The effect of electromagnetic waves on the human body

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ABSTRACT

Artificial electromagnetic waves are the most common and rapidly growing source of exposure in the modern world, including exposure to several groups of frequencies: extremely low frequencies from power lines, car hybrid batteries, and high-voltage lines (>3 Hz-3 kHz); radio frequencies; microwave frequencies, including millimeter waves (3 kHz-300 GHz) from cell phones towers, base stations, and wireless devices, and intermediate frequencies, so-called "dirty electricity" generated by power cables.

Purpose. To conduct a systematic review of the sources of modern scientific literature.

Materials and methods. The latest sources of foreign literature on this topic have been studied

Results. Brain, thyroid, liver, reproductive systems an important effect that the electromagnetic field affects zones. This led to the result of electromagnetic radiation the most basic consequences that come are. Thermal exposure to electromagnetic radiation the most important, albeit not to the extent that exposure to functional systems has the property. As the weakest of them experts calculate the nervous system. Electromagnetic fields of the nervous system cell membranes for calcium ions a very simple mechanism of permeability breaks under the influence of. The result is in the nervous system the disorder is caused and chronic head pain, slowing down of ovement, memory fading, leading to diseases such as depression comes. Also in the work of the cardiovascular system pulse stroke in the heart under the influence of electromagnetic radiation acceleration, increased blood pressure and pripheric blood composition it has been established that disorders such as changes have been recorded.

Conclusion. In place of the conclusion we transport,from electrical appliances and wireless communication from the idea that you should not use we are far away.Because now the benefits they bring us there is no way to do this in front. Hence for us (especially children and pregnant women) of them technical safety when using we must follow the rules.

Keywords: electromagnetic radiation, non-thermal exposure, health, electrohypersensitivity.

Introduction

The human organism is like all organisms on Earth it has its own electromagnetic field. For this reason man each tissue of the organism in a harmonic way works. Also human electromagnetic its radiation is also called biomaydon. This is the area from different negative effects on our organismthe protector is the main protective shell. His violation human of various negative factors increases the activity of

exposure to the body. An electromagnet that spreads to us if if the beam of a source stronger than radiation is affected, it leads to the fact that our health is affected. These rays not only the daily use of distribution resources includes technical equipment, mobile phones and transport, maybe a crowd of people gathered, a human mood and its treatment to us, geopathic zones, magnetic fleas and others can also enter. High frequency low power (0.01-0.001 Vatts) to the human body of electromagnetic fields the danger is that the intensity of such an area of the body normal functioning human organism intensity compatible with. Human as a result of interaction electromagnetic field acting on it power is broken by the action of the source light. The worst of electromagnetic signals features are that they are time in the human body has the property of accumulating during. Work activities various technical devices – computer, telephone associated with (including mobile phones) decreased immunity in humans, irritability, diseases such as sexual weakness and exhaustion it has been determined to cause. Lai and Singh demonstrated that after a two-hour exposure 60 Hz extremely low frequency (ELF) radiation led to an increase in the number of single- and double-stranded DNA breaks in rat brain cells, and that this effect may have been blocked by melatonin and N-tert-butyl-a-phenylnitrone (PBN). Udroiu et al.[1] found a significant increase in the number micronuclei in liver and peripheral blood samples of newborn mice after intrauterine exposure to 50 Hz radiation (electromagnetic field of 650 mT). Zothansiama et al. [2] found a significantly ($p < 0.0001$) higher occurrence of micronuclei in peripheral blood lymphocytes of people living within 80 m from cell phone base stations, compared to compared to those who lived 300 m away from a source of radiofrequency (RF) radiation source. Workers exposed to microwave radiation in the workplace showed hematological changes in the peripheral blood, depending on the time of exposure. Significant changes were noted in the concentration and/or glutathione (GT), catalase (CAT) and superoxide dismutase (SOD) activities. Also observed were an increase in lipid cross-oxidation (LPO) in peripheral blood lymphocytes of people living near cell phone base stations [2]. Lai performed a review and summarized data from multiple studies, showing changes in the activity of free free radicals such as reactive oxygen species (ROS)/nitrogen (RNS) and endogenous antioxidant enzymes caused by exposure to radiation extremely low frequencies.

