

EFFECTS OF ELECTROMAGNETIC FIELDS EXPOSURE ON DNA: NEGATIVE STUDIES

Maria Rosaria Scarfi

CNR- Institute for Electromagnetic Sensing of Environment, Naples, Italy

e-mail: scarfi.mr@irea.cnr.it

Among the studies carried out to evaluate the biological effects of non ionizing electromagnetic fields (EMFs) a large number has been devoted to investigate the possible induction of genotoxic effects, since they represent one of the most interesting aspects in the risk assessment of human exposure to EMFs due to the close correlation between DNA damage and cancer occurrence.

Data available in the literature include either the evaluation of genotoxic effects induced by exposure to EMFs alone and by combined exposures with well known physical or chemical mutagens. The experiments have been conducted by adopting different exposure conditions and by using different cell types. For this purpose classical and molecular cytogenetic techniques have been applied, such as chromosomal aberrations, sister chromatid exchanges, micronuclei and the single cell gel electrophoresis/comet assay.

Most of the studies available in peer reviewed scientific journals are independent investigations, while a small number has been conducted to replicate other studies under similar experimental conditions and just few of them have adopted exactly the same conditions. The majority of studies does not suggest a direct mutagenic effect of EMFs, as reported in several review papers [1-9].

In this presentation the negative results will be described and discussed, including the studies replicated by independent laboratories.

REFERENCES

- [1] J. McCann, F. Dietrich, C. Rafferty and A. O. Martin. A critical review of genotoxic potential of electric and magnetic fields. *Mutat. Res.* 29:, 61–95, 1993.
- [2] J. C. Murphy, D. A. Kaden, J. Warren and A. Sivak. Power frequency electric and magnetic fields: A review of genetic toxicology. *Mutat Res.* 296: 221–240, 1993.
- [3] J. McCann, F. Dietrich and C. Rafferty. The genotoxic potential of electric and magnetic fields: an update. *Mutat. Res.* 411, 45–86, 1998.
- [4] M. L. Meltz. Radiofrequency exposure and mammalian cell toxicity, genotoxicity and transformation. *Bioelectromagnetics*, 6 (Suppl.): S196-213, 2003.
- [5] Vijayalaxmi and G. Obe. Controversial cytogenetic observations in mammalian somatic cells exposed to radiofrequency radiation. *Radiat Res* 162: 481-496, 2004.
- [6] J. E. Moulder, K. R. Foster, L. S. Erdreich and J. P. McNamee. Mobile phones, mobile phone base stations and cancer: A review. *Int. J. Radiat. Biol.* 81: 189–203, 2005.
- [7] L. Verschaeve. Genetic effects of radiofrequency radiation (RFR). *Toxicol Appl Pharmacol*, 207: 336-341, 2005.
- [8] Vijayalaxmi and G. Obe. Controversial cytogenetic observations in mammalian somatic cells exposed to extremely low frequency electromagnetic radiation: A review and future research recommendations. *Bioelectromagnetics*, 26: 412–430, 2005.
- [9] Vijayalaxmi and T. J. Prihoda. Genetic damage in mammalian somatic cells exposed to radiofrequency radiation: A meta-analysis of data from 63 publications (1990–2005). *Radiat. Res.* 169: 561–574, 2008.