SINGAPORE: Losing weight could soon be as easy as swallowing a pill.

Researchers from the Nanyang Technological University (NTU) and National University Health System (NUHS) have invented a pill designed to make one feel full, thus helping with weight management.

On Wednesday (Apr 24), they demonstrated a prototype of the EndoPil, a 3cm by 1cm capsule containing a balloon that can be self-inflated with a handheld magnet once it is in the stomach.
The capsule can be taken with water, just like regular medication.

NTU Dean of Engineering, Professor Louis Phee, explained that a simple chemical reaction is all it takes to fill the capsule with gas.

“We have a valve connected to a small magnet in a pill. One chamber will hold an acid, one of them is citric acid. If you mix these two chemicals together, you produce carbon dioxide,” he said.

He added that the chemicals would be natural ingredients used in everyday household activities such as lemon juice and baking soda.
An external magnet would be used to activate the chemical reaction that produces the gas.

“The balloon actually mimics food,” said clinician-innovator at NUHS, Professor Lawrence Ho. “The top part of your stomach controls appetite. Once the balloon occupies the top part of your stomach, you will feel full.”

The balloon can inflate to a volume of 120ml or roughly the size of a small potato.

When used in regular treatment, researchers expect the balloon to remain in the body for about two weeks to a month. Thereafter, the balloon will deflate on its own and pass out of the body naturally.

The capsule is largely meant for obese patients, in cases where non-surgical weight loss methods such as behavioural procedures and drug therapy have failed.

It is "less invasive" and cheaper than surgery, but produces "close to surgical effects", said Prof Ho.

RISKS
The risks involved in using EndoPil are mostly related to the inflation process, said Prof Ho. “If it blows up too early, (it will tear the oesophagus). If you blow it up too late, it will stay in the small intestine and cause blockage.

“In the stomach, you have to make sure that it won’t over-inflate or fail to inflate, and that it will deflate at the right time,” he said.

But this is not a problem unique to the EndoPil, said Prof Ho, adding that endoscopy, which is a non-surgical procedure to examine the digestive tract, "has the same problem".

![The inflated EndoPil capsule as seen in a demonstration. (Photo: Cindy Co)](image)

The EndoPil is still in its early stages of development. It is designed to be ingested orally, but trials using this route for administration have not yet begun.
The team has only tested the product on pigs and a human volunteer, and using an endoscope.

The pig with the inflated capsule in its stomach lost 1.5kg a week later, while a control group of five pigs gained weight.

The capsule was also inserted into the stomach of a healthy patient volunteer through an endoscope. The balloon was successfully inflated within her stomach with no discomfort or injury from the inflation.

Trials are expected to continue over the next two years as laid out in the National University of Singapore’s Institutional Review Board guidelines.

Ultimately, the team hopes to focus their efforts on making the product safe for use.

"Our next step is to try and show that people can swallow the capsule without an endoscope," said Prof Ho.

“Over the next two years, it’s all about engineering - to make sure that even if it fails, it will fail safely,” said Prof Phee.