Research on the Effects of Wireless Radiation Exposure on the Immune System

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Electromagnetic Radiation Safety, March 18, 2020

This compilation of research on the effects on the immune system from exposure to radio frequency radiation consists of excerpts from a research review published in 2013 by Dr. Stanislaw Szmigielski in a peer-reviewed journal and a list of references to studies published since 2000.

Reaction of the immune system to low-level RF/MW exposures

Szmigielski S. Reaction of the immune system to low-level RF/MW exposures. Science of the Total Environment. 2013 Jun 1; 454-455:393-400. doi: 10.1016/j.scitotenv.2013.03.034.

Abstract

Radiofrequency (RF) and microwave (MW) radiation have been used in the modern world for many years. The rapidly increasing use of cellular phones in recent years has seen increased interest in relation to the possible health effects of exposure to RF/MW radiation. In 2011 a group of international experts organized by the IARC (International Agency for Research on Cancer in Lyon) concluded that RF/MW radiations should be listed as a possible carcinogen (group 2B) for humans. The incomplete knowledge of RF/MW-related cancer risks has initiated searches for biological indicators sensitive enough to measure the "weak biological influence" of RF/MWs. One of the main candidates is the immune system, which is able to react in a measurable way to discrete environmental stimuli.

In this review, the impacts of weak RF/MW fields, including cell phone radiation, on various immune functions, both *in vitro* [cell culture studies] and *in vivo* [live animal studies], are discussed. The bulk of available evidence clearly indicates that various shifts in the number and/or activity of immunocompetent cells [cells that can develop an immune response] are possible, however the results are inconsistent. For example, a number of lymphocyte [small white blood cells especially found in the lymphatic system] functions have been found to be enhanced and weakened within single experiments based on exposure to similar intensities of MW radiation.

Certain premises exist which indicate that, in general, short-term exposure to weak MW radiation may temporarily stimulate certain humoral* or cellular immune functions, while prolonged irradiation inhibits the same functions.

https://www.ncbi.nlm.nih.gov/pubmed/23562692

Excerpts

“Recently, Jauchem (2008) reviewed the effects of RF/MW radiation on the immune system and concluded that although both positive and negative findings were reported in some studies, in a majority of instances no significant health effects were found. However, most studies had some

methodological limitations. Some changes in immunoglobulin levels and in peripheral blood lymphocytes were reported in different studies of radar and radio/television-transmission workers (Moszczyński et al., 1999)."

Immunotropic effects of RF/MW exposure in in vitro studies

"In summary, it may be concluded that non-thermal intensities of RF/MW radiation may exert certain measurable effects and shifts in physiology of immunocompetent cells, however these effects appear to be weak, inconsistent and difficult to replicate. Among other stress reactions, induction of heat-shock proteins, altered reaction of lymphocytes to mitogens, weaken phagocytosis and/or bactericidal activity of macrophages were reported after in vitro exposure of isolated cells to arbitrarily chosen conditions of the exposure (frequency and modulation of the RF/MW radiation, power density, time and schedule of exposure, etc.).

From studies performed in our laboratories (Dąbrowski et al., 2003; Stankiewicz et al., 2006, 2010) it may be concluded that in vitro effects of non-thermal RF/MWs cannot be revealed using basic tests for assessment of function of immunocompetent cells (including typical microculture of lymphocytes with mitogen stimulation) and finer techniques (e.g., immunogenic activity of monocytes (LM index), T-cell suppressive activity (SAT index) or release of cytokines in microcultures of PBMC) are required to study the effects of RF/MW exposures. Nevertheless, nothing can be concluded on thresholds of the above phenomena, their mechanisms or relevance to health risks. None of the above discussed studies provides data which can be directly or indirectly linked to cancer development (Table 1)."

Effects of in vivo RF/MW exposures on function of the immune system

"In summary, studies of immune reactions in animals exposed to MWs provide controversial results with some papers reporting no measurable response, while in others positive results were obtained. The available bulk of evidence from numerous experimental studies in vivo aimed to assess the effects of short-term and prolonged low-level MW exposure on function and status of the immune system clearly indicates that various shifts in number and/or activity of immunocompetent cells are possible. However, the results are incoherent; the same functions of lymphocytes are reported to be weaken[ed] or enhanced in single experiments with MW exposures at similar intensities and radiation parameters. There exist premises that in general, short-term exposure to weak MWs may temporarily stimulate certain humoral or cellular immune functions, while prolonged irradiation inhibits the same functions (Grigoriev et al., 2010). There exist papers which report changes in NK [natural killer] cell activity or TNF** release in MW-exposed animals, but clinical relevance or relation to carcinogenicity of these findings is doubtful."

[* Humoral immunity is mediated by macromolecules found in extracellular fluids such as secreted antibodies, complement proteins, and certain antimicrobial peptides.]

[** Tumor necrosis factor is a cell signaling protein involved in systemic inflammation.]

Dr. Szmigielski signed the Catania Resolution in 2002:

The Catania Resolution

According to several reports, a group of scientists issued a statement on EMF at a meeting in September.

They were attending the international conference "State of the Research on Electromagnetic Fields—Scientific and Legal Issues," organized by ISPESL, the University of Vienna, and the City of Catania. ISPESL is a technical-scientific branch of the National Health Service that advises industry on protection of occupational health and well-being in the workplace. In Catania, Italy, on Sept. 13 and 14, 2002, they agreed to the following:

Epidemiological and in vivo and in vitro experimental evidence demonstrates the existence for electromagnetic field (EMF) induced effects, some of which can be adverse to health.

We take exception to arguments suggesting that weak (low intensity) EMF cannot interact with tissue.

There are plausible mechanistic explanations for EMF-induced effects which occur below present ICNIRP and IEEE guidelines and exposure recommendations by the European Union.

The weight of evidence calls for preventive strategies based on the precautionary principle. At times the precautionary principle may involve prudent avoidance and prudent use.

We are aware that there are gaps in knowledge on biological and physical effects, and health risks related to EMF, which require additional independent research.

The undersigned scientists agree to establish an international scientific commission to promote research for the protection of public health from EMF and to develop the scientific basis and strategies for assessment, prevention, management and communication of risk, based on the precautionary principle.

https://www.bems.org/node/824

List of signatories: https:/www.emrpolicy.org/faq/catania.pdf

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Following is a list of studies of the biologic and health effects on the immune system from exposure to radio frequency radiation published since 2000 based on a **search of the EMF-Portal archive**.

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