

Helio-Pressing” At Natural and Technogenetic Geomagnetic Deprivation of Human Populations into Megacities: Issues of Modeling and Prevention

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Citation: Trofimov A (2022) “Helio-Pressing” At Natural and Technogenetic Geomagnetic Deprivation of Human Populations into Megacities: Issues of Modeling and Prevention. J Earth Envi Sci: JEES-101.

Received Date: 01 September, 2022; **Accepted Date:** 06 September, 2022; **Published Date:** 15 September, 2022

Abstract

According to geophysical data, since the end of the XX century, the full vector of the Earth's magnetic field, following periodic secular excursions, gradually weakens. Accordingly, the buffer properties of the Earth's magnetosphere, which protects biosystems from an excess of solar proton-electron fluxes, are reduced and, particularly, in megacities with it geo-magneto-shielding constructions/It is shown that in the conditions of experimental geomagnetic screening, significant differences ($P < 0.05$) were revealed between the volunteers of the experimental and control groups in the dynamics of electrical, psychophysiological and other parameters determined by genetic markers (genes D4, B1, TNF) and the intensity of heliophysical factors at different stages of them ontogenesis.. The phenomenon of "heliophysical gene expression" was discovered, which is manifested in the modeling of long-term geomagnetic deprivation. While drinking water produced by the technology of LLC "Aurora-MNIIKA"(Russia) after light-holographic treatment in a weakened geomagnetic field, it acquires heliogenic-protective properties, contributing to a positive inversion of the functional dependence of many functional systems of healthy people and patients with arterial hypertension on heliophysical influences that increase with geomagnetic deprivation. The necessity of creating a global system of geoecological support for the life of residents of megacities is scientifically justified.

Introduction

The magnetic field of the Earth and its extremely important role in maintenance and evolution of life on our planet at the end of XXth – beginning of XXIth century became the main object of scientific attention by the collective of International Institute of Cosmoplanetary Anthropoecology named after academician V.P. Kaznacheev (Russia, Novosibirsk).

In the world scientific association, the analysis of the secular variations of the geomagnetic field (GMF) is continued. One of the analytical schemes is represented in the work by Ron Shaar et al. [1], in which distinct trend of geomagnetic induction weakening from the Xth century up to the modern period is seen (Fig.1).

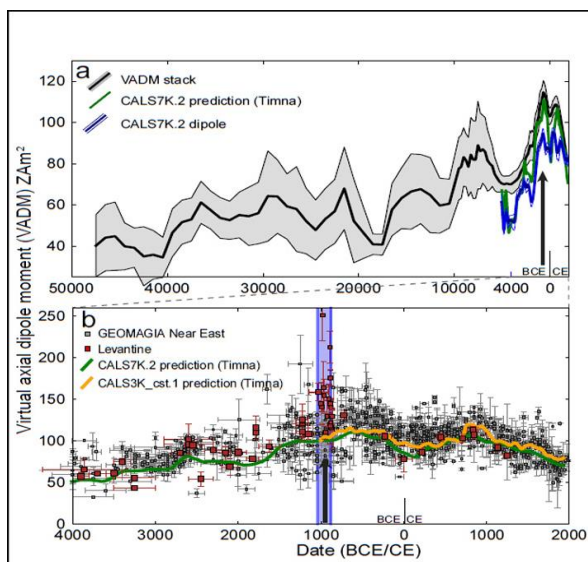


Figure 1: Summary of previous studies concerning trends of geomagnetic induction during 6000 years [by R. Shaare et al, 2011].

a) Gray line: average global VADM and the associated error estimates (2σ) obtained by stacking paleointensity GMF data of the past 50 ky. Blue line is the dipole moment calculated by CALS7K.2 model (C. Constable, M. Korte, 2006) [2].

b) Green line is the prediction of CALS7K.2 model. Location of the sites is shown in Fig. 1a. Green (orange) line is the prediction of CALS7K.2 model [CALS3K_cst.1 model (Korte et al., 2009)] for the location of Timna-30. The blue area and the arrow mark the spikes episode studied here.

