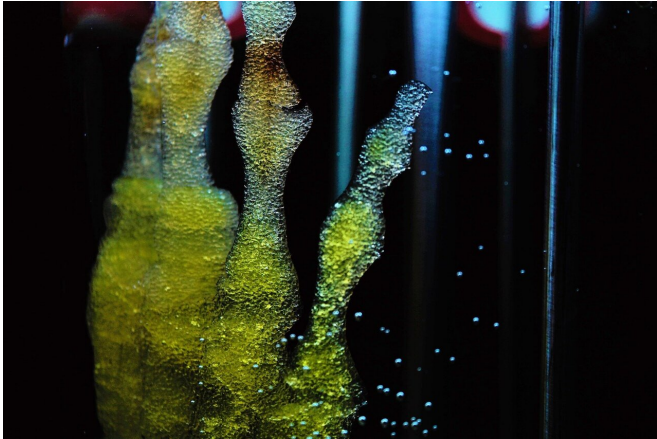


A new injectable hydrogel for cartilage repair

13 September 2021, by Bob Yirka



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A team of researchers affiliated with a host of institutions in China has developed an injectable hydrogel for use in repairing damaged cartilage. In their paper published in the journal *Science Advances*, the group describes how they made their hydrogel, how it can be applied and how well it worked when tested on mice and pigs.

Repair of torn or eroded cartilage has improved dramatically in recent years as scientists have learned to grow chondrocytes (cells that grow into cartilage) and to use them to encourage growth of new cartilage. They are typically grown on structures in patches which are then applied to the area in need of repair. One major drawback to such treatment, however, is the need to cut through the skin and lay open the area to be treated. Such treatment can lead to a painful recovery over several months. In this new effort, the researchers have developed a type of hydrogel that can be used for the same type of treatment without the need for surgery.

The hydrogel developed by the team involved using light-initiated polymerization as well as light-

induced cross-linked imine organic compounds. The result was a gel that could be applied to a scaffold and which would harden only when exposed to ultraviolet light. This meant that a scaffold could be rolled into a very small shape and inserted by injection to the site needing repair. The gel could then be injected onto the scaffolding. Once in place, all that was needed for the gel to harden in place was to shine a UV light onto the impacted area. The gel would harden within ten seconds allowing the scaffolding with its load of chondrocytes to grow new cartilage.

The researchers tried a variety of scaffolding shapes using lab mice and finally settled on a star-shape. They then further tested their gel by injecting several mice and allowing cartilage to grow for eight weeks. They next tested their approach using pigs that had defective cartilage and monitored the growth of cartilage using MRI scans. They found that after approximately six months, the cartilage in the pigs was restored.

The researchers plan to continue testing their [hydrogel](#) approach and expect to begin [human trials](#) soon—if all turns out well, they expect their approach to become [standard treatment](#) for [cartilage](#) repair.

More information: Yujie Hua et al, Ultrafast, tough, and adhesive hydrogel based on hybrid photocrosslinking for articular cartilage repair in water-filled arthroscopy, *Science Advances* (2021). DOI: [10.1126/sciadv.abg0628](https://doi.org/10.1126/sciadv.abg0628)

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