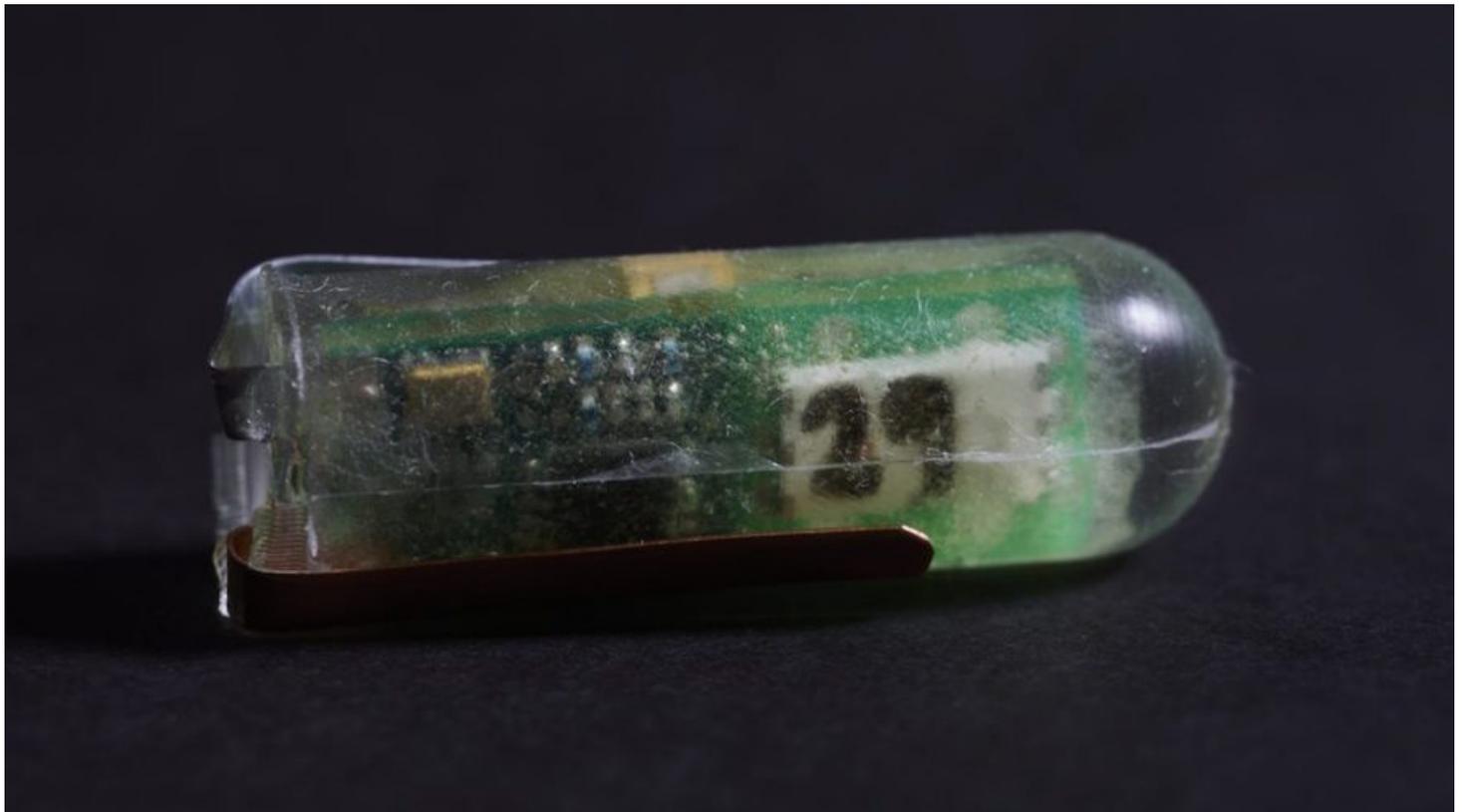


Patients who pop this pill could provide doctors with better information

By PBS NewsHour, adapted by Newsela staff on 02.13.17

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Researchers at MIT and Brigham and Women's Hospital have designed and demonstrated a small, ingestible voltaic cell that is sustained by the acidic fluids in the stomach. Photo by: Diemut Strebe/MIT News

There is a lot of talk about “brain power.” You don't usually hear about stomach power.

