



Cleveland Clinic Laboratories

Clinical and Molecular Microbiology Services

Trust in us for everything you need in a reference lab.

OUR MISSION

The Robert J. Tomsich Pathology and Laboratory Medicine Institute contributes to excellent patient care by providing comprehensive, high quality laboratory testing and patient-focused expert consultation. This mission is supported by innovative research and new test development, exceptional customer service, continuous quality improvement and leadership in education.

OUR VISION

We will provide the highest quality laboratory testing and expert pathology diagnosis to patients institutionally, regionally and nationally.

OUR VALUES

Clinical Excellence – We provide comprehensive and high quality laboratory testing in a patient-responsive manner.

Expert Diagnosis – Diagnoses are provided by subspecialty experts, and consultation with physicians is important for patient care.

Continuous Quality Improvement – We are continuously evaluating and implementing the best practices in laboratory testing across the testing spectrum.

Dedication to Our Staff – Our staff are our most valuable resource and are supported and recognized for their accomplishments.

Innovative Test Development – A continual focus on new test development is important to provide the best capabilities for patient diagnosis.

Research and Education – Research is crucial for leadership in laboratory medicine; education and development are important at all levels.

INTEGRITY
EXPERTISE
REPUTATION
FOCUS
INNOVATION

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Clinical Microbiology

Cleveland Clinic Laboratories offers comprehensive testing for patients with infectious diseases. Our high quality, state-of-the-art diagnostic services, combined with readily available consultation with MD pathologists and PhD laboratory scientists have made Cleveland Clinic Laboratories a national referral center for microbiology testing.

Our staff is committed to improving and advancing the diagnosis of infectious diseases. They have been responsible for the development and evaluation of several innovative molecular tests for the rapid identification and characterization of infectious agents. The results of their studies have been published in leading medical journals, and these new tests, already in use at the Cleveland Clinic, are becoming the standard of care in laboratories nationwide.

Infectious diseases may be acute or chronic and may be caused by a variety of microorganisms, including a number of medically important bacteria, viruses, fungi, and parasites. Our staff of experienced clinical microbiologists is trained in the most effective, advanced diagnostic methods for the detection and testing of microbial pathogens. We offer expert assistance in test selection and test result interpretation, as well as guiding additional testing, when necessary.

Cleveland Clinic Laboratories is accredited by the College of American Pathologists, certified by CLIA, and Medicare approved.





Specialized Diagnostic and Consultative Services

Cleveland Clinic Laboratories offers a wide array of testing for patients with infectious diseases. Perhaps most importantly, when needed our specialized diagnostic services include person-to-person interaction with a professional dedicated to the laboratory detection and assessment of microbial pathogens, and may employ the most advanced nucleic acid-based testing available in clinical microbiology (see Molecular Microbiology section). Specialized diagnostic services include the use of fluorescence *in situ* hybridization (FISH), real-time PCR and other nucleic acid amplification assays for the detection of a variety of bacteria, fungi, and viruses.

Staff members are available for consultation regarding any of our diagnostic services. In conjunction with the Cleveland Clinic Department of Anatomic Pathology, infectious disease pathology consultations are available on histologic sections, and cytologic preparations.



Core Laboratory Services

The Sections of Clinical and Molecular Microbiology offer comprehensive core laboratory services that range from basic to sophisticated infectious disease testing. Clinical specimens are processed promptly in our state-of-the-art facility and interpreted using international guidelines for best laboratory practices. For more information, please contact Client Services at 216.444.5755 or 800.628.6816.

