**PULSED ELECTROMAGNETIC FIELD STIMULATION AS A POTENTIAL CARDIOPROTECTIVE INTERVENTION**

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**Objective:**The loss of cardiomyocytes leads to heart failure, a burgeoning disease reaching epidemic proportions. Research efforts over the past two decades have intensified the focus on regenerating the myocardium. However, reported regeneration rates have been underwhelming. In this study, we aim to *investigate the utility and safety profile of a clinically-relevant modality: pulsed electromagnetic field (pEMF) stimulation to confer cardioprotection against hypoxia reoxygenation injury.*

**Methods:** We tested the cardioprotective capacity of pEMF stimulation by looking into its proliferation-inducing capacity in cardiac myocytes as well as protection against hypoxia reoxygenation-mediated cell apoptosis. To test its safety, we exposed mice to weekly pEMF stimulation for 6 weeks and monitored the cardiac function by echocardiography. At termination, hearts were harvested for histology.

**Results:** We found that *in vivo*pEMF stimulation did not negatively affect cardiac structural parameters or function. Left ventricular anterior, posterior wall, internal diameter, volume and mass measurements did not differ from control mice. Similarly, heart rate, fractional shortening, ejection fraction as well as cardiac output were also comparable to control mice. However, there was a significant increase in connective tissue area which could arise from thymosin-beta 4-expressing cells. Direct pEMF stimulation also increased proliferation rate of neonatal rat cardiac myocytes at optimized strength of 2-3mT and upregulated expression of proliferative gene Yap1, antioxidant gene Sod2, glucose transporter Glut4 as well as a calcium channel, Trpc1. Reduction in percentage of early and late apoptotic cells following hypoxia and hydrogen peroxide treatment was also seen.

**Conclusions:** Results highlighted the potential of pEMF stimulation in conferring cardioprotective effects on cardiomyocytes upon hypoxic treatment by upregulating key cardioprotective genes. Safety of pEMF on cardiac structure and function was also established. We are currently investigating further pEMF-stimulation cardioprotective capacity in ischemia-reperfusion injury *in vivo.*