

SCIENCE

Review: Electromagnetic fields and the blood-brain barrier

Rianne Stam from the National Institute for Public Health and the Environment of the Netherlands summarizes the results of the review as follows:

- Exposure to levels of radiofrequency electromagnetic fields (EMF) that increase brain temperature by more than 1°C can reversibly increase the permeability of the BBB for macromolecules.
- The balance of experimental evidence does not support an effect of 'non-thermal' radiofrequency fields with microwave and mobile phone frequencies on BBB permeability.
- Evidence for an effect of the EMF generated by magnetic resonance imaging on permeability is conflicting and conclusions are hampered by potential confounders and simultaneous exposure to different types and frequencies of EMF.
- The literature on effects of low frequency EMF, which do not cause tissue heating, is sparse and does not yet permit any conclusions on permeability changes.
- Studies on the potential effect of EMF exposure on permeability of the BBB in humans are virtually absent.

The author proposes that future permeability studies should focus on low frequency effects and effects in humans and that care should be taken to avoid the methodological limitations of earlier studies and to determine the pathophysiological relevance of any changes found.

Bibliography: Brain Res Rev. 2010 Oct 5; 65(1):80-97, **Full Abstract**

Publication: Novel methodology to characterize electromagnetic exposure of the brain

Due to the very non-uniform field distribution induced in brain tissues by RF electromagnetic sources, the exposure of anatomical and functional regions of the brain may be a key issue in interpreting lab findings and epidemiological studies concerning endpoints related to the CNS. This paper introduces the Talairach atlas in characterization of the electromagnetic exposure of the brain. Based on Jean Talairach's work, the well-recognized atlas gives very detailed information about the different brain regions. A hierarchical labeling scheme is mapped onto high-resolution human models allowing identification of over a thousand sites in the brain. Applications include the detailed dosimetric analysis of the exposure of the brain during cell phone use, improved design of exposure setups for human studies or medical diagnostic and therapeutic devices using electromagnetic fields or ultrasound.

Source: The Foundation for Research on Information Technologies in Society (IT'IS):
<http://www.itis.ethz.ch/>

Bibliography: Crespo-Valero et al., 2011 Phys. Med. Biol. 56 383, **Full Abstract**

POLITICS AND LAW

Current assessment of health risks associated with mobile communications – recommendation issued by the Austrian National Institute of Health in 2010

In its finding, the Austrian National Institute of Health (OSR) concluded that there is currently no firm scientific evidence which demonstrates adverse human health effects when the current regulatory limits and guidelines are not exceeded. However given the unresolved questions raised in numerous research areas, it would be wise to take a sensible, cautious approach. The institute recommends continuous screening to assess relevant research results. The scope of the screening activity should be extended to include many other high-frequency technologies. The body has also determined that the evidence currently available is not sufficient to necessitate an evidence-based reduction of the existing regulatory limits and guidelines (as defined in Austrian standard ÖNORM E 8850). Since long-term effects cannot be excluded with a sufficient degree of certainty, as a precautionary measure radio communication equipment which causes sustained human exposure should be set to operate within a target limit. The target limit for high-frequency exposure should be set at a level which is below the power flux density limit, as defined in ÖNORM E 8850, by at least a factor of 100.

The OSR assessment and recommendations can be downloaded (in German) from:
<http://www.bmg.gv.at>

TECHNOLOGY

Brochure on the pilot study "Assessment of general-public exposure to LTE transmitters" now available in English

In October 2010, the German "Information Centre Mobile Telephony" (IZMF) presented the results of this study that was carried out by the Institute for Mobile Radio and Satellite Technology (IMST). In a brochure the results were summarized and experts assessed and discussed the measurement results from a technical and biological point of view. This brochure is now also available in English and is available for download at:

<http://www.izmf.de/html/de/40723.html>

LTE: Technology and Health

The GSM Association (GSMA) has produced this brief to describe key features of the technology and address some of the questions related to exposure to radio signals from LTE antennas and devices.

Download at: http://gsmworld.com/documents/health/gsma_lte_health.pdf

Determination and comparison of exposure to low-frequency electrical and magnetic fields caused by underground cables and overhead high-voltage power lines

The 2nd revised edition of the departmental research report was published by the German Radiation Protection Agency in November 2010. Actual and worst case electric and magnetic immissions in the neighbourhood of overhead and underground high voltage power lines have been determined by measurements resp. calculations. For overhead power lines extrapolation to maximum power load resulted in immissions up to 52 μ T resp. 9 kV/m. Within the route of 380 kV overhead power lines small-scale violations of the legal limits defined by the 26th Ordinance Implementing the Federal Immission Control Act (26. BImSchV) were found in some cases. Above underground cables laid in a depth of 1.5 m or more magnetic fields of up to 168 μ T are possible, i.e. small-scale violations of the legal limits defined by the 26. BImSchV can occur within the route.

The report (in German) with an English summary can be downloaded from:

http://www.bfs.de/de/bfs/druck/Ufoplan/Expositionen_durch_Erdkabel_und_Hochspannungsfreileitungen

India: Results of a Cellular Tower Study in New Delhi

The first Indian study report on electromagnetic radiation measurement at New Delhi shows compliance with International Commission on Non-Ionizing Radiation Protection (ICNIRP) standards. The study measured cumulative emissions within the 800 to 2000 MHz band of frequency (which includes both GSM and CDMA technologies) in 180 areas across the capital to understand the extent of EMF emissions from the mobile towers. It revealed that the magnetic field readings were 100 times below international safety guidelines. The study was commissioned by the Cellular Operators Association of India (COAI) and Association of Unified Telecom Service Providers of India (AUSPI) as a proactive measure stemming from the concern for the public health and safety issues.

COAI Press release from 21.12.2010:

<http://www.coai.com/docs/PressReleases/Press%20Release%20EMF%20Delhi-%2021-12-2010.pdf>

MISCELLANEOUS

Agenda and presentations from the conference "Interactions of RF with the human being - State of knowledge"

The event, which was held on December 16th, 2010 in Paris, was organized by WHIST Lab, a research institute operated jointly by France Telecom and Orange. The agenda and presentations are available online at:

http://whist.institut-telecom.fr/JBio2010/JBio_2010.html