Discussion of the geophysical data concerning numerous jerks and excursions of the GMF, accompanied by

considerable decrease in its intensity as, for example in case of excursion Laschamp, when the intensity of the GMF decreased by almost 10 times [3], goes on. The problem of possible relationships between the magnetic inversions and the course of biological evolution is also discussed [4]. With a decrease in the intensity of the GMF the buffer properties of the magnetosphere are reduced. It ceases to properly protect the biosphere from cosmic radiation: reinforced flows of cosmic rays start to penetrate into the atmosphere and cause a progressive increase in the number of secondary ionized particles that form the so called "broad atmospheric showers", reaching the biosphere (Fig. 2).

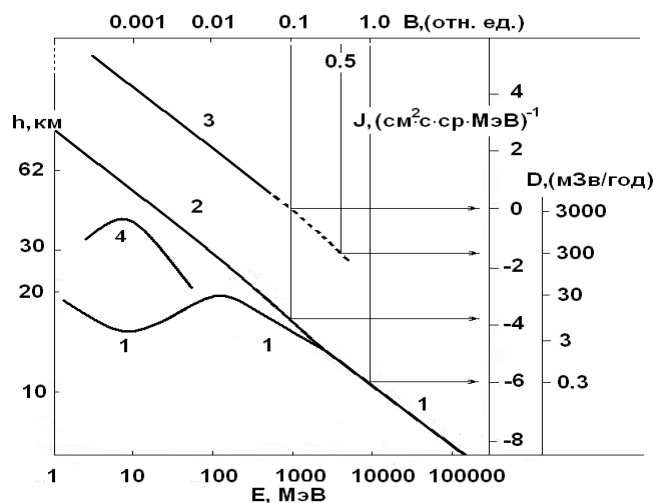


Figure 2: The depth of cosmic particles penetration in geomagnetic deprivation [by N; Kuznetsova, V. Kuznetsov, 2012].

Density (J) of the cosmic rays (CR) flux as protons and CR induced radiation dose D in relation to CR energy E : 1-galactic CR; 2-Sun CR; 3-protons flux within radiation belt; 4-anomalous. Left scale: h -altitude the CR protons ionizing atmosphere penetrate (Acasofu, Chepmen, 1975). Top scale: magnitude of geomagnetic field module (module of

the modern field is equal to 1) corresponding to cut off energy of CR protons with energy E (B equal to 1 corresponds to $E = 10$ GeV).

Increased levels of radiation near the Earth surface in the periods of geomagnetic excursions can cause numerous genetic changes in biosystems, leading to significant

evolutionary consequences. In this case, mutagenic hard radiation from flashes of supernew stars is seen by some authors as a necessary condition for evolution; the GMF excursions can lead to mutations of regulatory genes. Russian geophysics N.D. Kuznetsova and V.V. Kuznetsov [5]

in their works presented comparative chrono-evolutionary analytical assessment of the possible dependence of genetic mutations of different types on a variety of geomagnetic inversions for discussion (Table 1) [5].

Table 1: Excursions and inversions of GMF and events in human evolution [N. Kuznetsova, V. Kuznetsov.2012].

