

Guided drug delivery with magnetic force

Sivagnanam G.

Section Editor, Journal of Pharmacology and Pharmacotherapeutics

NEWS

“Researchers from Brown University had albino rats take gelatin capsules containing tiny magnets. The team used a magnet outside the body to direct the movement of the pills in the small intestine, and used a computer to track the pills and at the same time use the guidance system to test which spots are better and worse at absorbing chemicals.”^[1]

(RE)VIEW

Magnetic materials are already used in diagnostics, a classic case being magnetic resonance imaging contrast agents. Magnetic particles are presently explored as a means in other diagnostic and therapeutic medicine too.

Anatomical mapping (3-D images) as well as continuous

evaluation of human gastrointestinal motility is possible using a minimally invasive technique called “magnetic tracking system” (MTS). MTS is a potential method for studies of gastrointestinal motility in normal as well as pathological conditions (e.g., motility disorders). A small magnet progressing through the digestive tract is tracked continuously through signals received and recorded by 16 magnetic field sensors placed over the abdomen.^[2,3]

Principle

Therapeutic or diagnostic agents are encapsulated within or attached with magnetic micro/nano particles. When this complex is injected into the blood stream, it can be attracted to and released at a desired site (mostly superficial body sites as the magnetic field strength reduces in deeper tissues) by a focused, high-gradient external magnetic field over the site.

Prospect

This technique has potential applications like delivering genes^[4] or drugs^[5] to the desired target tissue. As of date, usage of magnetic force in applied therapeutics, especially for drug delivery, is still in the embryonic stage. However, ongoing research aims at targeted delivery of drugs like anti-cancer drugs (e.g., doxorubicin), NSAIDs (e.g., ibuprofen) and enzymes (e.g., trypsin, lipase), etc.^[6] The likely toxicity from magnetic particles remains unknown.

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News and views

Magnetofection

It is a simple and efficient transfection (introduction of exogenous DNA into cells, i.e. gene transfer) method utilizing magnetic fields to deliver and retain nucleic acid into the target cells.^[7]

Thus, magnetic principle is employed not only in potential targeted drug therapy but also in gene therapy.

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Universal standards proposed for prescription container labels to help reduce medication misuse

Prescription container labeling deals with medication instructions to promote better patient understanding toward safe and effective medication usage.

There is a proposed new test chapter on prescription container labeling available at <http://www.usp.org/pdf/EN/USPNF/M5531.pdf>

The purposes are to:

1. Determine the optimal prescription label content and format to promote safe medication use by critically reviewing factors that promote or distract from patient understanding of prescription medication instructions and
2. Create universal prescription label standards for format/appearance and content/language.