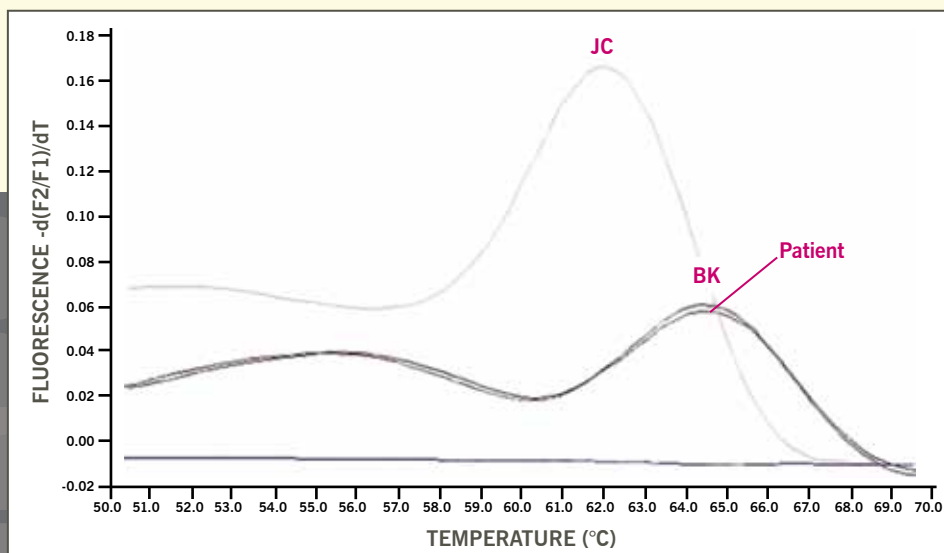





Research in Microbiology

Our clinical microbiologists continue to pursue new techniques for more rapid, accurate testing and identification of microorganisms related to infectious diseases.

Through a number of pre-clinical and clinical trials funded by industry partners, Centers for Disease Control and Prevention, and other sponsors, they are investigating the use of automation, mass spectrometry, and a variety of molecular diagnostic methods to improve the detection and characterization of microorganisms responsible for human infections. Our expertise includes site coordination, protocol development, sample kit design and preparation, testing, database entry and data analysis. Research personnel in our group have completed many successful FDA submission trials.





For more information about Clinical and Molecular
Microbiology Services at Cleveland Clinic Laboratories,
please contact:

Client Services:

216.444.5755 | 800.628.6816 (toll-free)
clientservices@ccf.org

Submit specimens to:

Cleveland Clinic Laboratories
9500 Euclid Avenue, L15
Cleveland, OH 44195

Complete information about tests, specimen preparation
and ordering is available at clevelandcliniclabs.com



Cleveland Clinic

Every life deserves world class care.

9500 Euclid Avenue, Cleveland, OH 44195

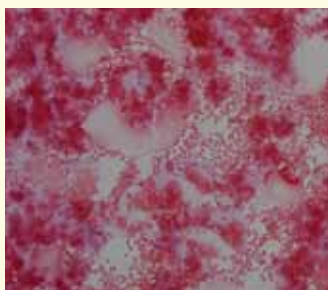
Cleveland Clinic is an integrated healthcare delivery system with a main campus, 18 family health centers, eight community hospitals and locations in Ohio, Florida, Nevada, Toronto and Abu Dhabi. It is a not-for-profit group practice where nearly 3,000 staff physicians and scientists in 120 medical specialties collaborate to give every patient the best outcome and experience. Cleveland Clinic is ranked among America's top hospitals overall, and among the nation's leaders in every major medical specialty (*U.S. News & World Report*).

clevelandclinic.org

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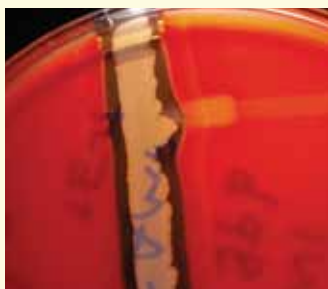
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Bacteriology Services



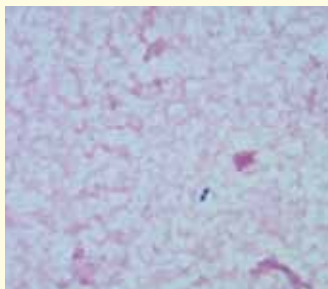
The Bacteriology Laboratory offers standard aerobic and anaerobic cultures with antimicrobial susceptibility testing when appropriate. These include:

- Continuously monitored, automated blood cultures
- Urine cultures
- Routine stool cultures are used to detect *Salmonella*, *Shigella* and *E. coli* O157:H7. Enzyme immunoassays are used for the detection of *Campylobacter* and Shiga Toxins



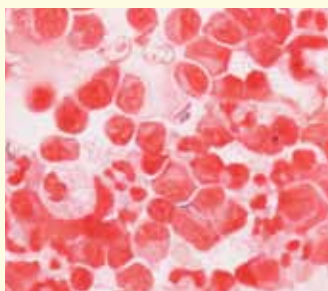
Cultures for the recovery of *Vibrio* species, *Yersinia enterocolitica* and *Aeromonas/Plesiomonas* from stool are also available

- Respiratory cultures
Standard respiratory cultures
Legionella pneumophila culture
- Tissue, throat, CSF and wound cultures
- *Mycoplasma hominis* and *Ureaplasma urealyticum* cultures from urogenital specimens



Molecular Bacteriology Services include:

- PNA FISH for rapid identification of commonly-encountered yeasts and *S. aureus* in positive blood culture bottles. Microarray hybridization assays will soon be employed to further characterize the causes of bacteremia.
- Group A *Streptococcus* by genetic probe.
- Rapid cycle PCR for:
 - Staphylococcus aureus* nasal colonization
 - Clostridium difficile* from liquid stool specimens
 - Group B *Streptococcus* rectovaginal colonization
 - Legionella pneumophila*
- NAAT testing for *Chlamydia trachomatis* and *Neisseria gonorrhoeae*.



