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Abstract preview

Pulse-modulated 1800 MHz electromagnetic fields affect microglial cell responses triggered by lipopolysaccharide

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The extensive use of wireless communications has motivated investigations that aim at characterizing biological effects of electromagnetic fields (EMF) belonging to the radiofrequency (RF) spectrum. Many studies have probed responses of the healthy CNS exposed to these EMF but the EMF effects on brains affected by pathological processes remain seldom investigated. In the current study, our goal was to determine whether pulse-modulated 1800 MHz EMF used in the Global System for Mobile Phone Communication (GSM) could affect microglial proinflammatory responses triggered by lipopolysaccharide (LPS) *in vivo* or *ex vivo*. Adult rats were injected ip with LPS (250 µg/kg) 24h before a 2h "head only" exposure to GSM EMF. Dosimetric analyses showed that the specific absorption rate of RF averaged 2.9 W/kg in the dorsomedial part of the cerebral cortex. Cortical cell responses unfolding after the exposure to RF were assessed by immunohistochemistry and RT-qPCR analyses. Comparison of GSM- and sham-exposed animals revealed that the RF triggered a significant and transient down regulation of the IL-1β gene, accompanied by an increase in the spatial coverage of microglial cell processes. We also found that purified microglial cells stimulated with LPS were responsive to GSM EMF, as indicated by significant reductions in the levels of microglial transcripts encoding M1 proinflammatory markers. Together, our data provide evidence that GSM EMF can interfere with proinflammatory cell responses triggered in microglia.

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