‘Clinical Laboratory Diagnosis: Infectious Diseases’

A Four-Hour Accredited Seminar for Clinical Laboratory Techs

Saturday, April 30, 2022 | 9:00am to 2:00pm (ET)

9:00am	**PARTICIPANTS LOGIN**
9:20am – 9:30am	**Welcome and Introductory Remarks**
9:30am – 10:30am	**“Emerging Point-of-Care Diagnostics for Infectious Diseases”** — **Bijay Jha, PhD** Infectious diseases are caused by pathogens such as bacteria, viruses, parasites or fungi. Early diagnosis of infectious diseases using efficient diagnostic tools is critically important for better management of the diseases and to prevent the spread of the pathogens. In this context, Point-of-Care (POC) tests performed at the site where the patients meet a health care provider are valuable diagnostic tools to start appropriate treatment. It facilitates rapid disease diagnosis, monitoring, and management of the diseases. Therefore, in recent years, POC testing devices is one of the essential tools for health care providers to overcome the time-consuming traditional way of testing in the central laboratories. Several newer generations of POC diagnostics such as the incorporation of nanomaterials, label-free biosensors, microfluidics, multiplex, and lateral flow tests are used during recent years to increase the accuracy and early detection of pathogens 1, 2, 3, 4. The lateral flow immunoassay has revolutionized POC testing due to more cost-effective, simplicity, and higher sensitivity to diagnose infectious diseases5. The detection of nucleic acid as POC diagnostics is emerging as an alternative tool for the diagnosis of infectious diseases to improve sensitivity, cost-effective, and rapid diagnosis6, 7. The clustered regularly interspaced short palindromic repeats (CRISPR)/CRISPR-associated proteins (Cas)-based nucleic acid detection methods are emerging as a promising technology that would facilitate POC diagnostics in the next–generation8, 9. Thus, the emerging advances in POC testing support better diagnosis and management of infectious diseases and the overall delivery of primary healthcare services. 1. Recent advancement on Point-of-Care diagnostics to diagnose infectious diseases; 2. Impact of existing and emerging Point-of-Care testing on the diagnosis of infectious diseases; and 3. Current and future challenges in implementing new molecular Point-of–Care testing.
10:30am – 11:30am	**“Robotics in the Fight Against Infectious Diseases”** — **Melvilí Cintrón, PhD, D(ABMM)** Historically, culture-based microbiology testing has been a manual process. While automation systems have been common in the clinical chemistry and hematology laboratories, it wasn’t until recently that automated systems were adopted in the clinical microbiology laboratory (CML). The increased demand for microbiology testing and the shortage of trained medical microbiologist technologist in recent years have resulted in the emerging necessity for automation in the CML. Automation within the CML ranges from simple task automation systems such as automated Gram-stain instruments to highly complex automation system such as total laboratory automation (TLA). In this session, we will focus in discussing TLA, its benefits and potential to positively impact the laboratory efficiency, turnaround times and overall quality of culture methods which can potentially improve patient care. 1. Introduce the concept of total laboratory automation within the clinical microbiology laboratory; 2. Discuss benefits and limitations of total laboratory automation; and 3. Discuss applications of total laboratory automation.
11:30am	**BREAK**
12:00pm – 1:00pm	**“Advances in Early HIV Detection and Disease Monitoring”** — **Hana Fukuto, PhD, SMB(ASCP)CM** There are approximately 1 million people infected with HIV in the United States, out of which more than 10% is unaware of their status. To maintain the patient’s health and to prevent additional spread of the virus, early detection, proper treatment and monitoring of HIV infection is crucial. This webinar will review the advances in the clinical tests that detect the early signs of HIV infection, including those used in the routine diagnosis and blood supply screening (ELISA tests to detect antigens and antibodies, and RT-qPCR tests to detect viral RNA), as well as the rapid tests used at the point-of-care and self-testing. We will discuss the evolution of the tests over the last few decades, the algorithms to minimize false results, and the challenges of implementing wide HIV screening programs to minimize the transmission of the virus. In addition, we will discuss how other molecular-based HIV tests, such as the viral load assays and HIV genotyping, can be used to monitor the effectiveness of anti-HIV therapy and assist in choosing the appropriate therapy for the patients. 1. Summarize the HIV infectious cycle and the key immune responses that are relevant to HIV testing, and explain the concept of the “window period” for viral detection; 2. List tests that are used for early detection of HIV infection, including both rapid tests used in point-of-care settings, as well as serological and molecular assays used in the clinical laboratories; 3. Describe the tests that measure the amount of virus present in the patient to monitor the effectiveness of therapy; and 4. Describe the method that detects drug resistance mutations in HIV and how it can assist in the treatment of the HIV patients.

1:00pm – 2:00pm	**“Molecular Tools for Tuberculosis Testing”**	**Gloria Viboud, PhD, SM(ASCP)MB**

Tuberculosis remains the world’s deadliest infectious disease. More than 20% of the world population is infected, and one third of those never get diagnosed or treated, which leads to the spread of the organism. Multidrug resistant (MDR) and extensively drug-resistant (XDR) TB pose an added challenge to successful TB treatment. TB diagnosis is mainly based on X rays, smear microscopy and bacteriological testing. The long turnaround time of bacterial culture delays diagnosis and increases the risk for drug resistant TB, especially in developing countries. Molecular methods provide an alternative to culture by not only speeding diagnosis but also by detecting genetic traits associated with anti-TB drug resistance. Here, we will review the molecular tools available for TB testing and discuss the advantages and disadvantages of each method.

1. Describe the WHO-endorsed molecular tests for TB and drug resistance;
2. Discuss emerging technologies under development or evaluation; and
3. Contrast intended use, sensitivity and specificity of each method.

2:00pm	**PROGRAM END**