

Clinical Chemistry Goals and Objectives

Patient care

- To develop proficiency in the interpretation of general chemistry, immunoassay, esoteric, therapeutic drug monitoring, and toxicology tests
- To become familiar with instrumentation and methods used in the chemistry laboratories
- To understand limitations, specificity, and sensitivity of commonly used clinical chemistry tests
- To develop the skills necessary to succeed as an independent researcher

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Medical knowledge

- To appreciate the clinical context of chemistry test results
- To develop an understanding of the pathophysiology underlying abnormal test results
- To develop expertise in the appropriate selection of chemistry tests for different diseases
- To gain an understanding of how preanalytical variables affect test results

Interpersonal and communication skills

- To effectively participate in quality control and managerial meetings of the technical staff, supervisors, and faculty
- To effectively consult in the interpretation of chemistry test results with clinical faculty, residents, and medical staff
- To present continuing education lectures
- To prepare and give effective case reports
- To prepare and present concise and accurate summaries of clinical inquiries received
- To prepare and give effective lectures to medical technology students
- To read, summarize, and critically evaluate clinical chemistry literature

Professionalism

- To complete interpretive reports in a timely fashion
- To interact in a professional, helpful, and respectful manner with clinicians, other residents, and technical and administrative staff
- To understand ethical issues relating to toxicology results and other sensitive laboratory tests

Systems-based practice

- To develop an understanding of quality control in clinical chemistry, by evaluation of quality control data, troubleshooting, and participation in quality control review meetings
- To understand CAP accreditation requirements by performance of a mock inspection of the laboratory
- To provide consultation in cost-effective medical practice, laboratory stewardship and appropriate ordering of clinical chemistry tests
- To understand the workflow and daily operation of the laboratory and its relationship to staffing and equipment needs.

Practice-based learning

- To use case-based learning as a tool for insight into disease pathophysiology
- To locate, appraise, and assimilate pertinent evidence from the electronic medical record,

patient case studies and scientific reviews

- To demonstrate effective problem-solving skills, using a wide variety of information resources
- To use the techniques of medical informatics to acquire and manage data
- To participate and support diagnostic management teams and interpretation of clinical chemistry tests

FELLOW GOALS AND OBJECTIVES TRANSFUSION MEDICINE ROTATION

ROTATION GOALS:

This rotation is intended to provide the fellow with an appreciation for transfusion medicine services. The fellow will see immunohematological diagnostic and compatibility testing as well as transfusion support of disorders and conditions commonly encountered in transfusion medicine practice.

ROTATION TIMING:

Minimum 2 Day Rotation, or longer as needed to achieve all expected objectives

ROTATION FACULTY:

Jennifer Andrews, M.D., M.Sc.; Garrett S. Booth M.D., M.S, Quentin Eichbaum M.D., Ph.D., Deva Sharma, M.D., Allison P Wheeler, M.D., M.S.C.I.

THE FELLOW IS EXPECTED:

Patient care

- To understand the blood type and screen test
- To identify how blood components are utilized in routine and emergency situations

Medical knowledge

- To recognize blood group serology and genetics
- To appreciate the clinical consequences of blood rejection

Interpersonal and communication skills

- To see a blood transfusion or apheresis
- To work with a blood bank technologist and understand test workflow

Professionalism

- To interact in professional, helpful manner with clinicians, house staff, technical and administrative staff

Systems-based practice

- To appreciate the role of a chemist in support of transfused patients
- To see quality assurance and quality control principles applied to meet federal regulations (FDA and AABB) specific for transfusion medicine.

Practice-based learning

- To understand the basic methodologies employed in transfusion medicine
- To consider how transfusion services are integrated into patient care

FELLOW GOALS AND OBJECTIVES VETERAN'S ADMINISTRATION LABORATORY ROTATION

ROTATION GOALS:

This rotation is intended to provide the fellow with an appreciation for core laboratory services outside of Vanderbilt. The fellow will see laboratory operations under government administration and witness quality assurance/quality control in a different setting.

ROTATION TIMING:

Minimum 2-day rotation or longer as needed to achieve all expected objectives.

ROTATION FACULTY:

Claudio Mosse, MD, PhD

THE FELLOW IS EXPECTED:

Patient care

- To appreciate laboratory support of patient care under the VA system

Medical knowledge

- To observe coagulation mixing studies, interpretation and reporting of results
- To observe POCT at TVHS and how it differs from VUMC
- To review typical chemistry challenges in a VA laboratory with a large outpatient population

Interpersonal and communication skills

- To interact in professional, helpful manner with clinicians, house staff, technical and administrative staff

Professionalism

- To witness laboratory workflow and operations at the VA

Systems-based practice

- To discuss federal/ VA system organization
- To understand quality assurance in a different laboratory
- To review equipment purchasing process under federal acquisition rules

Practice-based learning

- To understand a different model of core lab organization (including chemistry, hematology and coagulation labs) and other laboratory instrumentation
- To be introduced to a different LIS/EMR from the VUMC system (VISTA/CPRS with Instrument Manager and RALS middleware)

FELLOW'S GOALS AND OBJECTIVES MOLECULAR ROTATION

ROTATION GOALS:

This rotation is intended to provide the fellow with an appreciation for the various assays performed in Clinical Molecular Diagnostic laboratories, the limitations of testing, clinical scenarios of patients referred for testing and importantly, the utility of test results for the diagnosis and management of VUMC patients.

