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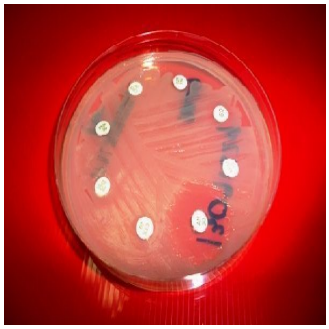
New Method Detects Antibiotic Resistance Fast



A new method developed by Swedish researchers can rapidly identify which bacteria are causing an infection and detect whether they are resistant or sensitive to antibiotics. Results of the study have been published in the *Journal of Clinical Microbiology*.

"Clinical use of the method would mean that the right antibiotic treatment could be started straightaway, reducing unnecessary use of antibiotics," explained Professor Dan I. Andersson of Uppsala University, who headed the study jointly with Professor Mats Nilsson of the Science for Life Laboratory in Stockholm and Stockholm University. Their colleagues from Uppsala University Hospital also collaborated on this research project.

According to the researchers, the new method could identify correctly both the bacteria and their resistance patterns in all the clinical samples analysed. The technique is based on highly sensitive, bacterium-specific measurement of bacterial growth in the absence or presence of various antibiotics. Bacterial growth is measured as follows:

- If the bacterium is resistant, it can multiply with antibiotic present; this is detected as an increase in the number of copies of a specific DNA sequence.
- If it is sensitive, on the other hand, no growth takes place.

Antibiotic resistance is a growing threat to human health all over the world. Today, many people are dying because of infections caused by resistant bacteria. When an infected person is treated with antibiotics, "empirical therapy" is usually provided, the researchers explained. This means that the choice of antibiotic is based on the resistance situation of the bacteria in a large population (such as the Swedish population), rather than on the resistance, if any, of the bacteria in the infected person's body.

Inappropriate use of antibiotics gives bacteria more opportunities to develop resistance to the drugs. This helps boost the use of antibiotics, especially what are known as "broad-spectrum" antibiotics that work on many types of bacteria. A solution to these problems is to have reliable methods of quickly identifying the bacterial species causing the infection and its resistance pattern, and apply the correct treatment immediately.

"This is just what we've been working on in our study," Prof. Andersson said. "We have developed a new method that permits identification of both the species and the resistance pattern of bacteria in urinary infections in less than four hours. By comparison, the resistance determination done at present takes one to two days."

The new method can be automated for use in a clinical laboratory, according to the study's principal author Anja Mezger. Also, it is entirely general in application and could, in principle, be used for all types of bacteria and antibiotics.

An instrument based on the method is already being developed at Q-linea, a company in Uppsala of which Prof. Nilsson was a co-founder. This instrument focuses on blood infections. As such infections are life threatening, the researchers noted, it is very important for effective treatment that the patient should start taking the correct antibiotic without delay. The company expects to launch a working instrument on the market in 2017.

"We hope that the method can be used in the future at hospitals and health centres, so that the right treatment is given promptly, and also so that the use of antibiotics is reduced," Prof. Andersson said.

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