

## THE CARDIOVASCULAR RESPONSE TO AN ACUTE 1800- $\mu$ T, 60-HZ MAGNETIC FIELD EXPOSURE IN HUMANS

**Purpose:** Previously published literature has suggested an effect of extremely low-frequency (ELF) magnetic fields (MF) on human heart rate (HR) and heart rate variability (HRV). The combined response of the microcirculation and macrocirculation to ELF MF exposure has not previously been studied in humans. This study investigated the effects of 1-h exposure to an 1800-IT, 60-Hz MF on human microcirculation (represented in this study as skin blood perfusion), HR, low-frequency HRV, and high-frequency HRV.

**Methods:** Fifty-eight volunteers were recruited to partake in a double-blinded, counterbalanced study consisting of two testing sessions (real and sham) administered on separate days. Each session included four consecutive blocks of measurements, separated by 15-min rest periods, allowing measurement of cumulative and residual MF effects. Within subjects, ANOVA were conducted on each of the measured parameters.

**Results:** A decrease of skin blood perfusion and HR, and an increase of HRV were observed over blocks ( $p < 0.05$ ). No session by block interactions were found for any of the cardiovascular parameters which would have suggested a MF effect ( $p > 0.05$ ). A session by block interaction ( $p < 0.001$ ) and a MF order effect (sham or real exposure first,  $p < 0.05$ ) were observed for skin surface temperature.

**Conclusions:** The MF used in this experiment did not affect cardiovascular parameters. Although an alternative explanation for why skin surface temperatures decreased in the sham and not in the real exposure condition is presented, the possibility of a MF effect cannot be excluded.