

Microbiological research with the Phenom Pro Desktop SEM

Novel insights into bacterial surface structures and host-bacteria interactions

One of the research groups within the Department of Medical Microbiology of UMC Utrecht aims to elucidate the evolution and transmission of antimicrobial resistance and the intestinal outgrowth of multidrug resistant *Enterococcus faecium* during antibiotic treatment.

The challenge

Part of the activities at the Department of Medical Microbiology is to continuously try to understand and unravel novel cellular mechanisms, such as bacterial surface structure assembly or the interaction of bacteria with their host. Microscopy in general, and electron microscopy in particular, has always been able to provide researchers with valuable insights and hypotheses for research. The use of a scanning electron microscope (SEM) is highly recommended for each microbiology lab to boost research.

Why Phenom Desktop SEM

Until recently the researchers at the Department of Medical Microbiology had no direct access to their own electron microscope; all samples were handled at Utrecht University. When the possibility to obtain a desktop SEM arose, the Thermo Scientific™ Phenom Pro Desktop SEM was chosen as it is easy to use for all people in the department: from bachelor's and master's students to technicians, PhDs, post doctorates and staff scientists. The Phenom Pro Desktop SEM has also attracted people from other departments within the University Medical Center Utrecht. Nowadays, the Phenom Pro Desktop SEM is being used full-time. People are routinely trained and within 30 minutes they are able to operate the instrument.

The solution

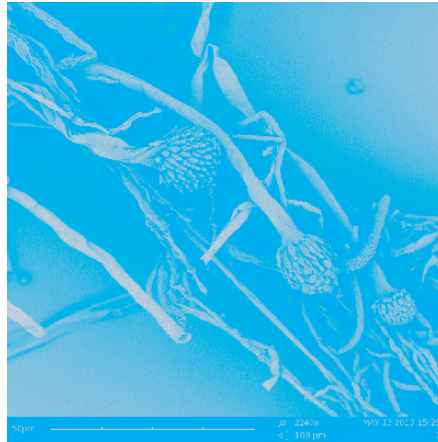
In order to perform SEM analysis, serial ethanol-hexamethyldisilazane dehydration incubations of fixed bacteria or tissue are used. The most important analyses are performed on:

- Bacterial biofilms on catheters (*Enterococcus faecium*) or bone (*Staphylococcus aureus*)
- Endocarditis, gastrointestinal colonization: visualization of bacteria in mammalian tissue
- Bacterial cell wall morphology when testing novel antimicrobial compounds
- Interaction of antibiotic resistant bacteria with human cells

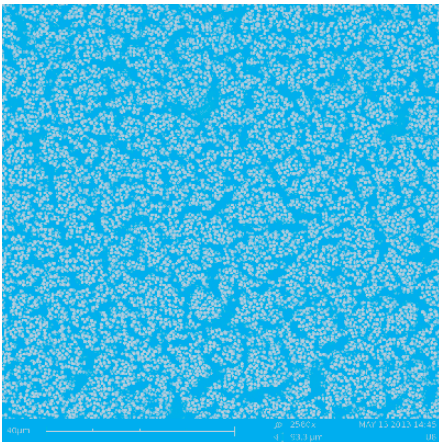
Depending on the sample, specimens are ready for analysis on the Phenom Pro Desktop SEM within one to five hours.



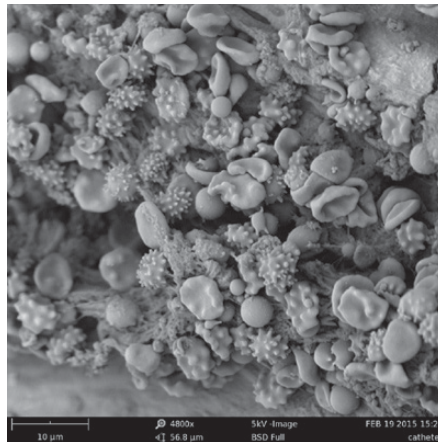
Mouse duodenum.



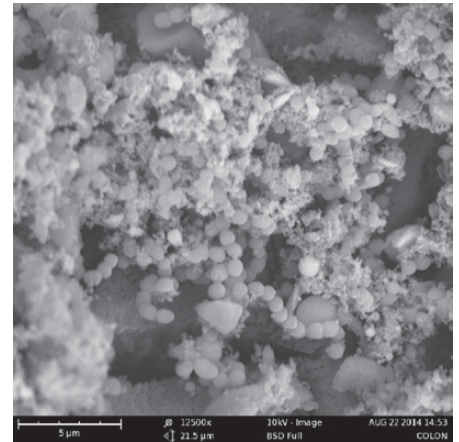
Aspergillus fumigatus.



Staphylococcus aureus biofilm.



Deposition of blood cells on a catheter.



Enterococcus faecium in the mouse colon.



UMC Utrecht

The Department of Medical Microbiology of UMC Utrecht is responsible for the diagnostics of infectious diseases (bacteriology, virology, serology, mycology and parasitology). Within these areas of expertise the training and education of medical doctors, students and PhD candidates are covered as well. The scientific research of the Department of Medical Microbiology is embedded in the Eijkman Graduate School for Immunology and Infectious Diseases. www.umcutrecht.nl

Find out more at thermofisher.com/phenom

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