



Laboratoire de bioélectromagnétisme - Ecole Pratique des Hautes Études
Laboratoire de l'Intégration, du Matériau au Système UMR 5218
Institut Polytechnique de Bordeaux

COST Action BM0704

Scientific report on the Workshop

“Strategy research for RF emerging technologies”

The Workshop of COST Action BM0704 on “Strategy research for RF emerging technologies” was organised by Working group 4 (biology) and was held as a joint meeting with the URSI Commission K on 27 and 28 May 2010, with parallel and joint sessions.

The meeting was marked by joint sessions "RF electromagnetic fields and children" and "MRI and occupational exposure", both being identified as (transversal) focus within the COST action and headed by WG4.

- The first theme was discussed in terms of measurement and exposure assessment (Joe Wiart, France), epidemiology (Maria Feychting, Sweden) and *in vitro* (Maria Rosaria Scarfi, Italy) and *in vivo* (Claudio Piola, Italy) experimentations.

Models are made for assessing the exposure of children and fetuses, with their share of uncertainty in the simulations, which must be characterized. Experimental studies on the effects of radiofrequency fields on children enter the overall theme of the susceptibility of children to environmental factors. These studies are few, some of which are ongoing. For epidemiology, case-control studies are underway in Europe and some challenge studies among adolescents



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showed no influence of exposure to mobile phone signals. *In vivo* effects of radiofrequency on teratology and development are well documented and show that high power RF are teratogenic because of the resulting hyperthermia (43°C for 15 minutes are needed). At the power level of mobile telephony, the temperature increase is insignificant and very few data are available for young organisms on other parameters or long-term exposure. A study was made on the effect of a Wi-Fi-type signal on mice exposed *in utero* and during five weeks after birth. The results showed no alteration of the immune system of these animals. *In vitro*, a score of studies relevant to this issue does not suggest, without exception, a special sensitivity of the cells studied (embryonic cells, primary cells, tumor cell lines). A study showing a genotoxic effect of GSM-1800 signal in fibroblasts of young subjects is the subject of controversy (lack of reproducibility) and another study suggested a transient effect on DNA in human trophoblasts (to be confirmed independently).

- The second theme is related to the implementation of the European Directive on occupational exposure to electromagnetic fields and has been addressed by two keynote papers and four conferences. Frank Prato (Canada) made an inventory on the knowledge and research needs in this area, especially for long-term effects in occupationally exposed persons, and Penny Gowland (UK) presented the performance and development of MRI showing the benefits of using higher static magnetic fields (> 3T).



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Thereafter, conferences have dealt with the assessment of exposure to nearby magnets, measurements and simulations and needs in terms of exposure characterisation for epidemiological studies. These contributions came from Italy, Poland and Sweden.

- Another focus of WG4 within COST BM0704, i.e. “extrapolating RF data”, was presented by Bernard Veyret. Current knowledge on the biological and health effects of radiofrequency fields has been gained using 2G signals. With the introduction of new signals such as UMTS, Wi-Fi, WiMax, UWB, and RFID, the question is whether the same scientific approach should be used for each new signal. This question has to be discussed in a context of declining funding. A group of experts in biology, epidemiology, exposure assessment and modelling, and mechanisms has been set with the aim of gathering all available information and perform the analysis of current knowledge. A conclusion will be given about the real need for further research on new signals.

- Two other events have marked these days:
 - The presentation of the new research agenda by the WHO EMF program manager, Emilie Van Deventer. The research priorities identified include the continuation of ongoing cohort studies, further research on the EEG and on young organisms, as well as characterizing the fullest possible public exposure to



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RF fields and identifying new RF exposure sources.

- The presentation of final results of the Interphone epidemiological study by Elisabeth Cardis, the coordinator of the program. This study was of case-control type and data gathered from 13 countries on tumors of the head and neck (gliomas, meningiomas, acoustic neuromas, salivary gland tumors). Regarding gliomas and meningiomas, the results suggest no association with the RF from mobile phone use of less than 10 years. The study shows an increased risk of glioma (OR = 1.4 [1 to 1.9]) for the biggest consumers (> 1640 hours of calls). However, because of recall bias in particular and other biases inherent in case-control studies, the Interphone conclusion is that increased risk of glioma has not been shown ... but the lack of risk is not demonstrated either. A major risk is eliminated. Will prospective cohort studies provide clearer conclusions in twenty years?

In conclusion, this workshop gave a good overview of the current focused actions headed by WG4. The time dedicated to discussions optimized scientific exchanges. Having the workshop as a joint meeting with URSI commission K and EBEA was a good option to gather more scientists and we all had a mutual benefit of this, as having key presentations in the field.