

Antibiotic Microspheres for Treatment of Infections and Osteomyelitis

More than 750,000 people in the United States have knees, hips, or shoulders replaced surgically each year. For about 30,000 of these patients the surgery results in osteomyelitis, a dangerous infection of the bone tissue. This infection results in repeat surgeries for repair, replacement, and sometimes even removal of the implant.

To treat osteomyelitis, high doses of antibiotics are administered in addition to surgical removal of the infected tissue. The antibiotics are commonly administered systemically, which increases the risk of nephrotoxicity, ototoxicity and gastrointestinal side effects. To avoid these negative effects, the field is moving towards localized delivery of antibiotics, typically done using bone cement containing antibiotics. Although these techniques focus the release of antibiotics locally, the delivery is short term and non-linear and the cement must be surgically removed, introducing an opportunity for subsequent infection.

Scientists at the University of Texas Health Science Center at Houston and Rice University have developed implantable, injectable, or otherwise internalizable time-release microspheres that deliver antibiotics in a near-linear fashion. The microspheres are biodegradable and are able to release antibiotics locally over a period of several weeks. A pre-clinical study in a rabbit model of osteomyelitis found that the antibiotic microspheres were able to prevent infection in 100% of the animals. Importantly, the microspheres did not impair healing or provoke an immune response.

The microspheres can be used not only therapeutically for existing infections, but also preventatively in surgeries, particularly applications with orthopedic implants, cardiovascular stents, grafts, hernia repair, gynecological and neurosurgical procedures.

Technology Highlights

- Microspheres are biodegradable, no need for subsequent surgery
- Antibiotics are administered locally
- Linear release of antibiotics over several weeks
- Microspheres do not impair healing



Implant coated with antibiotic microspheres

Technology Status

Issued U.S. and international patents
Available for world-wide exclusive or non-exclusive licenses

Publications:

J Bone Joint Surg Am. 2014 Jan;96(2):128-134
Clin Orthop Relat Res. 2004 Apr;(421):293-9
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Non-confidential Technology description

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