RAPID DIAGNOSTIC FOR BACTERIAL INFECTIONS

KEYWORDS

- Bacterial infection
- Rapid diagnostic
- RNA
- Patient blood
- Antibiotic resistance

Collaboration type
Licence agreement and R&D collaboration

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STATE OF THE ART

Current microbiological diagnosis of bacterial infections is mainly based on the inoculation of clinical specimens on specific media and the detection of microbiological growth. The time required to receive the first results vary from 24 to 48 hours. An alternative to the need to grow a microorganism consists in detecting the presence of its DNA in the clinical specimen. This diagnostic technique is faster than culture, but often lacks sensitivity and/or specificity. Therefore, its clinical relevance suffers from serious limitations. Another option, so far unexplored in clinical diagnosis, would be to detect the presence of bacterial specific RNA in the clinical sample. This technique is experimentally difficult because of the instability of the RNA molecule but has the fundamental advantages of detecting live bacteria (which actively replicates) and identifying genes that are expressed by the bacteria (such as antibiotic resistance genes). All these results can be obtained in less than two hours time. The clinical potential of such RNA diagnostic tests is very significant and could significantly improve the management of patients with infectious diseases.

Lobar pneumonia, radiothorax

THE INVENTION

Our laboratory has developed a new technique for extraction and detection of bacterial RNA in patient blood by quantitative PCR (qPCR). The value of this promising technique has been evaluated on 117 patients with pneumonia. While the classical diagnostic test for such infection (Blood culture) only allowed identifying the bacteria in 16% of the patients, our new diagnostic test detected the presence of bacterial RNA in 52% of them. Further improvements of the test are being made to allow for the detection of a broader array of bacterial pathogens and their antibiotic resistance profiles.

KEY ADVANTAGE OF THE TECHNOLOGY

- Rapid diagnostic (2 hours versus 48 hours with the classical diagnostic)
- Detect more cases (better sensitivity)
- Simultaneous detection of antibiotic resistance profile

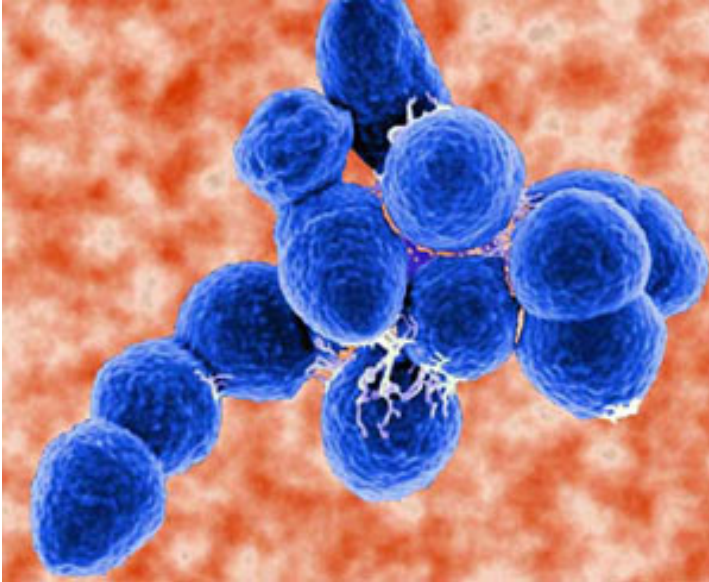## CONTACT

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Streptococcus pneumoniae
under the microscope

TEAM

Dr Pierre Smeesters is a paediatrician and microbiology resear-
cher with a strong clinical background in paediatric infectious
diseases. As demonstrated by his multidisciplinary publication
record, his expertise ranges from basic science to clinical infec-
tious disease. Based on this work, Dr Smeesters was awarded
the triennial GlaxoSmithKline Biologicals Award from the Bel-
gian Royal Academy of Medicine in June 2013. Dr Smeester's
international profile is also demonstrated by his position as the
Chair of the European Society of Paediatric Infectious Disease
Master Class, by his appointments in international initiatives and
by his recent International Influence Award from ULB.

COMMERCIAL INTEREST

New and fast diagnostic tool for bacterial infection

Streptococcus pneumoniae in a Petri dish

THE LABORATORY

The Bacterial Genetics and Physiology Laboratory is part of the 'Institut de Biologie et de Médecine Moléculaires' (IBMM) of the Uni-
versité Libre de Bruxelles. This institute is composed of 14 laboratories working in various fields such as microbiology, immunology,
parasitology and development. Our lab has a long-standing know-how in bacterial genetics and mobile genetic elements. We have
developed a translational research line in the field of bacterial infections that aims to provide clinically relevant outcomes based on
our basic science expertise.

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