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Clinical Virology and Retrovirology Services

The Clinical Virology Laboratory offers standard cell cultures and shell vial cultures for adenovirus, CMV, enteroviruses, influenza A & B, parainfluenza viruses 1, 2, & 3, respiratory syncytial virus (RSV) and herpes virus (1 and 2).

- Direct Immunofluorescence

Assays are available for respiratory viruses (influenza, RSV, parainfluenza, adenovirus and human metapneumovirus), herpes simplex virus and varicella-zoster virus

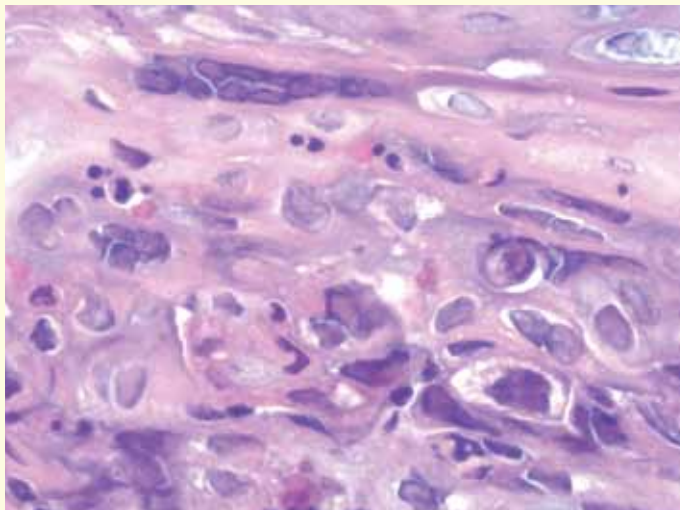
- Rotavirus EIA

The Retrovirology Laboratory offers HIV detection and confirmation by EIA and western blot, PCR, RT-PCR assays are listed in the Microbiology Section.

Molecular Virology Services include:

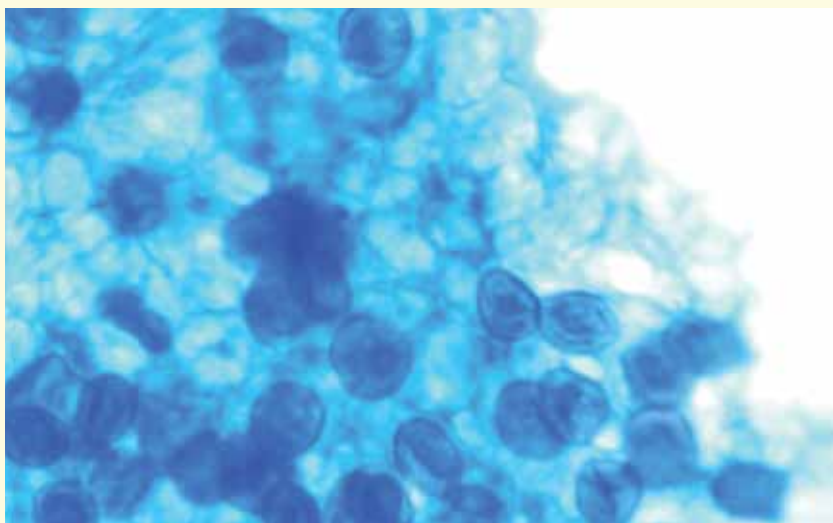
- Detection and Quantitation of HIV by PCR and RT-PCR, respectively
- Detection and Quantitation of HBV
- Detection, Quantitation, and Genotyping of HCV
- Detection of HPV High-Risk Subtypes
- Detection and Quantitation of CMV, EBV, and BK viruses
- Detection of Influenza A/B and RSV by rapid cycle PCR.
- Detection of enteroviruses by RT-PCR
- FISH for BK virus

Validation of the multiplex detection of other respiratory viruses is underway.



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Medical Mycology Services



The Mycology Laboratory offers direct specimen examination and culture for fungal pathogens, and focused susceptibility testing of yeasts.

Tests include:

- Direct examination of clinical specimens by Calcofluor White/KOH
- Fungal culture and identification
- Yeast antifungal susceptibility testing
- Validation of MALDI-TOF identification of fungi is underway.