Excurses and inversions, mln years ago	Events in human evolution, mln years ago
0.033 – Mono Lake a	0.03 - disappearance of the Neanderthal men
0.041 – Laschamp a	0.042 –FOXP2 gene mutation 0.037 – microcephalin gene mutation c
0.070 – Norwegian – Greenland Sea a	0.070 - division of ancestral population into three races (according to the mtDNA) d
0.120 – Blake a	0.1 – age of the common ancestor of a modern man (according to Y - chromosome) e
0.211 – Jamaica – Pringle Falls a	0.23 – age of the common ancestor of a modern man (according to the mtDNA) e
0.56 – 0.58 – Big Lost a 0.67 – Stage 17 a 0.78 – Matuyama – Brunhes 0.797 – Brunhes precursor a	660.000±140.000 – division of the lines of a man and the Neanderthal men (according to the mtDNA) f
0.78 - Matuyama – Brunhes h	0.8 – age of the human ancestor according to beta-globin g
1.95 – 1.79 – Olduvai i	1.8 – appearance of <i>Homo erectus</i> j
2.6 – Gauss – Matuyama k	2.4±0.3 –mutation that provides an increase in brain volume among representatives of line <i>Homo l</i> 2.8 –mutation inactivating the gene, that encodes manufacturing of sucrose at the cell surface

With the continuing decline in the intensity of GMF, the biogeophysical study of its possible functional, genetic, and evolutionary consequences for modern humans experiencing additional geomagnetic deprivation in numerous shielding metal structures in large cities, as well as the search for effective preventive measures, is particularly relevant. This was the main motive and **purpose** of the study.

Objectives

1. To study the dynamics of the association of psychophysiological parameters of a person with the B1 gene, with the length of alleles of the D4 gene and the heliogeophysical situation at different stages of the ontogenesis of the volunteer’s organism with multiple weakening of the total vector of geomagnetic induction and transformation of its inclination as a model of

combined effects on a person of technogenic and natural geomagnetic deprivation in megacities.

2. To develop and test the means of non-medical prevention of excess heliomagnetotropic human reactions (at healthy people and patients with arterial hypertension) on the basis of drinking water exposed to a weakened geomagnetic field.

Study design

While solving the problem ISRICA, together with the laboratory of heliostatopathology of Scientific Centre of Clinical and Experimental Medicine SB RAMS, the original screening system was used for research installations of Y.A. Zaitsev` design (patent of RF № 2012175 from 30.04.1994) with more than 500-fold weakening of the geomagnetic induction for the research with name «Cosmobiotron» (Fig.3).

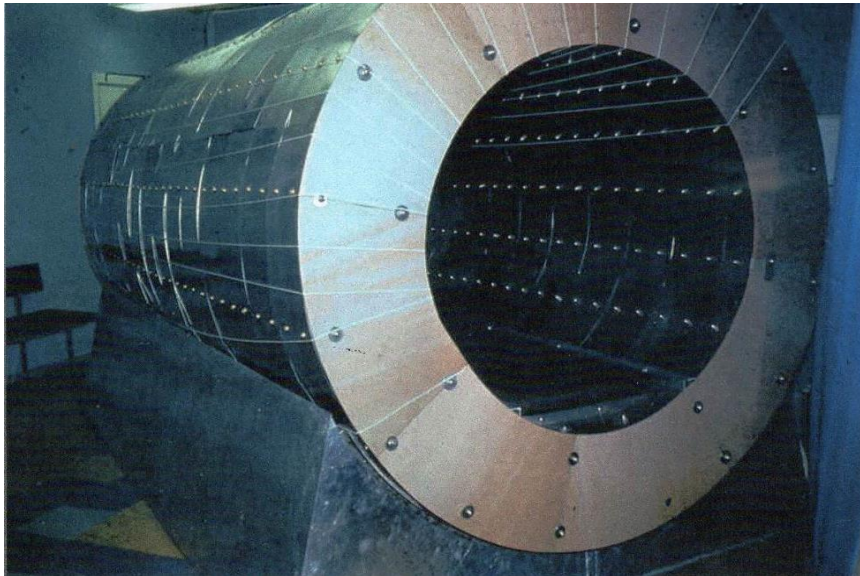


Figure 3: Hypogeomagnetic chamber as a simulator of bioeffects on human geomagnetic deprivation Patent RU №2012175[6].

The scheme of works at the 1st stage of the study (2002 - 2005), held by "double blind" method, envisaged the 3-month course of 10 weekly sessions of 30 minutes for the male subjects aged 18-20 years (n = 39) in the screening and transforming GMP installations [6].

