifungal property of amphotericin B has been demonstrated in the present study. More studies, however, are necessary to elucidate the mechanism by which such electro-activated water resembles the activity of an antimicrobial agent.

Key words: Antimicrobial effect, activated water, bioresonance, amphotericin B, growth inhibition, *Candida albicans*.

Пример: противомикробное действие электронно активированной Амфотерицином В воды в отношении Candida albicans