HealthManagement
Promoting Management and Leadership

Volume 14 - Issue 2, 2014 - News

News

Genome Sequencing and the Potential to Personalise the Treatment of Individual MRSA Infections

The spread of the antibiotic-resistant pathogen MRSA (methicillin-resistant Staphylococcus aureus) remains a concerning public health problem, especially among doctors trying to determine appropriate treatment options for infected patients. Bacterial pathogens, such as MRSA, cause disease in part due to toxicity, or the bacterium's ability to damage a host's tissue. In a recent study published in Genome Research, researchers used the genome sequence of MRSA to predict which isolates were highly toxic, thus potentially personalising the treatment of individual MRSA infections.

To study MRSA's toxicity, "the standard approach has always been to focus on a single or small number of genes and proteins," said lead author Ruth Massey, from the University of Bath. However, this has not always been successful because toxicity is a complex trait encoded by many genetic loci.

In this study, the authors used whole genome sequences from 90 MRSA isolates to identify over 100 genetic loci associated with toxicity. Despite belonging to the same ST239 clone, the isolates varied greatly in toxicity.

Importantly, the highly toxic isolates shared a common genetic signature. By looking for this signature in the MRSA genome, the researchers were able to predict which isolates were the most toxic and thus more likely to cause severe disease when used to infect mice.

"As the cost and speed of genome sequencing decreases, it is becoming increasingly feasible to sequence the genome of an infecting organism," said Massey. In a clinical setting, sequencing may be useful for deciding the course of MRSA treatment. For example, a clinician may treat a highly toxic infection more aggressively, including prescribing certain antibiotics known to reduce toxin expression. The patient also may be monitored more closely for complications and isolated from others to help control the spread of infection.

Although many novel genetic loci involved in MRSA toxicity were identified in this study, it remains to be determined how each influences disease. In addition to examining genomes of other MRSA strains, such as the particularly antibiotic-resistant USA300 strain, the authors are working to apply their methodology to other bacterial pathogens, such as Streptococcus pneumonia, a leading cause of deaths in infants and children under the age of five.

To read the study in full, please visit: http://genome.cshlp.org/content/early/2014/04/02/gr.165415.113

Laboratory Medicine: Both a Profession and a Clinical Science

Writing for the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC), Bogdan Solnica, Milena Dabrowska and Grazyna Sypniewska have assessed the state of laboratory medicine as both a profession and also a clinical science. In their paper they offer ideas on performance (Laboratory Medicine As A Profession And Clinical Science – How To Perform Both Of Them Well).

The authors stress that laboratory medicine or laboratory diagnostics is a medical science and clinical discipline. The two are separate and yet intrinsically linked. We are all aware of the importance of labs in the hospital and healthcare sector. Lab results dictate medical decisions and play a vital role in terms of screening. Indeed the authors have found that laboratory diagnostics account for 10% of all healthcare costs.

The demand for laboratory diagnostics is increasing and the very nature of laboratory medicine is also changing thanks to automation, consolidation, integration and centralisation of procedures. In turn there are new professional competencies for laboratory staff (handling new equipment, information systems, turnaround time, analytical quality and methodology).

The paper states that there are two key factors in the competence of laboratory staff: professional training and human resources management. There is a wide range of tasks and roles within the laboratory, some tasks requiring more professional qualifications than others. The authors divide laboratory staff into two main categories: technicians and diagnosticians.

Pre- and postgraduate training and continuous professional development should ensure laboratory staff have the proper skills to fulfil their varied roles. Management ability is also important.

The authors conclude their study emphasising the fact that laboratory medicine is also a clinical science which works across all other clinical disciplines. Laboratory tests are essential diagnostic tools and laboratory medicine involves analysis and interpretation of results. Proof of its role as a clinical science can been seen in evidence-based laboratory medicine (EBLM).

To read the article in full please visit: http://www.ifcc.org/ifcc-communications-publications-division-%28cpd%29/ifcc-publications/ejifcc-%28journal%29/e-journal-volumes/ejifcc-2010-vol-21/vol-21-n%C2%B0-3/laboratory-medicine-as-a-profession-and-clinical-science-how-to-perform-both-of-them-well

Published on : Wed, 25 Jun 2014