

Investigation of the effects of Pulsed Magnetic Field on Apoptosis at Rat Vascular Smooth Muscle Cells

P06-10

I. GUNAY¹, I. Ocal¹, F. Cicek¹

¹Department of Biophysics, Faculty of Medicine, Çukurova University, Adana, Turkey

The therapeutic effects of pulsed magnetic field (PMF) application have been shown in many studies. Although the effects of PMF were investigated on some key players such as voltage-gated Ca^{2+} channels, its cellular action mechanism is not been fully understood. Furthermore, it is unclear how in vivo applied magnetic fields affect the vascular system with electrical signaling mechanism. Therefore, the primary question of this study was the understanding of the effect of PMF on apoptosis through cytosolic Ca^{2+} signals.

In our study PMF applied to the rats in vivo for 30 days (40 Hz-1.5 mT/day). Then thoracic aorta of the animals removed and vascular smooth muscle cells (VSMCs) were isolated enzymatically. Primary cells were used for the experiment after 5-6 th day of isolation.

Effects of PMF were tested with an apoptosis inducer H_2O_2 (1 mM). H_2O_2 induced Ca^{2+} responses were measured in Fura 2-AM loaded cells with a CCDI camera system. Measurements were analyzed according to the fluorescence intensity increase. We observed that in PMF treated group 1 mM H_2O_2 application caused a statistically significant increase in the cytoplasmic Ca^{2+} responses according to the control group. We also checked caspase-3 activity of the VSMCs. We did not measure any difference between PMF treated vs. control group. However, H_2O_2 (1 mM, 1 hour) incubation increased caspase-3 activity in PMF group vs. control.

These differences in Ca^{2+} responses and caspase-3 activities may reflect that PMF effect is not sufficient to induce apoptosis alone. However, more experiments needed for a full understanding.

(Supported by Cukurova University Grant Fund with numbers: TSA-2015-3878 and TSA-2015-4050)