ICU
MANAGEMENT & PRACTICE

An Innovative Way to Detect Infectious Disease, Superbugs

Researchers at McMaster University have developed a new diagnostic test designed to help clinicians detect infectious diseases such as hepatitis C and deadly superbugs (eg, MRSA and C. difficile) more easily and quickly. They say the new method does not require complicated equipment so tests can be run at room temperature under ordinary conditions.

The invention can detect the smallest traces of metabolites, proteins or fragments of DNA. In essence, the new method can pick up any compound that might signal the presence of infectious disease, be it respiratory or gastrointestinal, the researchers explain. Their work is described online in the journal *Angewandte Chemie* International Edition.

"The test has the best sensitivity ever reported for a detection system of this kind — it is as much as 10,000 times more sensitive than other detection systems," says Professor John Brennan (pictured), director of McMaster's Biointerfaces Institute, where the work was done.

Prof. Brennan and colleagues used sophisticated techniques to develop a molecular device made of DNA that can be switched 'on' by a specific molecule of their choice — such as a certain type of disease indicator or DNA molecule representing a genome of a virus — an action that leads to a massive, amplified signal which can be easily spotted.

"This invention will allow us to detect anything we might be interested in, bacterial contamination or perhaps a protein molecule that is a cancer marker," says Yingfu Li, a professor in the Departments of Biochemistry and Biomedical Sciences, Chemistry and Chemical Biology. "Our method can sensitively detect all of them, and it can do so in a relatively short period of time."

Work is ongoing to move the test onto a paper surface to create a portable point-of-care test, which would completely eliminate the need for lab instruments, allowing users — family physicians, for example — to run the test, according to Professor Li.

The Biointerfaces Institute has developed a series of paper-based screening technologies which enable users to generate clear, simple answers that appear on test paper indicating the presence of infection or contamination in people, food or the environment.

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