With the continued development of cancer research, much work has been done to investigate the use of nanomaterials and heating based methods as a means for treatment. This work outlines the preliminary studies for a treatment that incorporates selective metallic nanoparticles and short electric field pulses to heat and treat breast cancer cells in solution. The results indicated that given the correct operation parameters, over 90% of the cancer cells could be ablated. The results of these pilot studies could translate into actual tumor treatments that are minimally invasive, selective, and efficient.