Luminol-dependent chemiluminescence of peripheral neutrophils from workers exposed to low frequency electromagnetic fields.

Vuotto ML,¹ Sannolo N,² Liotti F,² Miranda R,³ De Seta C,² Di Grazia M,² Ruggiero G,¹ Spatuzzi D,¹ Sarno C,¹ De Sole P⁴.
1. Dipartimento di Patologia Generale, Seconda Università degli Studi, Napoli, Italy
2. Dipartimento di Medicina Sperimentale, Seconda Università degli Studi, Napoli, Italy
3. Servizio Sanitario della Polizia di Stato, Italy
4. Istituto di Biochimica e Biochimica clinica, Università Cattolica S. Cuore, Roma, Italy

The production of reactive oxygen species is considered a possible route for cellular damage in presence of environmental electromagnetic fields. Phagocytes are a main source of free radicals and reactive oxygen species and their activity could be modified by electromagnetic fields. In this study we evaluated the effects of chronic exposition to extremely low frequency electromagnetic fields (ELF) on neutrophils (PMN) measuring their resting and stimulated chemiluminescence (CL) activity. Intra- and extra-cellular CL was also analysed to obtain information on the compartment release of reactive oxygen species. The subjects studied were a group of workers chronically exposed to 50 Hz ELF and a group of age-matched healthy subjects. Resting intracellular CL of PMNs from exposed workers was found higher than that of the control while the extra-cellular one was not significantly different from that of controls. On the contrary, extra-cellular CL emission of activated cells of ELF-exposed subjects was lower than that of controls and no difference was found in intra-cellular CL. In conclusion, subjects professionally exposed to ELF have a basal production of reactive oxygen species higher than unexposed controls and a modification of the ratio of the intra/extra CL. The decrease of stimulated CL observed in ELF exposed subjects is probably dependent on the chronic activation of peripheral blood PMNs induced by ELF exposure.