At the 2nd stage (2006-2020), while solving Problem 2, for the sample, volunteers (n = 24) were investigated in the mode of their testing: in the period of solar eclipse on July 22, 2009, when there was a redistribution of the flows of solar and galactic protons reaching the Earth's environs. Hemodynamic parameters of the subjects were measured twice in the various phases of the eclipse: before and after taking 150 ml of heliomagnetoprotective drinking water (Patent of RF №2342149), prepared in a portable installation "TRODR"(authors AV Trofimov, GI Druzhinin,2011) (after modernization the new name was «HELIOSTAR-m» or «Helios-m»), which, subsequently, became the prototype for a new generation of screening devices series "HELIOSTAR-2", intended for industrial production of helioprotective concentrate and drink of line "Holographic Water- HELIOSTAR-2", intended for the industrial production of helioprotective concentrate and other drug-free protective agents.

At the stage of 2002-2005, a test was used with the genotyping of volunteers by the length of the alleles of the dopamine receptor D4 gene, as well as for the B1 and TNF genes by PCR methods with primers flanking polymorphic sections of DNA (a joint fragment of work with the Institute of Therapy of the SB RAMS and the Institute of Cytology and Genetics of the SB RAS).

Before-, in the middle and after the courses of test, computer registration of electroencephalographic, electro-light-psychophysiological, hemodynamic and other parameters of the volunteers, and also assessment by the program "Helios" (Certificate of state registration in the

Russian Federation № 970125 from 24.03.1997) of cosmic conditions in the period of prenatal development of the subjects were conducted [8].

In the mathematical treatment the data of satellite monitoring (satellites «Goes» NACA, USA) of cosmic corpuscular proton-electron fluxes and multivariate correlation analysis on the program "Decision tree" (Institute of Mathematics of SB RAS, Berikov, 2002) were used.

Results and discussion

In the conditions of multiple short-term geomagnetic deprivation, a significant increase in the electrical activity of the volunteer's brain was noted, mainly in the alpha-rhythm range, and it was shown that the heliogeophysical matrix, imprinted at various stages of prenatal development of the subjects 'and their parents' bodies, is activated and adaptively demanded with the weakening of geomagnetic induction (Table 2) [6].

The disclosure of functional reserves of the brain is revealed: improvement of memory, concentration, development of intellectual abilities, in particular, to abstract from habitual associations. By the end of the course of simulated geomagnetic deprivation, a significant direct dependence of the level of thought processes on the intensity of solar electron and neutron fluxes was revealed, as well as their significant feedback with the magnitude of solar proton fluxes.

The higher nervous activity of a person is realized through a large number of neurotransmitter systems of the brain, which play an important role in the implementation of psychomotor and cognitive functions that are impaired in multifactorial diseases and conditions with hereditary predisposition, such as Parkinson's disease, schizophrenia,

drug addiction, and others. Among the genes involved in the formation of human neurochemical reactions, researchers are particularly interested in the B1 gene and the D4

dopamine receptor gene, whose allelic variants contain a variable number in the 3rd exon (from 2 to 10) imperfect repeats of DNA.

Table 2: Influence of heliophysical factors during the prenatal development of the volunteers 'and their parent's bodies on the genetically determined dynamics of the volunteer's physiological parameters in the conditions of the simulated geomagnetic field preformation (weakening of the GMF, change in its angle of inclination) [V. Kaznacheev, A. Trofimov, 2008].

Parametrs	1	2	3	4	5
gene	Prenatal period				
D4	P28-1P 28_2P		28-1P 28_1,2,4,5,6,7,10P 28+1P		28_9P
TNF				28_1,2,5,7,9F 28+1F	
B1		28-1M 28_3,4,7,9M			
Note:	1 – EEG		■	P – volunteer	
	2 – BP (blood pressure)				
	3 – Gench's test		■	M – mother of a volunteer	
	4 – hormones				
	5 – GDV-parameters		■	F – father of a volunteer	

Notes: 1-electroencephalography (EEG), 2-blood pressure systolic (BPS), 3-Gench's test, 4-hormones, 5- gas discharge visualization (GDV), 28_1,2...28+1: periods pre-postnatal development.

