

Commission K (Electromagnetics in Biology & Medicine) Activity Report

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by

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1. Update on EMF safety issue

The fourth meeting of Japanese URSI-Commission K for the 21st term of the Science Council of Japan was held on January 21, 2011, at meeting room of National Institute of Information and Communications Technology (NICT). In this meeting, the progress of 6th meeting of Japan Committee for URSI, discussion on the election of the next chair of Japanese URSI-Commission, preparation of National Report of Commission K (Electromagnetics in Biology and Medicine), the participation of XXX URSI GA and Scientific Symposium, etc were introduced.

In parallel to regular Commission K meeting, 2nd symposium of the Society of Electromagnetics in Medical and Biology supported partly by TELECOM Engineering Center was held. This meeting had 7 presentations with one cancel. Before regular presentation, two special lectures were given by Prof. Ueno of the former chair of Commission K (URSI) and Dr. Nakamura of National Institute of Advanced Industrial Science and Technology (AIST). Prof. Ueno presented the recent advances in brain imaging and bioelectromagnetics. It covered TMS, MEG MRI, cell control with magnetic nanoparticle and the control of cell orientation using of magnetic field. Dr. Nakamura talked about two topics, the development of manipulation tool of living cell at nano-scale resolution and the detection of intrinsic mRNA in a living cell using a molecular beacon-immobilized nano-needle. Among regular presentations, there were three topics including the development of MRI-based phantom model, the fundamental approach to study of dosimetry for the wireless power transfer system using magnetic resonance, the biological effects of RF and IF electromagnetic fields on gene expression and the formation of micronucleus and the development of humanized mice for human leukemia model in order to evaluate the effects of electromagnetic field. The presentations and discussions were highly successful.

As a second topic, researchers from the National Institutes of Health (NIH) have found that a cell phone's RF electromagnetic field can cause changes in brain activity, especially the higher rates of energy (or glucose) consumption in the region nearest to the antenna of closely held mobile devices (JAMA, vol.305, 808-812, February 22, 2011). Researchers used positron emission tomography (PET) to pick up hot spots where cells are consuming glucose. This paper shows that the human brain is sensitive to the electromagnetic radiation and it leads to the new questions about the health effect of low levels of radiation emitted from cellphones.

2. Meetings

(a) Past meetings

- (1) 5th course: "Medical applications of electromagnetic fields". 22-23 November 2010, Erice (Sicily), Italy (http://www.ebea.org/ebea_schol_2010.htm)
- (2) 10th EBEA International Congress, February 21-24, 2011, Rome, Italy (http://www.ebea.org/ebea_2011.htm)

(b) Future meetings

- (1) 29th Progress in Electromagnetics Research Symposium (PIERS). 20-23 March 2011, Marrakesh, MOROCCO (<http://piers.org/piers2011Marrakesh>)
- (2) 2nd International Conference on EMF-ELF, 24-25 March, 2011, Paris (<http://www.emf-elf-2011.org/>)
- (3) International Conference on non-ionizing radiation and children's health, 18-20 May, 2011, Ljubljana, Slovenia (<http://wwwincirp.org/Kids/kids&NIR2010a.htm>).
- (4) 33th BEMS Annual Meeting, June 12-17, 2011, Halifax, Nova Scotia, Canada
- (5) 14th International Congress of Radiation Research (14th ICRR 2011). 28 August – 1 September,

2011, Warsaw, Poland (<http://www.icrr2011.org>)

- (6) International Workshop on Electroporation-based Technology and Treatments. 13-19 November, 2011, Ljubljana, Slovenia (<http://www.cliniporator.com/ect/>)
- (7) XXX URSI General Assembly and Scientific Symposium, Istanbul, Turkey, 13-20. August, 2011 (<http://www.ursiga2011.org/>)
- (8) 7th ICNIRP International NIR Workshop. 9-11, May, Edinburgh, Scotland, United Kingdom, 2012.
- (9) International Conference on Non-Ionizing Radiation and Children's Health, 18-20 May, 2011, Ljubljana, Slovenia (<http://www.icnirp.org/Kids/kids&NIRa.htm>)
- (10) 34th BEMS Annual Meeting, 17-22 June 2012, Brisbane, Australia
- (11) IEEE Antennas and Propagation Society International Symposium and USNC-URSI National Radio Science Meeting, July 8-14, 2012, Chicago, Illinois, USA (<http://www.ece.uic.edu/2012aps-ursi>)

3. Publications

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