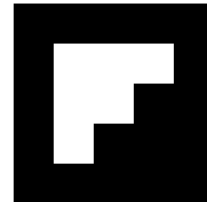
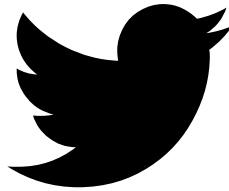


## MEDICAL

Magnets and a pinch of skin combine for slow, safe insulin delivery

By Nick Lavars  
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*Members of the Nanyang Technological University research team demonstrates their new method of transdermal drug delivery* **Nanyang Technological University**

A new drug delivery method inspired by traditional Chinese topical treatments has produced some impressive results as part of a study in Singapore. The research carried out at the Nanyang Technological University (NTU) demonstrates how magnets can be used to pinch and apply pressure to the skin, which opens up additional pathways for drugs such as insulin to enter the body in safer, more efficient ways.

The research was conducted on mice and focused on methods of creating what the team calls “temporal pressure” on the skin. The idea is to force short-term alterations in the skin barrier that lead to additional micropores beneath the surface, which in turn allow drugs to enter the body and diffuse more easily.

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“Our research project was first inspired by the traditional Chinese medicine ‘tuina’ therapy where physicians rub and apply pressure on skin and muscle tissue and apply a topical ointment,” says study author, Dr Daniel Lio.

In one round of experiments, the team applied a pressure treatment using two magnets to pinch a section of skin into a fold, and then observing how this affected the formation of micropores and uptake of insulin. This was compared to treatments involving no pressure, and treatments involving microneedle patches instead, where the drugs enter the body via dozens of ultra-thin needles.

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The team found that the additional micropores, which feature an area of around three micrometers, allowed six times the mass of drugs to diffuse through the skin compared to a treatment involving no temporal pressure. The amount of drugs delivered was also comparable to that delivered via the microneedle patches, while the micropores were found to disappear just a day later.

This type of drug delivery, where it is applied topically on the surface of the skin without needles, is known as transdermal delivery. The team reports that this new method delivered masses 40 times greater than what is possible using current transdermal drug delivery techniques.

The method therefore raises the prospect of advanced methods for administering insulin that don't involve needles breaking the skin, and allow the drug to enter the system more slowly. This would avert the risk of a hypoglycemic effect when insulin acts too quickly and leads to dizzying sensations, and avoid the discomfort of regular injections.

“Patients who have to inject drugs daily, such as insulin, are constantly asking whether there is another way to deliver their medicines that doesn't involve hurting or penetrating the skin,” says NTU's David Laurence Becker. “Our new findings hold promise for them and we hope that we can refine this method so that one day it may be possible to deliver enough drugs through the skin via a patch and to rid them of their daily injections.”

The research was published in the journal *Science Advances*.