Both in the functioning of the immune and endocrine system violation of exposure to electromagnetic radiation comes from. Conducted in this direction experimental studies have shown that, exposure to electromagnetic radiation in lowered hives, the infectious process has worsened, and immunity has fallen detected. Also adrenaline in the blood a sharp increase in composition, as a result of which consequences such as blood clotting detected. The problem I that get the disease, to, these risk-inducing factors are invisible and remains undetectable. Blood in a person under the influence of an electromagnetic field disorders in the circulatory system, headache, with eye, immunity and sexual disorders a predisposition to related diseases is caused. Electromagnetic waves every day and every minutes our eye, brain, gastrointestinal pathways, urogenetal, blood-forming imperceptible to our organs and immune system has an effect.

Kim et al. [3] discussed multiple effects on the nervous system, including apoptosis of nerve cells, changes in myelin nerve tissue and in ion channels. Sheppard et al.[10] used the effect of calcium washout from brain tissues when exposed to ELF of a certain frequency and in certain amplitude windows. Eberhardt et al. demonstrated the effects, produced by exposure to radiation in the 900 MHz radiofrequency on the permeability of the blood-brain barrier, and neuronal damage in experiments in rats. Carruba et al. [4] experimentally showed that low-frequency pulsation of cell phones caused peaks on EEG of volunteers. The effect exerted by ELF on neurodegenerative diseases has been described by Benassi et al. [5] on the example of Parkinson's disease, when it was noted significant deterioration of redox potential and thiol content in SH-SY5Y cells, as well as an increase in protein carbonylation. Similar phenomena were described by Bobkova et al.

[6], who noted changes in spatial memory and brain amyloid-β on two animal models with Alzheimer's disease. In a review by Terzi et al. [7] summarized the additive neurodegenerative effects. Attention deficit and hyperactivity disorder symptoms in children were associated with prolonged use of a cell phone phone. Many of the health risks associated with Wi-Fi exposure [8], as well as neuropsychiatric effects as a consequence of exposure ELF have been described by Pall.

Szmigielski performed a literature review and concluded that "short-term exposure to weak radiofrequency radiation can temporarily stimulate certain humoral or cellular functions immunity, whereas prolonged exposure suppresses these same functions." El-Gohary & Said [9] reported the effects of ELF and RF mobile phones on immunoglobulin levels (IgA, IgE, IgM and IgG), as well as on total leukocyte levels, lymphocytes, eosinophils, basophils, eutrophils and monocytes. Effects of electrosmog on the receptor Vitamin D and 1,25-dihydroxy vitamin-D (1,25-D), which are associated with many inflammatory and autoimmune diseases are discussed by Marshall and Heil [10]. Lushnikov et al. showed that with repeated repetitive exposure to extremely high-frequency low-intensity electromagnetic radiation (frequency 42.0 GHz and an energy flux density of 0.15 mW/ct2 for 20 min daily) affected the immunogenesis of mice. Belpomme & Irigaray [11] noted in patients some inflammation and an autoimmune response involving antibodies to O-myelin, and in 80% of patients with electrohypersensitivity, several oxidative stress biomarkers. Reproductive system. Saygin et al. [12] noted pathophysiological changes in the testes rats exposed to wireless frequencies (2.45 GHz) for 3 h daily. Schauer & Mohamad Al-Ali [13] showed that in men who regularly carried a cell phone in their pants pocket, the percentage of spermatozoa with abnormal morphology and lutropin levels were decreased. Skin. Johansson was one of the first published a study on "screen dermatitis," the effect of shortwave radiation on the skin.