Molecular Mycology Services:

- PNA FISH for the rapid identification of yeasts in positive blood cultures
- Genetic probe analysis for the culture confirmation of *Histoplasma capsulatum*, *Blastomyces dermatitidis*, and *Coccidioides* species.
- *Pneumocystis jiroveci* rapid-cycle PCR.

Validation of the sequence-based identification of fungi is underway.

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Mycobacteriology Services

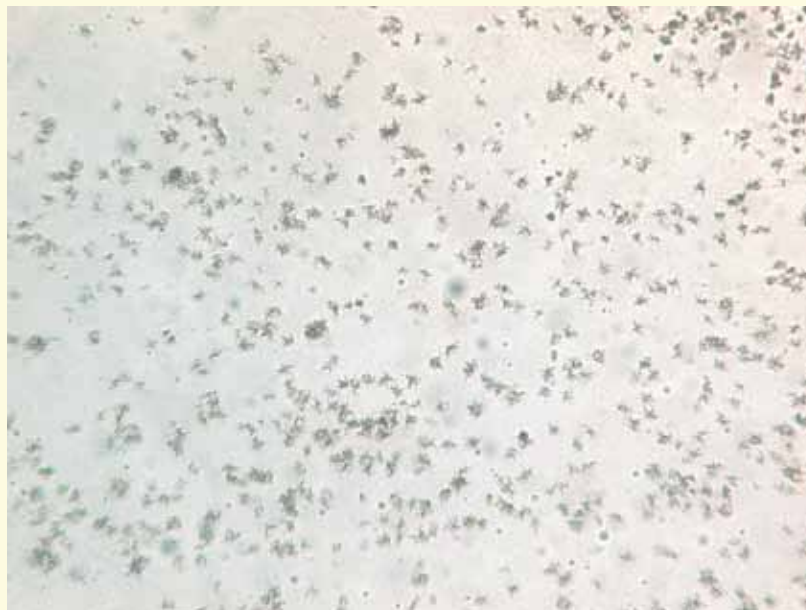
The Mycobacteriology Laboratory offers comprehensive specimen analysis for the detection of mycobacteria and *Nocardia*. Tests include:

- Direct fluorochrome analysis for detection of acid-fast bacilli and partial acid-fast staining for the detection of *Nocardia*
- Liquid and solid media culture and identification of mycobacteria, with focused susceptibility testing and solid media culture for *Nocardia*

Validation of the MALDI-TOF identification of mycobacteria and *Nocardia* is under way.

Molecular Mycobacteriology Services include:

- Genetic probes and/or DNA sequencing based identification of mycobacteria and *Nocardia*
- TB/NTM detection and differentiation by rapid cycle PCR



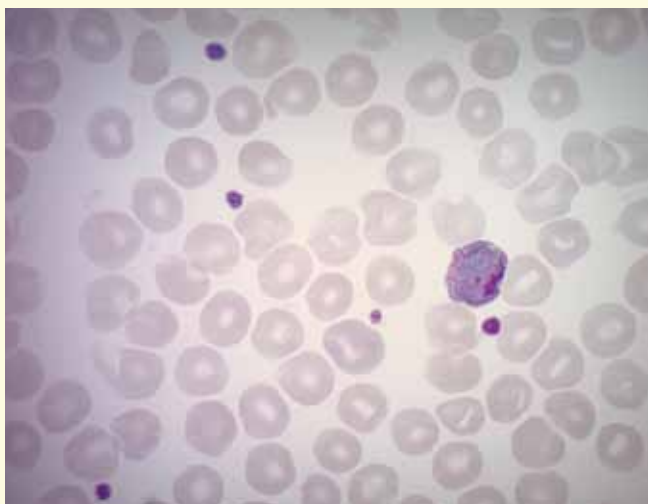
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Parasitology Services



The Parasitology Laboratory offers expert examination of clinical specimens by enzyme immunoassays and microscopic morphology for the detection and identification of infecting helminths or protozoa, and infestations by arthropods by experienced parasitologists. Services available include:

- Morphologic examination of stool preparations for ova and protozoal parasites
- Morphologic examination of thick and thin blood smears for *Plasmodium*, *Babesia* and microfilaria
- Enzyme immunoassay for the detection of *Giardia* and *Cryptosporidium*



Cleveland Clinic Laboratories

Clinical and Molecular Microbiology Staff

**Gary Procop, MD**

Chair, Molecular Pathology;
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Board Certifications: Medical
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**Sandra Richter, MD**

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How to Contact Us

For more information about Clinical and Molecular Microbiology Services at Cleveland Clinic Laboratories, consultation requests, related professional services, or technical inquiries please call 216.445.3225.