We called this appearance opened for the first time as a phenomenon of "heliophysical expression" of genes, showing that the activation of previously "sleeping" genes is accompanied by a lowering of the thresholds of the human body sensitivity to weak information signals of cosmogonic content (solar flashes, eclipses) that have important evolutionary significance [6].

Thus, after several sessions of geomagnetic deprivation, when presenting information and holographic signals to the subjects (RF patent No. 2239860 of 10.11.2004), a

significant effect of polymorphic expression of the D4 gene on changes in the topography of the electrical activity of the brain and the spectrum of EEG parameters was observed. On the presentation of a control hologram to volunteers, without not visualized physiologically significant information, was noted – the brain does not react, and when presented with holograms recorded during solar flares (G1) or solar eclipses (G2), the electrical response of different parts of the brain, coupled with the length of the D4 gene alleles, turns out to be different before and after the course of geomagnetic deprivation (Table 3).

Table 3: Changes in the topography and spectrum of EEG parameters during prolonged geomagnetic deprivation and a holographic sample associated with the length of the D4 gene alleles in healthy subjects at different stages of the study [V. Kaznacheev, A. Trofimov, 2008].

Date	Kind of loading	Amplitude				Frequency			
		delta	teta	alpha	beta	delta	teta	alpha	beta
12-13.11.2002	control hologram	-	-	-	-	-	-	-	-
	hologram G1	-	O2, Cz	-	-	Cz	-	-	-
	hologram G2	T4	F3, T3, Cz	-	T3	-	T3, O1, Cz	-	-
3-4.12.2002	control hologram	-	-	-	-	-	-	-	-
	hologram G1	-	T3	Cz	T4	T3	T3, T4, O2, Cz	-	-

Using the "decision tree" method, a significant effect of the length of the D4 gene alleles in combination with prenatally imprinted heliophysical effects on the magnetic sensitivity of the human body, the electrical conductivity of the AP (acupuncture points), the amount of light absorption of the

skin, the parameters of brain rheography, the indicators of intelligence, memory and creativity, and an increase in their dependence on solar corpuscular flows were determined. (Table. 4) [6].

Table 4: Features of the covariance dependence of genophenotypic traits, psychophysiological parameters of a person and the cosmophysical environment at the end of the course of geomagnetic deprivation [V. Kaznacheev, A. Trofimov, 2008].

Nº	Meaningfully coupled parameters	Cosmic rays
1	gene D4	intellect
2	gene B1	memory
3	gene TNF	digital test
4	magnetosensitivity (electroconductivity TR)	creative work
5	magnetosensitivity (electroconductivity TR)	memory
6	operative memory	creative work
7	magnetosensitivity (pulse, APs)	protons (Pr>1 meV), (Pr>10 meV)
8	reographic index	alpha particles
9	light absorption of the skin	protons (Pr>1 meV), (Pr>30 meV)
10	tolerance to physical load	neutrons

Later, in 2005-2007 studies we have noted other possible consequences of redistribution of solar-functional dependencies in conditions of a weakening of the GMF: with the use of the same screening installation it has been shown that after a short term geomagnetic deprivation (in vitro) of blood samples of volunteers (healthy and patients with arterial hypertension) significant associations of hemorheological and heliogeophysical parameters that increase the speed of aging and the risk of cardiovascular catastrophes are revealed [7].

Conclusions

Conclusion 1. In conditions of industrial electromagnetic remarking of nature of large cities and simulated with screen's constructions weakening of the geomagnetic field, by more than 500 times, the phenomenon of "heliophysical gene expression" is revealed: significant associations of parameters that reflect the functional activity of the brain, psychophysiological, intellectual and creative processes with genetic markers (genes B1 and D4) and heliophysical situation in the pre-and postnatal ontogeny of the examinees and their parents.

