# Image-Guided Magnetic Thermoseed Navigation

Medical therapies achieve their control at the expense of the patient in the form of a range of toxicities, which incur costs and diminish the quality of life. Magnetic resonance navigation is an emergent technique that enables image-guided remote-control of magnetically labeled therapies and devices in the body, using a magnetic resonance imaging (MRI) system. Minimally INvasive IMage-guided Ablation (MINIMA), a novel, minimally invasive, MRI-guided ablation technique, which has the potential to avoid traditional toxicities, is presented. It comprises a thermoseed navigated to a target site using magnetic propulsion gradients generated by an MRI scanner, before inducing localized cell death using an MR-compatible thermoablative device. Baker et al. demonstrated precise thermoseed imaging and navigation through brain tissue using an MRI system (0.3 mm), and they perform thermoablation in vitro and in vivo within subcutaneous tumors, with the focal ablation volume finely controlled by heating duration. MINIMA is a novel theranostics platform, combining imaging, navigation, and heating to deliver diagnosis and therapy in a single device [1].

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Baker RR, Payne C, Yu Y, Mohseni M, Connell JJ, Lin F, Harrison IF, Southern P, Rudrapatna US, Stuckey DJ, Kalber TL, Siow B, Thorne L, Punwani S, Jones DK, Emberton M, Pankhurst QA, Lythgoe MF. Image-Guided Magnetic Thermoseed Navigation and Tumor Ablation Using a Magnetic Resonance Imaging System. Adv Sci (Weinh). 2022 Feb 2:e2105333. doi: 10.1002/advs.202105333. Epub ahead of print. PMID: 35106965.