

## **Russian National Committee of Non-Ionizing Radiation Protection - 2008 report**

Russian National Committee of Non-Ionizing Radiation Protection (RNCNIRP) have accepted an important decision on the theme “mobile communication and children`s health” (the text of the decision is enclosed). The members of the committee give a prediction of possible illnesses, the possibility of which can be high for children, using modern mobile phones. This decision is based on the results of fundamental researches of biological influence of electromagnetic field, which has been held in Russia during the 40 years and considers the modern data. RNCNIRP considers that the manufacturers should inform the customers about the possible risk for children`s health from using the mobile phone. The point of view of the RNCNIRP is supported by the members of the members of Committees of health protection of both chambers of Russian Parliament.

The members of RCNIRP conduct continuous activity in the area of mobile telecommunication EMF safety.

Russian part of the project "Confirmation studies of Soviet research on immunological effects of microwaves", which was supervised by Professor Yuri Grigoriev from **Federal Medical Biophysical Centre**, are completely finished. This study was initiated under the auspices of the World Health Organisation International EMF Project's RF research agenda. The general results of Russian part of this study obtained using Complement Fixation Test and ELISA generally confirmed findings of the early studies and indicated possible effects from non-thermal RF EMF exposure on autoimmune process. The exposure resulted in increased formation of antibodies to the brain tissue extract. Nevertheless, the response to the RF EMF exposure did not appear to be pathological. While there were difficulties with the animal model, our results showed the same general trends as the earlier studies suggesting possible adverse effects of the blood serum from exposed rats on pregnancy, foetal and postnatal development in intact rats.

In 2007 in Russia came into effect the new mandatory safety standard “Maximum permissible levels of magnetic fields of power frequency (50 Hz) in residential and public buildings and in residential areas”. A comprehensive scientific study, including hygienic and experimental studies, was performed to establish a scientifically based MPL for PF MF limits for non-occupational exposure. This allows the establishment of a safe level for limiting exposure of general public to magnetic fields of power frequency equal to 5  $\mu$ T inside a continuously inhabited residence (chronic exposure) and 10  $\mu$ T in other residential areas (short-term exposure). Studies on laboratory animals were mostly performed by Dr Nina Rubtsova at the **RAMS Institute of Occupational Health**. Most of the hygienic studies and development of instrumental methods for measurement of PF MF generated by sources relevant to general public were performed by Dr Oleg Grigoriev and Dr Anton Merkulov at the **Center for Electromagnetic Safety**. All studies were performed in close collaboration with the RNCNIRP members and the main results of this scientific study and project of hygienic standard were discussed and approved by the RNCNIRP.

On the basis of previously performed hygienic, experimental, clinic and physiological studies the new sanitary norms for geomagnetic field attenuation was developed by the RAMS Scientific Research Institute of Occupational Health.

Professor Valentina Nikitina's scientific laboratory from **State Marine University** has carried out a hygienic research of import technological equipment and settings for impulses welding. The researches have shown that in the time of exploitation of this equipment, the size of electromagnetic field can be higher, than maximum permissible meanings for the working areas, which are set by the Russian standards of safety. Professor Nikitina's laboratory takes active part in development of new materials for the protection from magnetic field of industrial frequency. These materials use nanotechnical technologies, the tests which have been made, have shown the high efficiency. In 2007 professor Nikitina have the new training course "electromagnetic ecology" in Marine University in Saint-Petersburg.

Dr A. Tchubiy and Dr V. Zhukov results of experimental research of own chaotic electromagnetic radiation (EMR) of a person (bioobject, a population of microorganisms), forming his information electromagnetic image (EMI) on n! carrying frequencies and being uniform with corporal image of the person was analyzed.

Professor Igor Belyaev (**Institute of General Physics of Russian Academy of Science**) shows that non-thermal microwaves (MW) from mobile phones affect conformation of nucleoids in bacterial E. coli cells and human lymphocytes similar to extremely low frequency (ELF) magnetic fields at low intensities. Experimental data suggested that magnitude of both MW and ELF effects depend on frequency and static magnetic field. We have previously proposed the physical model for the effects of combined ELF/static magnetic fields on the charged DNA-domain/nucleoid. Now we have developed the model of slow non-uniform rotation of the charged DNA-domain/nucleoid for the combined effects of non-thermal MW and static magnetic field. The solution of this model suggests that the combined action of MW and static magnetic field results in slow non-uniform rotation of nucleoid with angular speed that depends on Larmor frequency. The model predicts that non-thermal effects of MW are dependent on carrier frequency and also static magnetic field in the area of exposure.

