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<b>Molecular Detection and Typing of Fungal Pathogens</b>	<b>781</b>
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A major goal of molecular testing is to develop a cost-effective as well as sensitive and specific assay that can detect microbial DNA in clinical samples early in the course of disease. Additionally, the ability to analyze the genetic relatedness of fungi on a timelier basis using molecular methods will have a positive impact on epidemiologic investigating. As technology advances, it seems apparent that commercially available molecular assays will become available in the near future for the management of patients with suspected fungal infections.

<b>Recent Advances in Laboratory Procedures for Pathogenic Mycobacteria</b>	<b>801</b>
Robert C. Cooksey	

Just as tuberculosis has persisted for many centuries as one of most serious and deadly infectious diseases in many parts of the world, so has the motivation to develop improved laboratory methods for characterizing *Mycobacterium tuberculosis* isolates. Modern technology has lead to great improvements in mycobacteriology laboratory procedures, particularly in detection, identification, epidemiologic strain typing, and drug susceptibility testing. Although the usefulness of some of these newer methods is under evaluation, many already are showing potential as adjuncts to clinical diagnostic procedures.

<b>Molecular Detection of Resistance to Antituberculous Therapy</b>	<b>823</b>
Harri J. Marttila and Hanna Soini	

Drug-resistant tuberculosis is becoming increasingly common and represents a worldwide threat. Therefore, new approaches for the

rapid susceptibility testing of *Mycobacterium tuberculosis* are needed to replace traditional culture-based methods. This article presents the genetic background of drug resistance in tubercle bacillus, and the methods currently available for genotypic susceptibility testing.

## **Molecular Diagnosis of Viral Infections of the Central Nervous System**

843

José R. Romero and David W. Kimberlin

The development of techniques for the amplification of DNA and RNA opened the way for the creation of extremely specific, sensitive, and rapid diagnostic tests for the detection of viral infections of the central nervous system. Polymerase chain reaction (PCR) and reverse transcription PCR diagnostic assays have revolutionized the approach to the diagnosis of important viral pathogens—in particular, enteroviruses (EVs), herpes viruses, and JC virus (JCV). These molecular approaches to diagnosis have led to improvements in clinical outcome and patient care. Additionally, their use has permitted a better understanding of the natural history and clinical spectrum of the syndromes caused by these important human pathogens. This article summarizes the current understanding with regard to the available, molecularly based, diagnostic assays for the detection of EVs, herpes viruses, and JCV.

## **Molecular Methods for Ehrlichiosis and Lyme Disease**

867

J. Stephen Dumler

This article reviews molecular techniques that have been developed and are effective in the clinical laboratory for the emerging tick-borne infections, ehrlichiosis and Lyme disease.

## **Molecular Epidemiology in the Public Health and Hospital Environments**

885

Paul D. Fey and Mark E. Rupp

The increasing speed and ease of genomic sequencing coupled with available funding to sequence multiple, unrelated strains of the same species inevitably will lead to the identification of candidate genes that can be used as molecular typing tools (multilocus sequence typing, single-locus sequence typing, microarray approach). However, it is important to note that even the most sophisticated typing tool should never replace a full epidemiologic investigation in which all available information is taken into account. Nevertheless, the typing methods discussed in this article and those yet to be developed have significantly improved the quality of health care worldwide.

<b>Molecular Detection of Infections Associated with Neoplasia</b>	<b>903</b>
Travis Henry and Stefano Tarantolo	

This article discusses the molecular targets and the methods for identification of human papillomavirus and the human gammaherpesviruses, Epstein-Barr virus and human herpesvirus type 8.

<b>Detection of Antiretroviral Resistance in HIV-1</b>	<b>915</b>
Winston Cavert and Henry H. Balfour Jr	

Resistance testing should be readily available to every clinician who specializes in HIV/AIDS. There are two main methods for HIV-1 resistance testing: genotyping and phenotyping. Selecting an initial antiretroviral treatment regimen or changing a failing one according to the test results is complex and requires knowledgeable interpretation to maximize the clinical benefit. To aid interpretation of resistance data, tables are provided with known resistance mutations and cutoff values for phenotypic resistance.

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