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Editorial

Molecular Microbiology for Diagnostic Purposes

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EDITORIAL

Clinical microbiologists recognised the potential benefits of the Polymerase Chain Reaction (PCR) when Kary Mullis invented it in 1983: faster, cheaper, and more accurate identification and enumeration of all organisms in a specimen without the need for a culture. Infectious illness researchers were also looking for a way to assess antibiotic susceptibility at the same time. These fantasies have gradually become realities. Multiplex arrays have been authorised or are being developed for the diagnosis of respiratory and gastrointestinal illnesses directly from patient specimens, with findings available in less than an hour.

The US Food and Drug Administration (FDA) approved an array in August 2013 that may detect common bacterial and fungal agents of bloodstream infections, as well as numerous critical antibiotic-resistant genes, within an hour after a positive culture bottle. Attempts are being undertaken to identify organisms and evaluate sensitivity to them straight from a blood sample, without the need for culture. There are microbiology lines ranging from automated plate streakers to molecular identification of organisms growing on solid media. Despite these molecular and technological advances, humans must still examine the culture plates, sometimes on a television screen, and choose colonies to study.

Furthermore, while cost conservation is critical in today's medical market, the term "cheaper" is a loaded term. Microbiology laboratories serve as diagnostic centres for treatment. Increased laboratory expenditures for faster microbial identification have been demonstrated to lead to earlier antibiotic administration, shorter hospital stays, better results, and lower overall health-care costs.

The frequency of cervical carcinomas, the cost of treatment, and related morbidity and mortality should all reduce if persistent Human Papilloma Virus (HPV) infections are diagnosed and suitable therapeutic approaches are implemented. Microbiologic examinations that were not possible with our previous diagnostic methods have now been made possible thanks to new technology. Patients' specimens can be detected and quantified using Next-generation Sequencing (NGS). This increases the likelihood of separating harmful organisms with large populations from colonisers with smaller populations.

As a result, this article serves as a snapshot of fast evolving diagnostic microbiology laboratory techniques as well as their clinical applications. Tests with a large market share in diagnostic microbiology, as well as those with technologies that the authors find particularly intriguing, have been given special attention. Despite its importance in the assay's sensitivity, specimen processing has a very minor role in concentrating nucleic acid targets and eliminating amplification inhibitors. Many innovative processes, on the other hand, are fully automated and include specimen processing as part of a hands-free process. Because most RT-PCR platforms are closed systems, they reduce the risk of amplicon contamination in the laboratory and have enabled the commercialization of numerous nucleic acid amplification techniques. The writers have also made an arbitrary attempt to choose recent citations to support key claims. Failure to mention a publication, technique, or trade name does not imply that the article, technique, or manufacturer is in any way inferior. Over the last few years, the application of molecular testing to the discipline of infectious disease diagnosis, prognosis, and management has advanced at an exponential rate. Additional milestones in sensitivity, specificity, cost reduction, and turnaround time from specimen procurement to result will undoubtedly be achieved in the future, allowing for more effective and expeditious patient management.