Nano-device Rapidly Diagnoses Blood's Harmful Bacteria

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Tiny device could help professionals diagnose and fight deadly infections.

Engineers have created a tiny device that can rapidly detect harmful bacteria in blood, allowing health care professionals to pinpoint the cause of potentially deadly infections and fight them with drugs.

The Rutgers coauthored study, led by researchers at Rochester Institute of Technology, is published in the journal [ACS Applied Materials & Interfaces](#).

"The rapid identification of drug-resistant bacteria allows health care providers to prescribe the right drugs, boosting the chances of survival," said coauthor Ruo-Qian (Roger) Wang, an assistant professor in the [Department of Civil and Environmental Engineering](#) in the [School of Engineering](#) at [Rutgers University–New Brunswick](#).

Drug-resistant bacteria, or super-bugs, are a major public health concern. Globally, at least 700,000 people die each year as a result of drug-resistant infections, including 230,000 deaths from multidrug-resistant tuberculosis. That number could soar to 10 million deaths a year by 2050 if no action is taken, according to a [2019 report](#).

Based on a new approach, the tiny new device rapidly isolates, retrieves and concentrates target bacteria from bodily fluids. It efficiently filters particles and bacteria, capturing about 86 percent of them. The nano-device has magnetic beads of different sizes that are designed to trap, concentrate and retrieve Escherichia coli (E. coli) bacteria. The small spaces between the beads are used to isolate bacteria in the device.

The inexpensive, transparent device is easy to fabricate and operate, making it ideal for detecting disease-causing organisms in laboratory and health care settings, according to the study. The research team is working to perfect the device and plans to add multiple devices

onto a small chip and explore scaling up testing in the field.

Researchers at the University of Alabama, Tuscaloosa; Carollo Engineers, Inc.; Tsinghua-Berkeley Shenzhen Institute in China; and The State University of New York, Binghamton contributed to the study.

Read the original article on Rutgers University.