

The Latest in Healthcare Innovation? Tiny Robots



2022-06-25

Nanotechnology is moving from fiction to reality, with at least two universities studying the use of miniature robots inside the body to treat diseases and address other health concerns.

Fans of *Fantastic Voyage* take heart: The innovative nanotechnology featured in the 1966 movie about miniaturized doctors entering a human body may actually be coming true—sort of.

Researchers at both [Stanford University](#) and [Purdue University](#) have recently published studies on the use of miniaturized robots inserted into the body to treat certain health concerns. The robots could be used to delivered timed doses of medicine, chart the course of a tumor or disease, or even remove obstructions such as blood clots.

While nanotechnology has long been a popular topic in fiction, from Michael Crichton's 2003 novel *Prey* to the most recent James Bond movie *No Time to Die*, it's starting to show up in the real world. Several programs over the past few years have focused on the development of pills fitted with digital health sensors that are ingested and used to deliver timed doses of medicine and/or track vital signs and medication results, though the digital health company best known for developing that technology, Proteus, filed for bankruptcy in 2020.

Now some researchers are trying a new delivery method.

At Purdue, "microbots" developed by Hyowon "Hugh" Lee, an associate professor from the Weldon School of Biomedical Engineering, have been used to remove blood accumulating around the brain after a stroke. Working with neurosurgeons Timothy Bentley, MD, of

Purdue's College of Veterinary Medicine, and Albert Lee, MD, from Goodman Campbell Brain and Spine in Carmel, Indiana, he successfully removed pooled blood in six of seven animals.

"This innovation is a real advance in the care of strokes, which are notoriously difficult to treat," Lee, whose work was recently profiled in Nature Communications, said in a press release. "Patients with brain hemorrhages have a mortality rate of up to 50%. Currently there is no great therapeutic solution for intraventricular hemorrhage. The only other option is blood clot-dissolving drugs that have undesirable risks."

At Stanford, meanwhile, Renee Zhao, an assistant professor of mechanical engineering, is working on "millirobots," or fingertip-sized biomedical robots that move through the body on magnetic fields. As noted in a study in [Science Advances](#), her "spinning-enabled wireless amphibious origami millibot" is designed to "crawl, spin or swim" through the body until it reaches its target, then release a high-concentration drug.

In a news story issued by Stanford, Zhao and her team say the technology "won't just provide a handy way to effectively dispense medicine but could also be used to carry instruments or cameras into the body, changing how doctors examine patients."

"While we won't see millirobots like Zhao's in real healthcare settings until more is known about optimal design and imaging best practices, the lab's first-of-its-kind swimmer ... is among their robots that are furthest along," the press release continues. "It's currently in the trial stages that come before any live animal testing that proceeds human clinical trials."

Read the [original article](#) on HealthLeaders.