As it turns out, the stomach might also be very powerful with a new electronic pill inside it. The pill has a Wi-Fi transmitter in it. The device is swallowed and then uses energy from inside the stomach. It uses that energy to record body temperature. Then, the information goes to a computer outside the body.

The model can power itself for nearly a week. This is much longer than other devices placed inside the body.

This Wi-Fi pill could lead to breakthroughs in medicine. Examples include delivering medicine or monitoring organs from the inside, said Giovanni Traverso. He is a doctor at Brigham and Women's Hospital in Boston and is one of the makers of these devices.

Traditional Temperature Readings Are Often Incorrect

It is a really big deal that this pill can measure body temperature. Thermometers can take people's temperatures from their mouths, armpits or skin. But, they are not always correct. This is important because incorrect temperatures can lead to risks for patients during treatments.

The device fits inside a capsule. A patient swallows it, and then it unfolds when it is in the stomach. It can deliver medicine for long periods of time. Then, it breaks down and passes through the body.

Traverso and some collaborators wondered if adding a power source would make the device work even longer. The team wanted to see if the stomach's juices could power the device.

They used tiny pieces of copper and zinc that have a chemical reaction with the stomach juices, said Philip Nadeau. He is an engineer who helped design the device. Copper and zinc are both metals that react when they are near acid.

"It basically generates the same power level that a lot of Bluetooth devices use," Nadeau said.

Pills In Pigs Transmitted Information 10 Feet Away

The devices were tested in pigs. Each pill contained conductors for energy to enter and leave, a temperature sensor and a Wi-Fi transmitter. The information would be sent to another device, called a receiver, hanging from the ceiling about 10 feet away.

"The device was sending a temperature measurement and a few performance indicators of the system every 12 seconds," Nadeau said. "So basically it would be almost like a tweet, maybe a bit shorter than a tweet."

The Wi-Fi pill moved through the stomach and intestines of the pigs. It tracked body temperatures for six days. Another device used the harvested energy to deliver medicine.

"It's a pretty nice accomplishment," said John Rogers, a scientist at the University of Illinois at Urbana-Champaign. Rogers wasn't involved in the study. "Not only were they able to (keep) power for a period of six days, but it was at levels of power that were practically useful."

Safety Concerns About Copper In Humans

In terms of safety, the electronic pill has low doses of zinc and copper. Scientists believe the zinc is safe but are less certain about copper. It will need to be studied more before it is used by humans. It could be that it is dangerous to have copper in a person's stomach.

Traverso and Nadeau also want to shrink down the pill from its current size.

"When I show it to people they say, 'I'm not going to swallow that!'" Nadeau said. He added that making it smaller is possible.

Traverso thinks temperature tracking is just the first of many ways to use the device to improve people's healthcare. The team has looked at measuring the heart and breathing, too. Swallowing a pill and monitoring people from the inside could help those with many different types of heart and lung diseases.

Quiz

- 1 Read the following sentence from the last paragraph of the introduction [paragraphs 1-4].

This Wi-Fi pill could lead to breakthroughs in medicine.

How does the author MOST help you understand what "breakthroughs" are?

- (A) The author includes the definition of breakthroughs in the article.
- (B) The author provides examples of breakthroughs that might happen.
- (C) The author describes who came up with the breakthroughs.
- (D) The author gives details about breakthroughs in the past.

- 2 Read the paragraph from the section "Pills In Pigs Transmitted Information 10 Feet Away."

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Which sentence uses "practically" in the SAME way as the paragraph above?

- (A) My mother told me that we were practically there, but there was still an hour left of the car ride.
- (B) I was nervous about presenting my project, because practically everyone used the same topic.
- (C) The gadget had too many parts and was too complicated to be built practically for everyday use.
- (D) The ballplayer walked off the field practically in tears after being hit in the stomach with the ball.

- 3 Which of the following answer choices BEST describes the structure of the the section "Pills In Pigs Transmitted Information 10 Feet Away"?

- (A) chronological order
- (B) compare and contrast
- (C) cause and effect
- (D) problem and solution

- 4 Fill in the blank. Overall, the article is organized around

- (A) a device and its problems.
- (B) doctors and their patients.
- (C) an invention and its uses.
- (D) a scientist and a discovery.