Programmable hydrogels could herald a new era in wound care

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Hydrogels are engineered materials that absorb and retain water and are currently used in various medical treatments, including dressing wounds. The problem with current hydrogels is that they adhere indiscriminately

to all surfaces, which means that wound dressing can potentially damage delicate tissue as it is healing.

McGill researchers have discovered that it is potentially possible to manipulate the way that surfaces of hydrogels are arranged to program not only where they will adhere, i.e., to some surfaces and not to others, but also with what degree of intensity and how fast the adhesion can establish over time.

When it comes to wound care, this means that the adhesive gel can be programmed to form strong bonds with healthy tissue and weak bonds with wounded tissue, preventing secondary damage.

"This work is potentially of benefit to surgeons since it will allow them enough time to accurately place an adhesive that only adheres to the desired location but not others," says Zhen Yang, a postdoctoral fellow in the Department of Mechanical Engineering at McGill University and the first author of the article that was recently published in *PNAS*.

"The next step in the research is to see how this discovery could also benefit the design of medical devices which are intended for sustained drug release on tissue surfaces."

More information: Zhen Yang et al, Programming hydrogel adhesion with engineered polymer network topology, *Proceedings of the National Academy of Sciences* (2023). DOI: 10.1073/pnas.2307816120

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