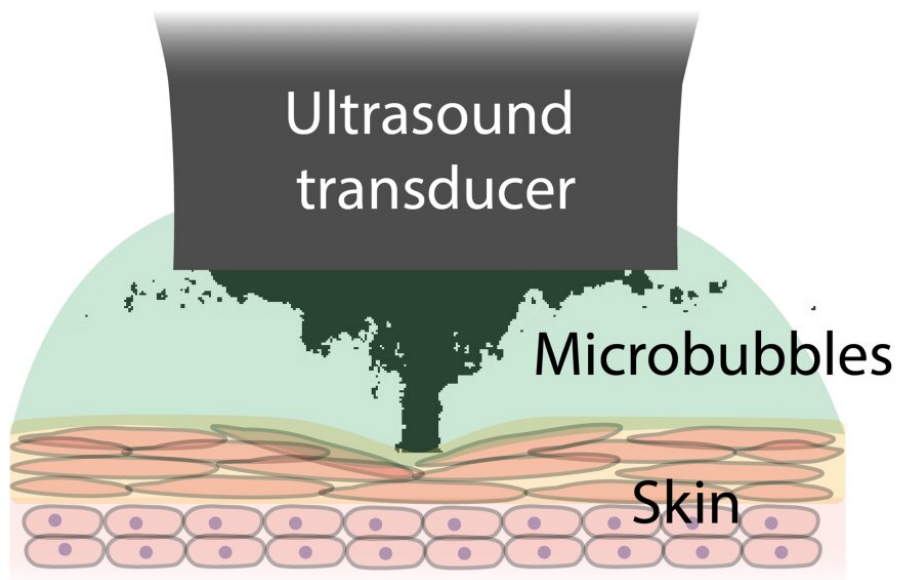


Using sound and bubbles to make bandages stickier and longer lasting

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Ultrasound induced microbubbles mediate bioadhesion. Credit: Zhenwei Ma

Researchers have discovered that they can control the stickiness of adhesive bandages using ultrasound waves and bubbles. This breakthrough could lead to new advances in medical adhesives, especially in cases where adhesives are difficult to apply such as on wet skin.

"Bandages, glues, and stickers are common bioadhesives that are used at

home or in clinics. However, they don't usually adhere well on wet skin. It's also challenging to control where they are applied and the strength and duration of the formed adhesion," says McGill University Professor Jianyu Li, who led the research team of engineers, physicists, chemists, and clinicians.

"We were surprised to find that by simply playing around with ultrasonic intensity, we can control very precisely the stickiness of [adhesive](#) bandages on many tissues," says lead author Zhenwei Ma, a former student of Professor Li and now a Killam Postdoctoral Fellow at the University of British Columbia.

Ultrasound induced bubbles control stickiness

In collaboration with physicists Professor Outi Supponen and Claire Bourquard from the Institute of Fluid Dynamics at ETH Zurich, the team experimented with ultrasound induced microbubbles to make adhesives stickier. "The [ultrasound](#) induces many microbubbles, which transiently push the adhesives into the skin for stronger bioadhesion," says Professor Supponen. "We can even use theoretical modeling to estimate exactly where the adhesion will happen."

Their study, published in the journal *Science*, shows that the adhesives are compatible with living tissue in rats. The adhesives can also potentially be used to deliver drugs through the skin. "This paradigm-shifting technology will have great implications in many branches of medicine," says University of British Columbia Professor Zu-hua Gao. "We're very excited to translate this technology for applications in clinics for tissue repair, [cancer therapy](#), and precision medicine."

"By merging mechanics, materials and [biomedical engineering](#), we envision the broad impact of our bioadhesive technology in wearable devices, wound management, and [regenerative medicine](#)," says Professor

Li, who is also a Canada Research Chair in Biomaterials and Musculoskeletal Health.

More information: Zhenwei Ma et al, Controlled tough bioadhesion mediated by ultrasound, *Science* (2022). [DOI: 10.1126/science.abn8699](https://doi.org/10.1126/science.abn8699)

Provided by McGill University

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