

RECENT RESEARCH ACTIVITIES

Human Safety on Electromagnetic Fields

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We increasingly live in a roiling environment of electromagnetic fields (EMF). The main origins of this increase are the fast-rising use of cell phones and wireless local area networks together with the proliferation of cell phone base stations and other related facilities throughout the world. In the near future, they will likely be joined by a rapid proliferation of wireless power supplies. Accordingly, unease has grown among many people concerning the potential effects of these fields on health, the assessment of the EMF effect has therefore become a major social demand.

Research at this laboratory has focused on quantitative analysis of a clear response to EMF exposure at the cellular and genetic levels. The results of the assessments have been presented in regard to the occurrences and the mechanisms of EMF genotoxicity (e.g., chromosomal aberration, micronucleus formation and DNA damage), and the responses to EMF in gene expression and in signal transduction mechanisms [1]-[3]. As shown in Figure 1, for research performed to assess the biological effects of EMF, we construct an exposure system in a cell-culture incubator with wireless energy transmission by resonance power transmission, and then assess the cytogenetic toxicity involved in carcinogenicity and other effects of EMF. For assessment of EMF effects on immune function, a field of research recommended by the World Health Organization (WHO), we analyze cytokine secretion, phagocytosis, and other related activities. The results have become essential materials for discussions on EMF biological effects. Through our membership in WHO, the International Agency for Research on Cancer, and the International Commission on Non-Ionizing Radiation Protection, we have participated in and contributed to international conferences on EMF assessment.

The rapid increase in use of EMF will continue in the coming years with widespread utilization of noncontact energy transmission technology, including wireless power supply systems for stationary and moving electric vehicles. Given this trajectory, it is essential to determine the safety levels and elucidate the effects and mechanisms of EMF based on scientific data. This requires the advancement of related research and effective utilization of leading-edge life science technology.

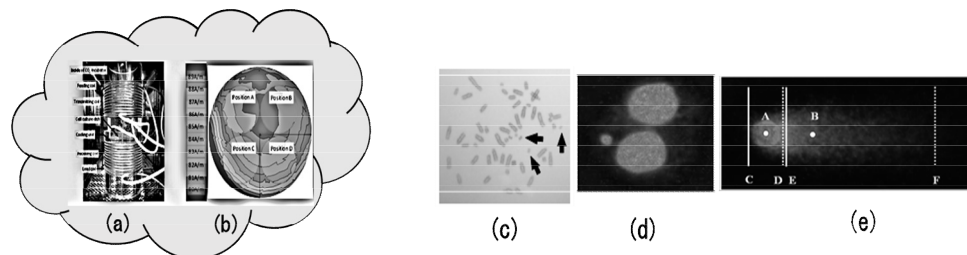


Fig. 1. Left:(a) Exposure system and (b) the distribution of electromagnetic fields; Right: Samples of genotoxicities, (c) chromosome aberration, (d) micronucleus, and (e) comet assay.

References

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