Conclusion 2. Heliophysical gene expression, which manifests itself in prolonged short-term geomagnetic deprivation of a person, contributes to a decrease in the thresholds of its sensitivity to information-holographic signals (about solar flares and solar eclipses), associated with the dynamics of electrophysiological parameters and the length of the D4 gene alleles.

Conclusion 3. Age-old excursions of the geomagnetic field, accompanied by a weakening of its induction and an increase in access to the biosphere of solar-galactic corpuscular flows, combined with man-made shielding

effects, increasing the degree of openness of biosystems, can have evolutionary consequences for people and, above all, residents of megacities.

The results of the 1st stage of the research made even more urgent the search for such non-medicinal means that would ensure the protection of the biosphere, a man and the entire civilization in conditions of increasing onslaught of galactic and solar-corpuscular flows with the weakening of the protective magnetosphere cover. Drinking water treated in the weakened geomagnetic field (RF patent №23421149), proved capable to protect the water structures of the human body, and, consequently, all its functional systems in the periods of solar-magnetospheric disturbances.

The first tests of helioprotective holographic water were conducted in the period of extreme heliogeophysical situation - during one of the solar and lunar eclipses in 2009-2018, under which generally component of galactic cosmic rays increases and solar proton flow, reflected by the moon decreases. Corpuscular flows, redistributed by the Moon subsequently reach the magnetosphere-ionosphere layer of the protective shell of our planet, where, usually, their energy is significantly reduced.

It is shown that a significant ($P < 0.05$) direct dependence of human vascular tone, estimated by the value of diastolic blood pressure, on the flow of electrons and protons of different energies, which occurs in the period after the eclipse (Table 5), when taking a small amount of helioprotective drinking water as a sample, is positively transformed after 20-30 minutes. In the volunteers with arterial hypertension who consumed water, there was a significant inverse correlation ($p < 0.05$) of the level of diastolic blood pressure and pulse rate from proton fluxes with an energy of more than 100 meV (Table 5).

Table 5: Correlation of (r)physiological parameters in healthy volunteers (n=24) on the five-minute values of electrons, protons, neutrons and x-rays during the sun eclipse before (A) and after (B) the test application of the «Helioprotective Water» [2012].

A Parameters	Pr>1 meV	Pr>10 meV	Pr>100 meV	El>0,6 meV	El>2 meV	Ne	X-Rays
systolic pressure	0.23	0.23	0.31	0.23	0	0.23	-0.25
diastolic pressure	0.53*	0.53*	0.54*	0.53*	0	0.53*	-0.26
IM	-0.03	-0.03	-0.08	-0.03	0	-0.03	-0.15
Heart rate	0.13	0.13*	0.29*	0.13*	0	0.13	-0.28
B Parameters	Pr>1 meV	Pr>10 meV	Pr>100 meV	El>0,6 meV	El>2 meV	Ne	X-Rays
systolic Pressure	-0.16	-0.16	-0.12	-0.16	0.34	-0.06	0.17
diastolic Pressure	-0.39*	-0.39*	-0.64*	-0.39*	-0.13	-0.11*	-0.32
IM	0.53	0.53	0.29	0.53	-0.30	0.34	0.52
Heart rate	-0.36	-0.42*	-0.66*	-0.60*	-0.24	0.20	-0.40

Notes: *-The significance of the correlation coefficients, IM -Myocardium index

Recent studies conducted in the Far North in regime of testing of healthy subjects during sun eclipse [8] and volunteers with hypertension who expressed their consent to pass (by double "blind" method) 2-3 - week courses with the use of control and geomagnetically-deprived drinking water, confirmed our first observations. Helioprotective water can provide a long-term and effective protection of the functional systems of human body in the periods of

solar-magnetospheric disturbances. On 2015 with the use of «Heliostar Holographic Water» significant ($p < 0.003$) positive for the patients with arterial hypertension organism change of correlative dependence vector of psycho -physiological parameters of the patients with arterial hypertension from the intensity of solar protons streams was fixed (Table 6).

