Tiny Robots Tumble Through Organs TO DELIVER DRUGS

Trend Watch: From patient rides to telehealth specialty visits, healthtech continues to forge new paths for better patient outcomes.

Tiny Robots Walk Through Colon to Deliver Drugs, Sample Tissue

A rectangular robot as tiny as a few human hairs can travel throughout the colon by doing back flips, Purdue University engineers have demonstrated in live animal models. The study, published in the journal Micromachines, is the first demonstration of a microrobot tumbling through a biological system in vivo.

The researchers believe that the microrobots could act as diagnostic tools as well as drug delivery vehicles. The back flip movement is key for the progression through the colon or other organs that have rough terrain. Since it is too small to carry a battery, the microrobot is powered and wirelessly controlled from the outside by a magnetic field.

"When we apply a rotating external magnetic field to these robots, they rotate just like a car tire would to go over rough terrain," says David Cappelleri, a Purdue associate professor of mechanical engineering. "The magnetic field also safely penetrates different types of mediums, which is important for using these robots in the human body."

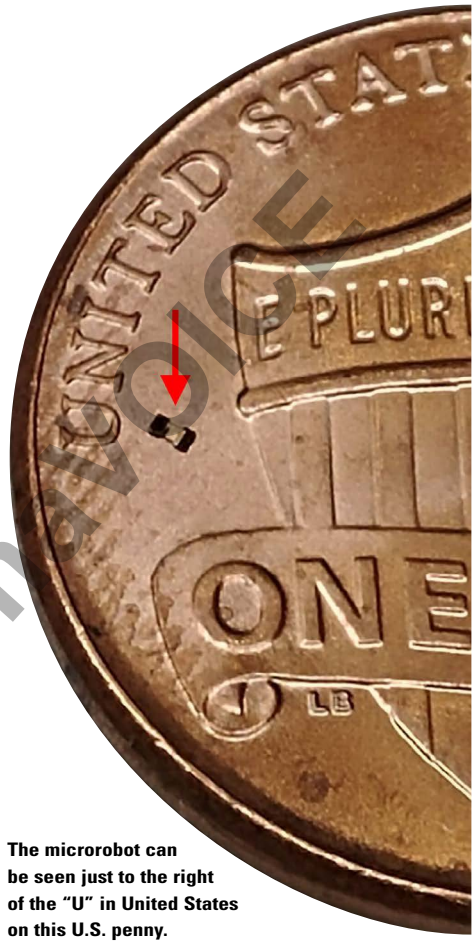
The lab tested the microrobot's ability to carry and release a drug payload in a vial of saline. The researchers coated the microrobot with a fluorescent mock drug, which the microrobot successfully carried throughout the solution in a tumbling motion before the payload slowly diffused an hour later.

The team conducted the in vivo experiments in the colons of live mice under anesthesia, inserting the microrobot in a saline solution through the rectum. They used ultrasound equipment to observe in real time how well the microrobot moved around.

The researchers found the microrobots could also tumble in colons excised from pigs, which have similar guts to humans.

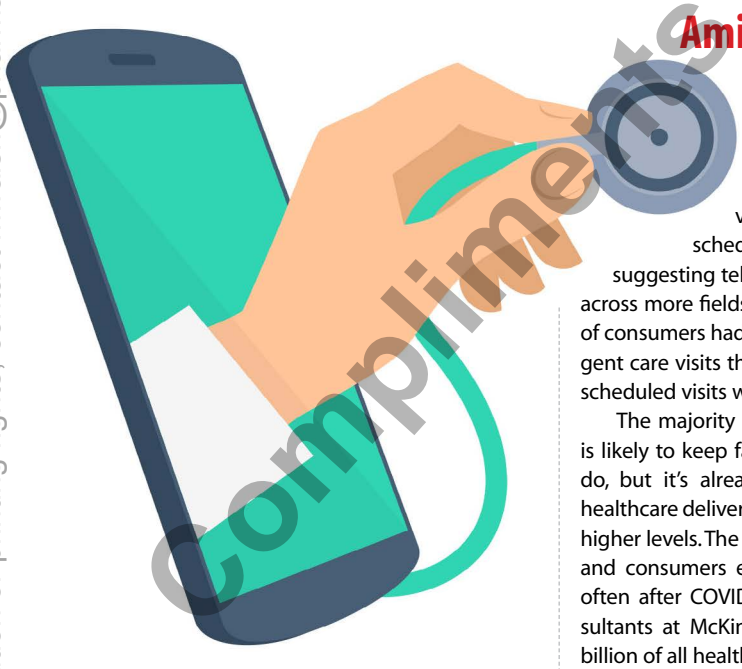
The magnetic microrobots, cheaply made of polymer and metal, are nontoxic and biocompatible, the study showed. Mr. Cappelleri's research group designed and built each of these robots using facilities at the Birck Nanotechnology Center in Purdue's Discovery Park.

