

# NTU team's safer way to tackle obesity – using gel, infrared light

**NTU** • Team develops special gel to tackle obesity | B5

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Scientists from Nanyang Technological University (NTU) have developed a therapy that uses a gel and infrared light to burn fat – a possible safer treatment for people working to control their weight.

Drugs that tackle obesity are meant to accompany exercise and a healthy diet in helping people who are severely obese, including those who have metabolic disorders, but many in the market come with side effects.

Laboratory trials by the NTU team from the School of Chemical and Biomedical Engineering show that mice on a high-fat diet that underwent its therapy were 5.5 per cent lighter after two weeks, and lost between 40 per cent and 50 per cent of body fat.

In the therapy, a transparent gel – called a hydrogel and developed by the scientists – is injected into a layer of fat under the mice's skin.

An infrared light is then shone on the injection site for five minutes a few times a day to trigger the hydrogel's fat-burning ability.

When exposed to the infrared light, nanoparticles in the hydrogel convert light into heat to activate a protein in the body that kick-starts the fat-burning process.

In this process, white fat – which stores excess calories and leads to weight gain – is converted to calorie-burning tissue.

"Fat cells become energy-burning instead of energy-storing," said bioengineering professor Chen Peng, who led the study.

After two weeks of the treatment, which includes eight days of rest, the mice lost 40 per cent of fat under their skin and 54 per cent of the fat surrounding their internal organs.

They had lower cholesterol lev-

els and reduced resistance to insulin, suggesting that the procedure has the potential to reduce the risk of metabolic disorders, said NTU in a statement yesterday.

Touching on the therapy's safety, the research team said the hydrogel nanoparticles – made of copper sulphide – have negligible toxic effects on vital organs and tissues.

And although the process uses heat converted from the infrared light to burn fat under the skin, the team found no thermal injury to the mice's skin, said Prof Chen.

The team envisions the therapy being used as a home treatment one day.

Similar to an insulin shot, patients with obesity can inject the hydrogel into their belly fat, for instance, in multiple places once a week. They can then point a handheld laser at the injection sites for five minutes a few times a day and repeat this over several days to activate the fat-burning process.

The scientists hope their therapy can be an alternative to costly fat reduction procedures that target only fat under the skin, and obesity drugs approved by the FDA that often come with side effects.

According to the National Institute of Diabetes and Digestive and Kidney Diseases in the United States, the common side effects associated with weight-loss drugs include diarrhoea, constipation, nausea and headaches.

"All FDA-approved medications for obesity indirectly act on the brain to suppress appetite or on the digestive system to reduce fat absorption. Most of them have been withdrawn from the market due to their serious side effects," said Prof Chen.

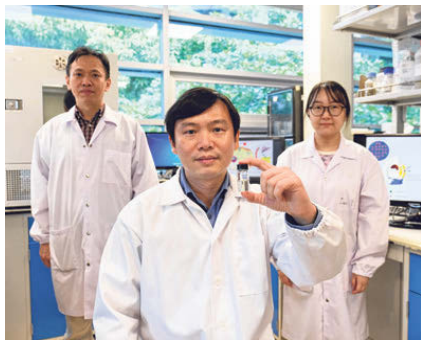
The NTU team is now looking to collaborate with partners to conduct clinical trials with one or two patients, as a start.

Prof Chen said studies must be done to observe the possible side effects of the therapy on humans. He said the cost of the therapy is likely to be less costly compared with weight loss surgery.

Senior research fellow Than Aung, who is part of the team, said each hydrogel jab could cost between \$10 and \$20. As several jabs a week are likely required, the cost may be comparable to obesity and weight loss drugs, which cost several hundred dollars a month.

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Professor of bioengineering Chen Peng (centre) holding a vial containing the hydrogel that is used together with infrared light to burn fat. With him are his research team-mates from the NTU School of Chemical and Biomedical Engineering – Dr Than Aung (left), a senior research fellow; and Dr Zan Ping, a post-doctoral researcher and first author of the paper. PHOTO: NTU