NANOPARTICLE MEDIATED ABLATION OF BREAST CANCER CELLS USING A NANOSECOND PULSED ELECTRIC FIELD

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ABSTRACT

In the past, both nanomaterials and various heating modalities have been researched as means for treating cancers. However, many of the current methodologies have the flaws of inconsistent tumor ablation and significant destruction of healthy cells. Based on research performed using constant radiofrequency electric fields and metallic nanoparticles (where cell necrosis is induced by the heating of these nanoparticles) we have developed a modality that simlarly uses functionalized metallic nanoparticles, specific for the T47D breast cancer cell line, and nanosecond pulsed electric fields as the hyperthermic inducer. Using both iron oxide and gold nanoparticles the results of our pilot studies indicated that up to 90% of the cancer cells were ablated given the optimal treatment parameters. These quantities of ablated cells were achieved using a cumulative exposure time 6 orders of magnitude less than most in vitro radiofrequency electric field studies.