

# Research activities in Russian Federation for non-ionizing radiation health

## *Annual report of Russian National Committee on Non-Ionizing Radiation Protection for the WHO International EMF Project (2017/2018)*

Russian Federation has carried traditional research of EMF bio-medical and health effects. Russian researches study of the EMF biomechanisms, ecological and hygienic research, experimental researches in vivo and in vitro. The most important researches are the following.

EMF bio-effects on the reproductive system in-vivo. Experimental data on the reproductive system of rats of low intensity RFR and various duration were obtained (N. Chueshova, S. Yashchenko). Conclusion on possible changes in the spermatogenesis of the first and second generation of rats.

The study of genetic instability of cells under the conditions of ionizing and non-ionizing radiation (Dr. E. Evstratova, Prof. L. Zhavoronkov, Prof. V. Petin). Methods for modeling bioeffects for the rapid assessment of the biological effects of complex modes of EM irradiation including those in the mm-waves have been developed (D. Uskalova, Dr. E. Mukhachev). The unicellular (incl. infusoria) are used as test systems.

The research to determine the number of people living under exposure to a magnetic field above 0.3 mT near the power transmission lines in the Moscow region, it is estimated that this is about 300 000 people (A. Prokofieva, Dr. O. Grigoriev). The data were obtained on the basis of monitoring and design prediction of the magnetic fields. This research will ensure the reliability of the epidemiological study.

Hygienic research is carried out on the safety of the devices for "digital" economics. Analyses of the physical factors in modern workplaces of users of personal computers, WiFi and other EMF devices. (Prof. L. Pohodzey, Dr. S. Yashchenko, D. Komarov, MD). An ecological and hygienic researches of the electromagnetic environment of communication systems is being carried out (Dr. S. Rybalko, Dr. O. Grigoriev, Dr. S. Perov). Staffs of Laboratory of Professor V. Nikitina conducts electromagnetic hygienic studies on new ships in the Arctic region.

According to Dr. I. Belyaev, Laboratory of Radiobiology, Institute of General Physics, Russian Academy of Science: "Exposure to electromagnetic fields (EMF) has consistently been associated with the increased risk for childhood leukemia which arises from hematopoietic stem cells by induction of mutations, most frequently by specific preleukemic gene fusions. All these mutations require DNA double-strand breaks (DSB) to occur. We have studied whether exposure from mobile phone induce DSB in CD34+ umbilical cord blood (UCB) hematopoietic stem cells (HSC) analysis of DSB co-localizing proteins  $\gamma$ H2AX and 53BP1. UCB CD34+/CD34- cells were exposed to EMF from GSM900 test-mobile phone (0.4 mW/kg, 4 mW/kg, 40 mW/kg). In general, no DSB or apoptosis has been detected. However, a statistically significant effect of EMF exposure on CD34- cells extracted with NH4Cl and exposed at 4 mW/kg. Importantly, significant increase in RNA expression was observed after exposures at 4 mW/kg and 40 mW/kg. EA2-PBX and AML-ETO gene fusions were found by RQ-PCR after exposure at 40 mW/kg in preliminary experiments. The follow up experiments may provide information on EMF-sensitive genes. It would be especially important to validate whether oncogenes, and oncogenic gene fusions are induced in stem cells".

In 2017 a new national project on the analysis of the scientific-historical datas of research of electromagnetic biology, radiobiology and bio-electrophysics was started (scientific head is Dr. O. Grigoriev, principal investigator V. Alekseeva). The special workshop has been held with 120th Anniversary of Presentation of the First Russian dissertation with research of EMF biological effects. Now an overviewing of the historical data of the bioeffects of non-thermal microwave radiation on biological objects is formed (since 1970th).

## **New policies and legislations regarding NIR exposure**

The Government Commission for Sanitary Norms and Rules has adopted the new SanPiN for short-term RFR exposure for using in range 0,02 – 6,00 GHz (the principal investigators Prof. L. Pokhodzey, Prof. Yu. Paltsev, the principal expert Dr O. Grigoriev). Currently, a new version of SanPin is being prepared for EMF of base stations of cellular communication (the principal investigators is Prof. V. Nikitina), as well as a new methods for measuring EMF of cellular base stations. The concept of global electromagnetic monitoring is being discussed (Prof. Yu. Spodobaev).

## **Areas of public concern and national responses**

The main public interest is the safety of children and school students with using of "digital" technologies, as well as in the use of EMF wireless communication and transmission data systems. Traditionally, attention has been paid to the safety for health of the location of base stations, the general EMF pollution and combined pollution of environment.

Prospects for the health safety of 5G mobile systems were discussed at the meetings of RussCNIRP and the Scientific Council of the Russian Academy of Sciences on radiobiology [https://twitter.com/o\\_grigoriev/status/1003384351063789569?s=21](https://twitter.com/o_grigoriev/status/1003384351063789569?s=21). According to the majority of scientists, the mass use of mm-waves creates a real danger to health, since their action has a resonant mechanism and acts directly on the receptors in the skin.

Problems of electromagnetic safety were discussed in the Federation Council, in the Moscow city Parliament <https://msk.kprf.ru/2017/02/16/23398/>, in the Ministry of Education and Science, in the Public Chamber, in the Office of the President's Commissioner for the Rights of the Child, so and the Ministry of Health, of course.

## **New public information activities**

The main Russian-language regular information resource now is the website of RussCNIRP [www.emf-net.ru](http://www.emf-net.ru)

Some media activity on web:

<https://www.kp.ru/daily/26840.7/3881176/>

<https://www.kp.ru/daily/26776/3809526/>

<https://doc.rt.com/filmy/wi-fi-fobiya/>

<https://news.rambler.ru/scitech/35453930-uchenyy-zayavil-o-katastroficheskom-elektromagnitom-izluchanii-v-moskve/>

<http://www.iksmedia.ru/articles/5291621-S-kazhdogo-zvonka-po-kopejke-na-eko.html>

[https://tvkultura.ru/video/show/brand\\_id/57402/episode\\_id/1341523/video\\_id/1529943/](https://tvkultura.ru/video/show/brand_id/57402/episode_id/1341523/video_id/1529943/)

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