TECHNOLOGY

# Therapeutic Nano-Particle Magnetic Injector System

## OVERVIEW

Background
Magnetic targeted delivery provides the ability to direct therapeutic substances to different tissues in the body using external magnetic fields. Magnetic targeting makes locations of disease, infection, and cancerous growth more accessible and more treatable with greater efficacy and less cost. A tremendous amount of research has gone into making, testing, and verifying the safety and efficacy of therapeutic magnetic drug carriers over the last two decades. The number of medical applications being considered for magnetic drug delivery treatment has increased dramatically.

Nevertheless, methods for shaping magnetic fields, to precisely direct magnetic carriers to target tissues, are less well developed. The physics of magnetic fields and particles is such that any single magnet will always attract magnetic particles. This has meant that magnetic targeted delivery has been limited to focusing therapeutic substances to shallow targets, e.g. to tumors near the skin by holding a magnet at the skin surface. Delivery to deeper body tissues areas would require surgical implantation of magnetic material into the body, a clinically impractical solution.

To address these limitations, researchers at the University of Maryland and the University of Oklahoma have developed a novel magnetic system that can repel (push) magnetically susceptible particles - a Magnetic Injector System (MIS).

Advantages
This procedure would open up new areas of targeted tissues, such as the ear, eye, skin, heart, and others, to precise therapeutic interventions, and is simple enough to be performed in a doctor's clinic using inexpensive equipment.

Applications

- Cost: MIS equipment could be purchased for approximately $10 due to its relatively small size
- Safety: smaller magnets pose less danger to patients and keep procedure within FDA safety limitations
- Precision: smaller magnets are easier to position and maneuver
- Comfort: MIS method avoids the invasiveness and long-term consequences of magnet implantation
- Access: MIS would provide access to a far greater area of the body than the "attract" method alone can offer

Stage of Development
The MIS has been designed based on computer simulations of magnetic fields and magnetic forces. Those results have been validated in laboratory experiments and, as predicted, the MIS was effective at pushing magnetic nano-particles. It is currently being tested for efficacy in guinea pigs.

## CONTACT INFO

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## Additional Information

### INSTITUTION

University of Maryland, College Park

### PATENT STATUS

Patent(s) pending

### LICENSE STATUS

Contact OTC for licensing information

### CATEGORIES

- Drug delivery devices
- Devices
- Engineering

### EXTERNAL RESOURCES

- US Patent 8,316,862

PS-2008-116