

# **EMF RESEARCH ACTIVITY IN RUSSIA 2006-2007**

## **Report of Russian National Committee on Non-Ionizing Radiation Protection**

The most important researches were carried out to a scientific substantiation of EMF safety standards, bioeffects of electromagnetic field of mobile communication and ELF magnetic field.

The experimental part of the Russian-French immunology project (Confirmation studies of the Russian data on immunological effects of microwaves) is full completed. Researches were carried out in the Institute of Biophysics and the Center for Electromagnetic Safety, Moscow; Professor Yuri Grigoriev is scientific leader of Russian part of this project. Now there is process of analysis of results, which will be finish to the end of the summer 2007. Additional small research on EMF dosimetry for exposure rats is carry out; this research is support of EOARD.

The individual dose of EMF exposure for different groups of mobile phones users was investigated; results of the first part of research are published (Dr Oleg Grigoriev). Some users from general public group have EMF exposure dose same as occupational exposure.

The new research project "EMF of mobile phone and health of children" has been started by Professor Yuri Grigoriev.

Center for Electromagnetic Safety carry on accumulation of database of EMF for base stations of mobile communication.

The methods for testing of mobile phones will be upgrade at this year, but main principles of the general safety standard for mobile phone (SanPiN 2.1.8/2.2.4.1190-03 "Hygienic requirements for terrestrial mobile radiocommunication facilities allocation and operation") is unchanging.

The Institute of Occupational Health of Russian Academy of Medical Science, Moscow, (Dr Nina Rubtsova) carried out researches of electromagnetic safety for mobile standards Wi-Fi and Bluetooth. In 2006 this Institute also has researches of conditions of EMF occupational exposure on metallurgy plants. Hygienic researches have been executed at use of the electromagnetic physiotherapeutic equipment. Dr. Rubtsova and her colleagues have developed and patented new methods of decrease a magnetic field in some systems of electric power transmission; the Patent for a cable line with the lowered level of a magnetic field also is received.

Safety standard (SanPiN) for power frequency (50 Hz) magnetic field for general population exposure was discussed RNCNIRP in last year and in this year it will be approval by the Federal Ministry of Health (Federal Service for Monitoring Consumer Rights Protection and Human Welfare). Basic MPL for general population is 5  $\mu$ T in this standard.

Professor Valentina Nikitina (from Research Lab "Alfa-Pol", St.Peterburg) has executed researches on hygienic conditions in the EMF shielded rooms. It is established, that the important factor of influence on health is the combination of the increased level of a magnetic field of industrial frequency, much decreased of a natural electromagnetic field of the Earth, change in ionic structure of air in a rooms. Also the laboratory of Professor Nikitina investigated new methods of shielding of an electromagnetic field which are combined with construction elements of buildings.

Professor Alexandr Somov (from the State University in Saratov) studied frequency-dependent biological effect of electromagnetic radiation of extremely high frequencies. This work was devoted to the study of frequency-dependent biological effect brought out by low-intensive radiation of different diapasons (50-80, 120-170, 270-380 GHz) and combined effect of resonant frequencies and biologically active compounds (nicotine and antimicrobial drug metronidazole).

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Doctor Igor Belyaev (Institute of General Physics, Russian Academy of Science) studied effects of microwave exposure on DNA repair foci in human stem cells. In his opinion, recent data indicate that microwaves (MW) from mobile phones inhibit DNA repair foci in human primary cells of different types: lymphocytes, fibroblasts and mesenchymal stem cells (MSC) derived from adult human adipose tissue while the strongest effects were observed in MSC cells. Importantly, the same GSM carrier frequency (915 MHz) and UMTS frequency band (1947.4 MHz, middle channel) was effective for all cell types, while another GSM signal (905 MHz) did not affect cells. Recent data suggest that different cancer types including leukemia have a fundamentally common basis that is grounded on epigenetic changes in stem cells. Therefore, our experimental findings regarding effects of microwaves on stem cells may be important for cancer risk assessment. Interestingly enough, exposure to extremely low frequency (ELF) electromagnetic fields results in similar biological effects as exposures to microwaves. In our studies, both ELF and MW exposures inhibited formation of DNA repair foci in human lymphocytes. ELF exposure has been reported in many epidemiological studies to be associated with the increased children leukemia. On the other hand, no association of ELF exposure with leukemia in adults was found. This discrepancy has not yet been clarified at the mechanistic basis while ELF was classified as a possible carcinogen based on these studies. It is known, that stem cells are more active in children as compared to adults. This activity may clarify the differences between results obtained in ELF-leukemia studies with children and adults. Respectively, elevated cancer risk may be expected in children from microwave exposure.

Has not any change of EMF safety standards in 2006 in Russia. An according of report of the Federal Service for Monitoring Consumer Rights Protection and Human Welfare, about 30% of working place have exposure level more then MPL of occupational EMF safety standards (Memorandum N16 at 29.03.2007, <http://www.rospotrebnadzor.ru/docs/decision/?id=1008>).

Main public interest of EMF safety is topic of hazard for health of general population of exposure of systems mobile communication. Scandalous articles on danger of mobile communication appear in newspapers, groups of people have a protest against base stations near his residence, schools, hospitals and agricultural farms. The amount of base stations of mobile communication has considerably increased in Russia, but there are no information's programs of operators of mobile communication about own EMF safety policy.