A video explaining the work is available on YouTube.



The microrobot can be seen just to the right of the "U" in United States on this U.S. penny.

Amid Pandemic, Specialty Telehealth Outpaces Urgent Care, AMWELL POLL SAYS



According to a recent survey from telehealth vendor Amwell, telehealth use spiked during 2020, with 22% of consumer and 80% of physician respondents having a telehealth visit this year. That's up from 8% and 22%, respectively, in 2019.

Before the pandemic, the majority of virtual visits were for on-demand urgent care. But this year, the volume of virtual specialty and scheduled visits outpaced urgent care, suggesting telehealth is becoming normalized across more fields and use cases. Only about 21% of consumers had a virtual visit for on-demand urgent care visits this year. By comparison, 54% had scheduled visits with their primary care physician.

The majority of experts think virtual care use is likely to keep falling slightly as COVID-19 cases do, but it's already become normalized in the healthcare delivery system and will persist at much higher levels. The survey reports that both doctors and consumers expect to use virtual care more often after COVID-19 than they did before. Consultants at McKinsey estimate an eventual $250 billion of all healthcare spend could be digitized.

Amwell commissioned online market research firm Dynata to survey more than 2,000 adults and consultancy M3 Global Consulting to survey 600 physicians in June to measure patient and doctor use of and satisfaction with telehealth. Other findings include:

- In 2020, 42% of consumers who had a virtual visit had a scheduled appointment with a specialist they knew, while another 13% had a telehealth visit with a new specialist.
- Specialists were more willing to use telehealth in 2020, with reported willingness doubling for a handful of high-volume fields like radiology, cardiology and surgery.
- About 59% of consumers who had used a video visit had their first video visit during the pandemic. That number swelled among seniors, with 86% of consumers above the age of 65 having their first telehealth experience during COVID-19.
- Nearly all, 96%, of physicians said they were willing to use telehealth, with a majority saying they'd use it for prescription renewals (94%), regular chronic care management check-ins (93%) and follow-up appointments after surgery or hospitalizations (71%).
- A quarter of consumers whose primary care physician doesn't offer telehealth would be willing to switch to a doctor who does.

Global Women-Only Telemedicine Initiative LAUNCHED BY THE UAE

A telemedicine initiative aimed at providing free diagnosis, treatment, and preventive services for women around the world has been unveiled by a United Arab Emirates humanitarian organization. Spearheaded by the Sheikha Fatima bint Mubarak Volunteering Programme, the initiative will oversee the launch of several women-only telemedicine clinics around the world, offering specialist care and medical consultations remotely for those in need. The initiative is being supervised by Emirati volunteer doctors from the Young Emirati Volunteer Leaders Initiative. Also involved are the nonprofit Zayed Giving Initiative and General Women's Union (GWU).

This is the first virtual platform of its kind to provide treatment and preventative services for women with health advice and information provided by volunteer doctors specialized in various conditions, including COVID-19.

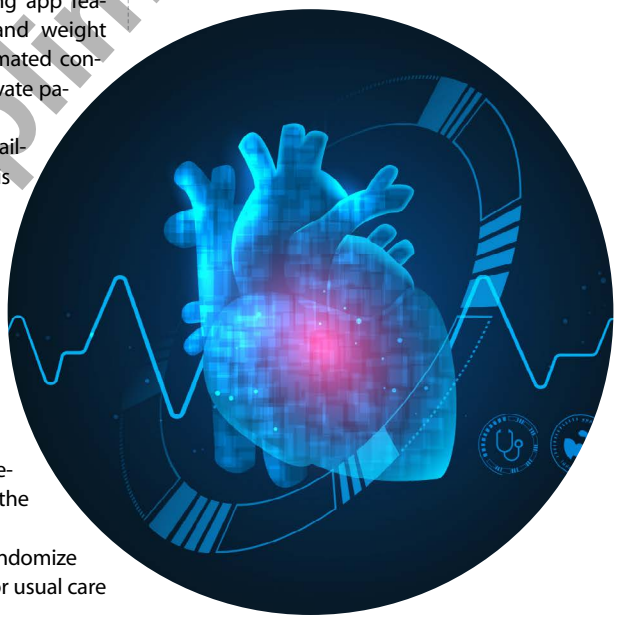
Yale and Boehringer Launch Study ON DIGITAL HEALTH TECH FOR CARDIAC PATIENTS

