

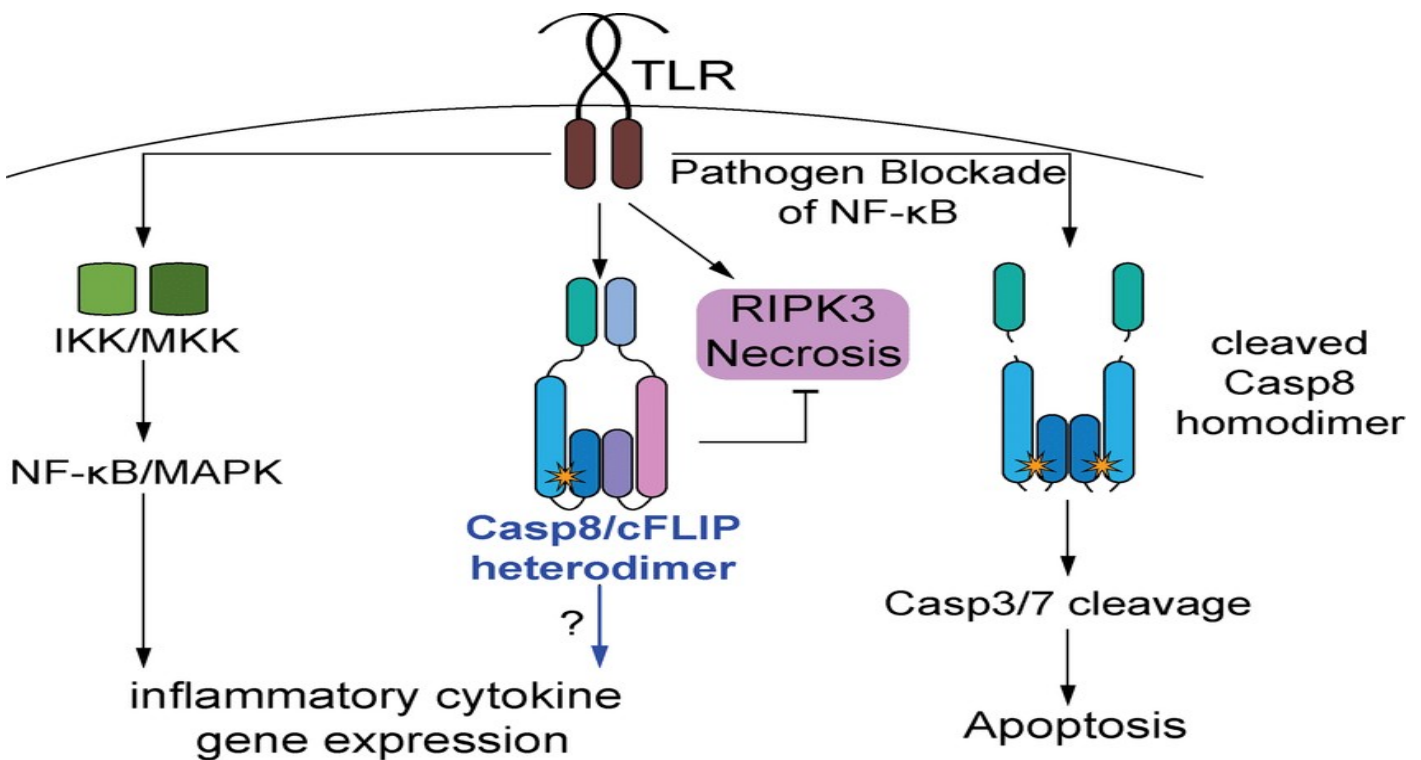
Medical PEMF Studies



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TENDONITIS

Effect of a wound healing electromagnetic field on inflammatory cytokine gene expression in rats.



1. Biomed Sci Instrum. 2001;37:209-14.

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In earlier studies, we have shown that pulsed electromagnetic fields (PEMFs) induce programmed cell death in cultured T cells and that rats exposed in vivo to PEMFs have decreased T-cell proliferative capacity. These data led us to hypothesize that PEMFs might be used to control proliferation of inflammatory lymphocytes and therefore beneficially affect inflammatory diseases. Tendinitis is characterized by painful inflammation of the tendon. Inflammation is

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characterized by massive infiltration of T lymphocytes, neutrophils and macrophages into the damaged tissue. These inflammatory cells produce a variety of cytokines, which are the cellular regulators of inflammation. The current study tests whether in vivo PEMF effects are mediated via systemic cytokine production in rat tendinitis. Inflammation was chemically induced in female Harlan Sprague Dawley rats Achilles' tendons and a wound healing PEMF (Electrobiology, Inc.) was applied for 4 hours immediately following injury. Spleens from control and experimental animals were harvested 24 hours later and total RNA was extracted from the tissues. Gene expression was analyzed by reverse transcription of mRNA, and polymerase chain reaction amplification (RT-PCR) using primers specific for the cytokines IFN-gamma, IL-1 beta, IL-6, TNF-alpha, and TGF-beta, as well as for the control beta-actin. RT-PCR products were separated on 1.5% agarose gels and band intensities were normalized to beta-actin gene expression of the same sample. TGF-beta was the only cytokine produced at high levels in rats with tendinitis in comparison to the other cytokines. PEMFs did not show an effect on any cytokine expression in the spleens, 24 hours after induction of tendinitis. Further studies need to test if cumulative exposures of PEMFs are able to regulate inflammatory cytokine expression either at the site of inflammation or at the local lymph nodes.

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