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Magnetically Stimulated Release of a Model Drug From a Magnetic Drug Carrier TOM RILEY, BEN EVANS, None — The use of particles in the micro and nanometer ranges has become increasingly important as therapeutic tools in medicine. In particular, magnetically-active particles may allow for magnetically-controlled release of drugs at targeted locations. The drugs can be delivered directly to cancerous tumors at desired concentrations. While hydrogel-based microspheres have been commonly proposed for such purposes, there is also a need for a lipophilic magnetic microsphere for delivery of poorly-soluble pharmaceuticals. We have created a well-dispersed suspension of iron oxide nanoparticles in a silicone matrix, and have used the material to manufacture microspheres in sizes ranging from 100nm to 50 microns. Our spheres are stable in aqueous suspensions, yet their silicone matrix is uniquely suited for the transport and delivery of hydrophobic pharmaceuticals. A high concentration of magnetic nanoparticles (50% wt.) enables magnetic localization, magnetic heating (hyperthermia), and magnetic stimulation to trigger drug release. Using fluorescein as a model drug, we use UV-visible spectroscopy to show a slow native release rate of the hydrophobic fluorescein from the spheres. We use these measurements to quantify the loading capacity of the microspheres, and we show results of magnetically-stimulated drug release using a DM100 field applicator (nanoScale Biomagnetics).

Tom Riley
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