

Medical/biological Study (experimental study)**Structural and kinetic effects of mobile phone microwaves on acetylcholinesterase activity.**

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Aim of study (according to author)

To determine the influence of nonthermal exposure to dual band mobile phone irradiation on the structure and function of electric eel acetylcholinesterase (an important CNS enzyme).

Endpoint

- structural and functional effects on acetylcholinesterase

Exposure

General category: GSM, microwaves

Field characteristics	Parameters
915 - 1822 MHz pulsed (PW) exposure duration: continuous from 1 to 50 min	electric field strength: 12 V/m max value (decreasing from 12 to 1 V/m every min) SAR: 0.51 W/kg

Exposed system:

isolated bio./chem. substance (in vitro)

Methods

Endpoint/Measurement parameters/Methodology

- enzyme activity of acetylcholinesterase (absorbance measurement); conformational/structural changes (circular dichroism spectra; hydrogel pattern of protein (SR-SAXS); ESEM); chromatographic profiles (GPC-HPLC); NMR relaxation time

investigated material: isolated bio./chem. substance (in vitro)

time of investigation: before und after exposure

Main outcome of study (according to author)


The data provided evidence that *in vitro* simple exposure of an aqueous solution of electric eel acetylcholinesterase to cellular phone emission resulted in an irreversible monomerization of the protein accompanied by a significant change in the enzyme activity.

It is found that radiofrequency irradiation irreversibly affect the structural and biochemical characteristics of the enzyme. SR-SAXS (Synchrotron radiation small-angle X-ray scattering) measurements provided data on the association of newly formed monomers into a soluble hydrogel. Jellification was confirmed by the variation of H^1 NMR relaxation times values. Further evidences of this process were revealed by ESEM (Environmental Scanning Electron Microscopy) observations. Although these data cannot be used to conclude whether exposure to radiofrequency during the use of cellular phone can lead to any hazardous health effect, they may be a significant first step towards further verification of these effects on other *ex vivo* or *in vivo* biological systems.

(Study character: medical/biological study, experimental study, full/main study)

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