

Osteoarthritis medicine delivered on-demand

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Scientists are reporting development of a squishy gel that when compressed—like at a painful knee joint—releases anti-inflammatory medicine. The new material could someday deliver medications when and where osteoarthritis patients need it most. Their study appears in the ACS journal *Biomacromolecules*.

Xinqiao Jia, Chandran R. Sabanayagam and colleagues note that in the past few decades, researchers have been developing a variety of "smart" hydrogels that can release medications over several days rather than in a single burst. Most of these gels release medicine all the time or in response to changes in temperature, light or other factors. Very few respond to physical pressure, which is what causes pain in the 27 million [osteoarthritis](#) patients in the U.S. Osteoarthritis is called the "wear-and-tear" type of [arthritis](#). The cartilage between the bones becomes damaged and wears away, making everyday movements of the knees, hands, backs and hips severely painful. Jia and Sabanayagam set out to develop an on-demand, drug-delivery system for [pain management](#) and tissue repair in a way that makes more sense for osteoarthritis patients.

They created a special type of hydrogel that responds to compression—such as the pressure between joints that occurs in everyday movement—and loaded it with an anti-inflammatory drug called dexamethasone, which is sometimes used to treat arthritis. When they compressed the hydrogel in the laboratory, it boosted the release of the drug. The researchers are currently testing their smart [pain medications](#) in laboratory animals.

More information: "Hyaluronic Acid-Based Hydrogels Containing Covalently Integrated Drug Depots: Implication for Controlling Inflammation in Mechanically Stressed Tissues" *Biomacromolecules*, 2013.

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