In 2007, the study of the primary physical processes underlying biological reception of weak low-frequency magnetic fields was continued by Prof. V.N. Binhi of the General Physics Institute RAS. Considered was the so-called 'kT problem' with its formulation, content, and consequences. The usual formulation of the problem points out the paradox of biological effects of weak low-frequency magnetic fields. At the same time, the formulation is based on several implicit assumptions. Analysis of these assumptions shows that they are not always justified. In particular, molecular targets of magnetic fields in biological tissues may operate under physical conditions that do not correspond to the aforementioned assumptions. Consequently, as it is, the kT problem may not be an argument against the existence of non-thermal magnetobiological effects. Specific examples are discussed: magnetic nanoparticles found in many organisms, long-lived rotational states of some molecules within protein structures, spin magnetic moments in radical pairs, and magnetic moments of protons in liquid water.

It was shown that biological effects of weak ELF MFs cannot be explained based on the model of Zhadin and Barnes [Bioelectromagnetics, 26:323–330, 2005] in which the statement has been made that combined action of DC and AC magnetic fields on thermal motion of ions in a biological macromolecule and, as a result, a diversity of biological phenomena could be explained. Adair [Bioelectromagnetics, 27:332–334, 2006] questioned that the interaction of weak magnetic fields with ions trapped in protein cavities can produce

detectable biological effects through changing the character of the ion orbits. His arguments were analyzed and some have been shown to be unjustified. It is stressed that invalid criticism does not promote producing a real insight into the nature of magnetobiological effects.

Decision of Russian National Committee on Non-Ionizing Radiation Protection  
**"CHILDREN AND MOBILE PHONES:  
THE HEALTH OF THE FOLLOWING GENERATIONS IS IN DANGER"**

*Moscow, Russia*

*14 April 2008*

For the first time in history, we face a situation when most children and teenagers in the world are continuously exposed to the potentially adverse influence of the electromagnetic fields (EMF) from mobile phones.

Electromagnetic field is an important biotropic factor, affecting not just a human health in general, but also the processes of the higher nervous activity, including behavior and thinking. Radiation directly affects human brain when people use mobile phones.

Despite the recommendations, listed in the Sanitary Rules of the Ministry of Health, which insist that persons under 18 years should not use mobile phones (SanPiN 2.1.8/2.2.4.1190-03 point 6.9), children and teenagers became the target group for the marketing the mobile communications.

The current safety standards for exposure to microwaves from the mobile phones have been developed for the adults and don't consider the characteristic features of the children's organism. The WHO considers the protection of the children's health from possible negative influence of the EMF of the mobile phones as a highest priority task. This problem has also been confirmed by the Scientific Committee of the European Commission, by national authorities of the European and Asian countries, by participants of the International scientific conferences on biological effects of the EMF.

**Potential risk for the children's health is very high:**

- the absorption of the electromagnetic energy in a child's head is considerably higher than that in the head of an adult (children's brain has higher conductivity, smaller size, thin skull bones, smaller distance from the antenna etc.);
- children's organism has more sensitivity to the EMF, than the adult's;
- children's brain has higher sensitivity to the accumulation of the adverse effects under conditions of chronic exposure to the EMF;
- EMF affects the formation of the process of the higher nervous activity;
- today's children will spend essentially longer time using mobile phones, than today's adults will.

According to the opinion of the Russian National Committee on Non-Ionizing Radiation Protection, the following **health hazards** are likely to be faced by the children mobile phone users in the **nearest** future: disruption of memory, decline of attention, diminishing learning and cognitive abilities, increased irritability,

sleep problems, increase in sensitivity to the stress, increased epileptic readiness.

**Expected (possible) remote health risks:** brain tumors, tumors of acoustical and vestibular nerves (in the age of 25-30 years), Alzheimer's disease, "got dementia", depressive syndrome, and the other types of degeneration of the nervous structures of the brain (in the age of 50 to 60).

The members of the Russian National Committee on Non-Ionizing Radiation Protection emphasize ultimate urgency to defend children's health from the influence of the EMF of the mobile communication systems. We appeal to the government authorities, to the entire society to pay closest attention to this coming threat and to take adequate measures in order to prevent negative consequences to the future generation's health.

The children using mobile communication are not able to realize that they subject their brain to the EMF radiation and their health – to the risk. We believe that this risk is not much lower than the risk to the children's health from tobacco or alcohol. It is our professional obligation not to let damage the children's health by inactivity.