

New test shows promise for detecting warning signs of joint replacement failure

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A new test shows promise for detecting the early stages of a major cause of failure in joint replacement implants, so that patients can be treated and perhaps avoid additional surgery. More than 1.5 million total joint replacement operations are performed worldwide each year. While the success rate is 90 per cent, almost 10 per cent of implants fail and require additional surgery, report appears in the ACS journal *Molecular Pharmaceutics*.

Dong Wang and colleagues at University of Nebraska Medical Center and the Hospital for Special Surgery of New York explain that wear and tear in a joint replacement can create tiny bits of debris that cause local inflammation and lead to bone loss. When this happens, the implant can become loose and set the stage for failure. Treatment usually comes too late, they note, since it's difficult to detect the problem in its early stages. "When pain or clear radiographic evidence is reported, unfortunately, considerable bone loss has already occurred, which cannot be easily restored," the scientists note.

To provide an early [diagnostic tool](#) for implant failure, the researchers developed a polymer-based system for imaging the inflammation that is associated with the wear debris. Their tests of the imaging agent in mouse bone suggest that it can help them detect the early stages of bone loss that might cause a joint implant to become loose. They also found that they could tether a powerful anti-inflammatory drug to the polymeric system, offering a way to treat [inflammation](#) and [bone loss](#) in these early stages of wear. "Subsequent therapeutic interventions at this

stage," they write, "would permit prolongation of the lifetime of the implant with improved patient outcomes."

More information: "Early detection and treatment of wear particle-induced inflammation and bone loss in a mouse calvarial osteolysis model using HPMA copolymer conjugates" *Molecular Pharmaceutics*.

Provided by American Chemical Society

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