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## Real time susceptibility testing and how close are we to implementing such technology in diagnostic clinical microbiology laboratories?

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The technological revolution in clinical microbiology is nothing short of impressive. In technology advanced laboratories, traditional microbiology is being rapidly replaced as accurate and rapid reporting of clinically useful results are important for patient management along with Antimicrobial Stewardship and Infection Prevention and Control programs. In more seriously ill patients, compelling evidence shows that treatment with the wrong antimicrobial agent (i.e. a drug resistant strain) can have a negative impact on outcome. Technologies including matrix-assisted laser desorption ionization-time of flight (MALDI-TOF) and multiplex Polymerase Chain Reaction (PCR) have substantially impacted Turn-Around-Time (TAT) for organism identification and/or detection of resistance genes. Unfortunately, in many laboratories, susceptibility results are unavailable for 24-48 hours after an organism has been recovered on agar plates. Optimal patient management requires susceptibility results in “real time”. Optical screening using time lapse imaging of bacteria-antibiotic interactions provided interpretable results in 6-30 minutes. Real time PCR to monitor DNA concentrations after exposure of bacteria to antibiotic yielded results in <4 hours and was 96% concurrent with a reference method and gave accurate genus level identification. ATP-bioluminescence assay based on the luciferase enzyme was reported to yield organism identification and susceptibility in 3-6 hours. MALDI-TOF detection of amoxicillin and cefotaxime resistant E. coli was reported within 6 hours. Assays using microfluidic channels or silver nanoparticles may allow susceptibility results in <2hours. Despite these innovative technologies for rapid or real time susceptibility testing, they are still unlikely to be avail for routine in the next year.

### Biography

JM Blondeau completed his Ph.D from the University of Manitoba, Winnipeg, Canada and his training in Clinical Microbiology at the Victoria General Hospital and Dalhousie University, Halifax, Canada. He is Head of Clinical Microbiology at Royal University and the Provincial Lead for Clinical Microbiology in Saskatoon, Canada. He has published ~180 papers, 255 abstracts and 5 books. He has given more than 640 lectures worldwide in 44 countries. He was twice nominated for a University of Saskatchewan Student Union Teacher of the Year Award. He is a senior editor for Future Microbiology and the current Editor-in-Chief of Expert Reviews in Respiratory Medicine.

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