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Reporter gels to identify macromolecular structure, enzymes, and cells using MRI

AzTE Case # M09-044

Inventors

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Invention Description

Hydrogel matrices have been developed to promote tissue regeneration after injury or to deliver drugs to a specific location. The interaction of the hydrogel with the surrounding tissue is complex and unique to each individual's biochemistry, thus making it important to monitor the molecular structure and degradation rate of the gels once implanted. Present techniques used to observe hydrogels and their intended progress are limited in resolution and depth.

Researchers at Arizona State University have developed a biocompatible hydrogel matrix that incorporates superparamagnetic nanoparticles allowing the hydrogel to be imaged using a common and highly resolved MRI technique. The nature of this hydrogel allows for the nanoparticles to be fined tuned for sensitivity to various target molecules. This technology can be used to image the progress of a hydrogel used for tissue regeneration; the successful delivery of timed release of medication; and to detect the presence of enzymes that are detrimental to the three dimensional structure of the implanted hydrogel

Potential Applications

- Drug delivery
- Clinical practice
- Surgery

Benefits and Advantages

- Noninvasive and improved resolution of hydrogel imaging using common MRI technology
- Sensitively detects the presence of toxins or enzymes harmful to the hydrogel structure post implantation
- Monitors the actual rate of timed-release drugs present in hydrogels

Intellectual Property Status:

Patent Pending

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