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## **NERVOUS SYSTEM AND NEUROENDOCRINE EFFECTS IN LONG TERM OCCUPATIONAL EXPOSURE TO MICROWAVES**

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### **Abstract**

The aim of this paper is to present the results of a study concerning nervous system and neuroendocrine effects in humans exposed to microwaves in occupational settings. In order to define exposure, microwave measurements and exposure metrics calculations were carried out and, consequently, a complex clinical epidemiological study has been done. Nervous system was studied both at peripheral and at central level by anamnesis, clinical examinations, electro-neurophysiological methods, questionnaires and psychological tests. Specific endocrinologic investigations, including hormone levels assessment were aimed to substantiate neuroendocrine effects. The results were statistically and epidemiologically analyzed in order to demonstrate the causality relationship presumed by study hypothesis. Microwave exposed subjects (electronic maintenance workers) had peripheral nervous system symptoms and related electromyography changes, central nervous system symptoms, related electroencephalography and psychological changes as well as neuroendocrine effects, especially calcium phosphorus balance changes and signs of thyroid dysfunction. There were significant differences versus matched controls as well as relevant associations with exposure metrics. Such changes put in evidence possible and plausible biological effects of microwaves on some structures of nervous system and point to the exposure metrics as important clues in the assessment of such effects. Authors consider that such studies have to be continued because the results have implications in understanding the intimate mechanisms of interaction between microwaves and nervous system. This kind of studies could facilitate the refinement of exposure standards, a step in the process of protecting the health of occupational exposed personnel.

*Key words:* central nervous system, endocrine system, microwaves, peripheral nervous system

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