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### **Nanoparticles could help increase retention of osteoarthritis drugs in knee cavity**

A novel study demonstrates that using nanoparticles to deliver osteoarthritis drugs to the knee joint could help increase the retention of the drug in the knee cavity, and therefore reduce the frequency of injections patients must receive. This research is being presented Oct. 23 - 27 at the 2011 American Association of Pharmaceutical Scientists (AAPS) Annual Meeting and Exposition in Washington, D.C.

Osteoarthritis affects 30 million Americans and is the most common joint disorder. It is projected to affect more than 20 percent of the U.S. population by 2025. Aging, obesity and joint injury can lead to osteoarthritis, which is characterized by progressive erosion of articular cartilage (cartilage that covers the bones). The disease can occur in all joints, most often the knees, hips, hands and spine, and currently there are no pharmacological treatments that halt the disease progression. For large joints, a drug could be injected into the joint to help limit potential side effects, like pain. A significant challenge in treating osteoarthritis this way is the short duration the medicine stays in the affected joint after injection.

Lead researcher Michael Morgen, Ph.D., and his colleagues from Bend Research and Pfizer propose to address this challenge with injectable nanoparticles that help retain osteoarthritis drugs in the knee joint. Test results show that 70 percent of the drug nanoparticles remain in the knee cavity after one week. In contrast, for most current formulations, the drug disperses within one to two days.

In this new process, positively charged nanoparticles carrying a drug attach to the negatively charged, naturally occurring molecules in the knee to form a gel. This gel acts as a depot that slows drug escape from the knee cavity.

"Current delivery methods do not maintain the drug in the knee for very long, which limits the effectiveness of therapeutic agents," said Dr. Morgen. "We hope that this type of sustained release technology, when used with current or new osteoarthritis drugs, will allow patients to be effectively treated with drug injections every three months instead of once a week."

The 2011 AAPS Annual Meeting and Exposition, the world's largest pharmaceutical sciences meeting, aims to improve global health through advances in pharmaceutical sciences. AAPS, currently celebrating its 25th Anniversary, has themed the keynote and plenary sessions at this year's Annual Meeting "The Next 25 Years." An estimated 9,000 scientists from around the world will participate in 90 sessions, including more than 60 symposia and roundtables.