Table 6: Correlation (r) between arterial hypertension patients` psychophysiological parameters and cosmic proton-electron flux in background research (1) and after «Heliostar Holographic Water»- two-weeks cure (2) [2015].

1.Parameters	Pr>1meV	Pr>10meV	Pr>100meV	El>8meV	El>2meV
CFF	-0.10	-0.07	0.55*	-0.07*	-0.07
SVMR	0.14*	0.21*	0.46*	0.21*	0.21*
RMO	0.18	0.09	-0.66*	0.09	0.09
Entropy	0.35*	0.55*	0.61*	0.53*	0.53*
2.Parameters	Pr>1meV	Pr>10meV	Pr>100meV	El>8meV	El>2meV
CFF	-0.66	-0.66	-0.87* P=0.004	-0.73* P=0.003	-0.66
SVMR	-0.59*	-0.59*	-0.82* P=0.001	-0.73* P=0.003	-0.59*
RMO	-0.04	-0.04	0.34*	-0.01	-0.04
Entropy	-0.33*	-0.33*	0*	-0.41*	-0.33*

Notes: CFF- critical fusion frequency (Hz), SVMR- simple visual motor reaction (ms), RMO-reaction to moving object(ms), Entropy- level of parameters chaos, Pr., El – cosmic protons and electron different energy, in bold type -significant negative correlations.

Conclusion 4. A non-medicinal product based on drinking water that has undergone light-holographic treatment in a weakened geomagnetic field ("Holographic water - "Heliostar") has been developed and successfully tested, which weakens excessive human heliomagnetotropic reactions and contributes to the prevention of crisis conditions (on the example of patients with arterial hypertension) [9].

Conclusion 5. The necessity of geoecological support of human life activity in the conditions of combined technogenic and natural changes in the heliogeophysical environment, the continuing decrease in geomagnetic induction and the increase in the access of solar-galactic corpuscular flows to the biosphere is scientifically justified [10].

Conclusion 6. Light-holographic treatment of drinking water in a weakened geomagnetic field leads to the stabilization of the water-cluster structure, energy-informational capacity and biocatalytic activity, which ensures its helioprotective effect in relation to humans at the genetic, supramolecular, cellular, systemic and organizational levels.

Suggestions

1. It is important to continue interdisciplinary studies of the biotropic effects of long-term geomagnetic deprivation of biosystems in order to determine the range of possible evolutionary consequences of the combined influence of industrial electromagnetic distortions and the reduction of the buffer properties of the geomagnetic field in order to create a global system of geoecological life support for humanity in conditions of significant cosmoplanetary changes.
2. The organization of the International Interdisciplinary Research Center "Cosmobiotron" with installations made of new composite materials with various degrees of GMF shielding and a staff of highly qualified astrogeophysicists, biologists, geneticists and doctors is promising.
3. In 2016-2020, our Institute, together with Aurora MNIKA LLC, continued to modify the Heliostar» series of GMF shielding devices for the production of light-holographically treated drinking water Certificate No. 918-866-207 on intellectual property for the new device was obtained. In the near future, production of a trial batch of helioprotective water will be started with our new partner, LLC "Dozor-Invest".

Acknowledgements

Acad. Voevoda, M.I. PhD Devitsin D. V., PhD Kuznetsova T. V., PhD Sevostyanova E.V., Dr. O. Oseeva, Dr. Berikov V.B., Kochurov V. S. Director of LLC "Aurora-MNIIKA", Kuzenkov D. D. Director of LLC "Dozor-Invest", S. N. Kapustin, founder of LLC "Dozor-Invest".

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