Boehringer Ingelheim has entered a collaboration with the Yale Clinical and Translational Research Accelerator to launch a study exploring digital health technologies for adults with heart failure. The goal of the study is to determine the impact of three digital health technologies on patient outcomes, clinical efficiencies, and the improvement in patient quality of life.

Technology partners were selected for evaluation in the study based on their ability to increase engagement in disease management and provide information to healthcare providers. They include Bodyport, a data-driven smart scale with enhanced cardiac monitoring directly accessible by providers; Noom, a data-driven, live coaching app featuring personalized plans for diet and weight management; and Conversa, an automated conversational platform designed to motivate patients to actively manage their health.

"Exploring solutions for the heart failure community to help manage this debilitating condition is a priority for Boehringer Ingelheim," says Christine Marsh, senior VP, market access, Boehringer Ingelheim. "We launched this study with Yale to help identify how digital health technology may address some of the key pain points for adults with heart failure, like the need for more frequent communication with healthcare providers in between visits and coaching to help with the daily management of the condition."

The innovative study design will randomize patients to one of three technologies or usual care in a single study over six months. Considering the current telemedicine environment, adults with heart failure who are currently enrolled in a Yale Heart Failure Disease Management Clinic will be eligible to participate in the study, which only requires at-home use of the technology and no in-person meetings. All participants will receive standard of care, including regular follow-ups with their clinic providers. Three investigational arms will add one of the three digital technologies, each of which will be evaluated versus standard of care alone. Enrollment began in September with a goal of recruiting a total of 200 patients. Results will be published next year.



STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION

1. Publication title: PharmaVOICE
2. Publication no.: #23626
3. Filing date: September 24, 2020
4. Issue frequency: published monthly except combined issues in July/August and Nov./Dec.
5. No. of issues published annually: 10
6. Annual subscription price: US: $190. Non-US: $360.
7. Complete mailing address of known office of publication: PharmaLinx LLC, 244 Jacobs Creek Road, Titusville, NJ 08560, Titusville, NJ 08560
8. Complete mailing address of headquarters or general business office of publisher: PharmaLinx LLC, 244 Jacobs Creek Road, Titusville, NJ 08560, Titusville, NJ 08560
9. Full names and complete mailing addresses of publisher, editor, and managing editor: Lisa Banket, P.O. Box 327, Titusville, NJ 08560, Taren Grom, P.O. Box 327, Titusville, NJ 08560, and Denise Myshko, P.O. Box 327, Titusville, NJ 08560
10. Owner: Lisa Banket, Taren Grom, and Marah Walsh
11. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities: (none)
13. Publication title: PharmaVOICE
14. Issue date for circulation data below: September 2020
15. Extent and nature of circulation (avg. no. copies each issue during preceeding 12 months and actual no. copies of single issue published nearest to filing date, respectively). Total no. copies - 17,785 and 17,600. Individual paid/requested mail subscriptions stated on Form 3541: 17,552 and 17,520. Sales through dealers and carriers, street vendors, counter sales, and other paid or requested distribution outside USPS: 11 and 0. Total paid and/or requested circulation: 17,563 and 17,520. Nonrequested copies stated on Form 3541: 0 and 0.
Free or nominal rate distributed outside the mail: 42 and 14. Total free or nominal rate distributed: 18 and 0. Total distribution: 17,623 and 17,534. Copies not distributed: 162 and 66. Total: 17,785 and 17,600. Percent paid and/or requested circulation: 99.66 and 99.92.
16. This statement of ownership will be printed in the November/December 2020 issue of this publication.
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