He reported an increase in the number of mastocytes in skin samples of patients with electrohypersensitivity during prolonged exposure. CardonaHernández et al. [14] performed a review of similar effects. Short-term exposure to the skin causes only minor changes in epidermal homeostasis, but it can still lead to deterioration of its protective functions. Esen & Esen found a longer response time of the protective response of facial and scalp skin, about 200 ms, when exposed to cell phone radiation. Belpomme & Irigaray [11] found skin damage mainly on the patients' hands, particularly on the hand with which the patient was holding the cell phone.

In another study of the health status of workers, Wilen et al., compared the health of operators of RF plastic sealers (RF operators) (an occupational category that is highly exposed to RF electromagnetic fields) and unexposed workers. The study found that exposure parameters, integrated by time, had an effect on symptoms such as fatigue, headaches, and sensation of warmth in the hands. RF operators had a lower heart rate heart rate was lower than in the comparison group, and bradycardia phenomena were more frequent. Rats exposed to powerful microwave radiofrequency radiation had lower heart rates than unexposed animals (30 mW/cm2 for 15 min exposure is very strong, but the main purpose was to show pathological changes in the myocardium). Exposed rats showed histological and structural changes in the myocardium with swollen and irregularly arranged myocytes, as well as some chromatin condensation and dark spots in the nuclei [15]. The authors of this review demonstrated significant and unique calcification in aortas rats exposed to intermediate frequencies of 150-155 kHz in a model experiment of chronic renal disease. It was hypothesized that the radiation would be able to remove calcium from the heart valves, but the result was exactly the opposite [16]. This study was repeated with 50 Hz ELF exposure using cell phone chargers and obtained the same the same results, but the results have not been published. Two studies of prolonged RF exposure, performed by the Ramazzini Institute and the National Toxicology Program of the Department of Health and Human Services U.S., found clear evidence of a

relationship between long-term exposure to low-intensity radiofrequency radiation and tumors heart (and brain) tumors in male rats [17, 18]. Electrohypersensitivity, formerly known as "microwave sickness. Many of the of the symptoms described by patients suffering from this disease are a consequence of nerve fiber damage and hypersensitive nerve reactions [19]. Belpomme & Irigaray [20] showed that in about 30% of patients from their impressive sample of 2,000 people, multifaceted chemical sensitivity is combined with electrohypersensitivity. Typical symptoms in of these patients were "headache, tinnitus, hyperacusis, dizziness, balance problems, disorders of superficial and/or deep sensitivity, fibromyalgia, autonomic nervous disorders, and cognitive impairment impairment of cognitive abilities, including loss of immediate memory, difficulty concentrating, and spatio-temporal disorientation. These symptoms were associated with chronic insomnia, fatigue, and depressive tendencies, in addition to emotional instability and occasional
irritability." In an extensive study involving a patient with electrohypersensitivity McCarty et al., showed that within 100 s of EMF exposure ($p < 0.05$) The patient had somatic reactions, including nervous symptoms (headaches, including temporal pain), muscle symptoms (seizures), and cardiovascular symptoms (extrasystole). Symptoms appeared following field transitions (on/off, off/on) and were not caused solely by his presence. The patient was unable to consciously determine whether the field was on or off.

Cellular networks must be planned in such a way that exposure is reduced, but global plans only call for its increase, both on the ground and in space. A recent study analyzed the expected effects of exposure caused by the planned density of G5 towers [21]. The results of the calculations by Ben Ishai based on based on a well-known model of energy consumption
energy consumption model, have suggested that G5 networks will generate six times more radiation than existing networks, and will require a thousand times they would require a thousand times more electricity.

In place of the conclusion we transport,from electrical appliances and wireless communication from the idea that you should not use we are far away.Because now the benefits they bring us there is no way to do this in front. Hence for us (especially children and pregnant women) of them technical safety when using we must follow the rules.

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