

Tiny tummy patch cuts fat fast without exercise

Invention can reduce mass by a third in a month using microneedles to deliver two weight-loss drugs

By Sarah Knapton SCIENCE EDITOR

FOR those who have overindulged during the Christmas period help may be at hand from scientists in Singapore.

A tiny tummy patch has been shown to cut body fat by 30 per cent in just 28

days without the need to exercise. The patch is covered in hundreds of microneedles which are smaller than a human hair and which gradually supply a dose of two weight-loss drugs.

The drug combination works to transform stubborn white fat into more manageable brown fat, which is burned away as energy by the body to keep warm. Although the patch has so far only been tested on animals, scientists at the Nanyang Technological University (NTU) want to move to human trials quickly, and have already received

interest from several biotech companies who are keen to develop the device.

It is estimated that two thirds of Britons - 36million - will be overweight or obese by 2025 and weight gain is a risk factor for many health problems.

Scientists believe the patch, which costs around £2.50 to make, could help people who struggle to lose weight, without needing to resort to costly surgery. "What we aim to develop is a painless patch that everyone could use easily, which is unobtrusive and yet affordable," said Prof Chen Peng, a bio-

technology and obesity expert at NTU. "Most importantly, our solution aims to use a person's own body fats to burn more energy, which is a natural process in babies."

The patch delivers the diet drug Beta-3 adrenergic receptor agonist and a thyroid hormone called T3 triiodothyronine which is commonly used for medication for an underactive thyroid gland. When the patch is pressed into the skin for about two minutes, the micro-needles become embedded in the skin and the patch can then be

removed. As the needles degrade, the drug molecules slowly diffuse the energy-storing white fat underneath the skin layer, turning it into energy-burning brown fat.

Brown fats are found in babies and they help to keep the baby warm by burning energy. As humans grow older, the amount of brown fats reduces.

Experiments on mice that were fed on a high-fat diet showed that the patch reduced their fat mass by more than 30 per cent over a period of just four weeks. It also significantly lowered

their blood cholesterol and levels of fatty acid. Xu Chenjie, assistant professor, added: "With the embedded microneedles in the skin of the mice, the surrounding fats started browning in five days, which helped to increase the energy expenditure of the mice, leading to a reduction in body fat gain."

The two drug are already available on prescription as weightloss oral drugs but patients can be prone to side-effects because of the large amounts needed. The research was published in the journal *Small Methods*.