ROTATION TIMING:

One week minimum, or longer as needed to achieve all expected goals.

ROTATION FACULTY:

Laurie Lee M.D., Ph.D., (APABP) Medical Director; Heather Pua, M.D., Ph.D. (AP/CP- ABP)

THE FELLOW IS EXPECTED:

Patient care

- To understand the role of pharmacogenetics, inherited disease and somatic testing in clinical practice
- To understand and interpret test results utilizing common molecular methodologies
- To demonstrate awareness of the appropriateness of various molecular tests in the context of the patient's clinical picture

Medical knowledge

- To understand the pathogenesis of inherited and acquired diseases
- To understand how laboratory assays are used in molecular diagnostics
- To learn to correlate morphologic and clinical findings with DNA results
- To learn how to validate/verify molecular assays as laboratory developed tests, and determine the specificity, sensitivity, limitations and interpretations of each assay

Interpersonal and communication skills

- To appreciate the role of genetic counseling in molecular testing
- To understand how results are conveyed to patients and their families

Professionalism

- To respect patient confidentiality in all clinical contexts

Systems-based practice

- To understand quality control and quality assurance issues in molecular diagnostics
- To understand the importance of proficiency testing in the molecular diagnostics lab and how it is assessed
- To understand the managerial aspects of the molecular diagnostics laboratory, focusing on cost-effectiveness of testing and the clinical utility of an assay

Practice-based learning

- To correlate results with the patient's clinical history and other laboratory findings
- To understand how molecular testing is integrated into patient care and management

FELLOW GOALS AND OBJECTIVES CLINICAL MICROBIOLOGY ROTATION

ROTATION GOALS:

This rotation is intended to provide the fellow with an appreciation for infectious disease and microbiology testing services. The fellow will see the role of microbiology, immunoserology and molecular infectious disease laboratories in the diagnosis, treatment and prevention of infectious diseases.

ROTATION TIMING:

Minimum 1 week rotation, or longer as needed to achieve all expected objectives

ROTATION FACULTY:

Romney Humphries, PhD D(ABMM), David Gaston, MD, Jonathan E Schmitz, M.D., Ph.D.

THE FELLOW IS EXPECTED:

Patient care

- To appreciate the role of medical microbiology to patient care
- To appreciate antimicrobial susceptibility and resistance
- To observe medical mycology and tuberculosis testing
- To understand hepatitis and HIV serologic and molecular tests and testing algorithms

Medical knowledge

- To appreciate antibiotic stewardship and appropriate treatment selection
- To recognize safety/epidemiology/infection control issues related to clinical laboratories

Interpersonal and communication skills

- To interact in a professional, helpful manner with clinicians, house staff, technical and administrative staff

Professionalism

- To witness laboratory workflow and operations for various specimen types
- To understand informatics and laboratory information system support of microbiology Services

Systems-based practice

- To appreciate the role of chemistry in support of medical microbiology and infectious disease
- To participate in daily clinical microbiology rounds and DMT

Practice-based learning

- To understand the methodologies utilized by clinical microbiology
- To consider how DMT and group discussions/interpretations support patient care

FELLOW'S GOALS AND OBJECTIVES PROTEIN ELECTROPHORESIS ROTATION

ROTATION GOALS:

This rotation is intended to provide the fellow with an appreciation for serum and urine protein electrophoresis testing performed in the hematopathology laboratory, including their limitations and the clinical context to perform such testing. The fellow will learn how to interpret serum and urine protein electrophoresis and immunofixation results.

ROTATION TIMING:

Minimum 2 Day Rotation, or longer as needed to achieve all expected objectives

ROTATION FACULTY:

Aaron Shaver, M.D., Ph.D.

THE FELLOW IS EXPECTED:

Patient care

- To explain which serum proteins are found in each electrophoretic fraction and understand their biological roles
- To be able to explain how serum and urine protein electrophoresis and immunofixation is used for diagnosis and management of clinical disorders involving monoclonal proteins

Medical knowledge

- To explain why serum protein electrophoresis and immunofixation electrophoresis are performed
- To describe the analytic principles behind protein electrophoresis and immunofixation electrophoresis
- To understand the benefits and limitations of gel-based and capillary-based analytical platforms

Interpersonal and communication skills

- To work effectively as a team with technical and administrative staff, and treat technical and administrative staff with respect

Professionalism

- To respect patient confidentiality in all clinical contexts

Systems-based practice

- To appreciate the role of protein electrophoresis in patient care
- To understand the process of laboratory accreditation in the context of the hematopathology laboratory

Practice-based learning

- To correlate results with the patient's clinical history
- To understand how testing is integrated into patient care and management

FELLOW GOALS AND OBJECTIVES HEMATOLOGY ROTATION

ROTATION GOALS:

This rotation is intended to provide the fellow with an appreciation for automated hematology, CSF cell counts, and urinalysis. The fellow will shadow the technologists on automated differential, manual differential, body fluid and urinalysis benches. The fellow will also attend hematopathology signouts, which include discussions about ordering ancillary testing (DMT).

ROTATION TIMING:

Minimum 2 Day Rotation, or longer as needed to achieve all expected objectives

ROTATION FACULTY:

Mary Ann Thompson Arildsen, MD, Ph.D.

THE FELLOW IS EXPECTED:

Patient care

- To recognize the parts of a hematology differential
- To understand pre-analytic variables in hematology and urinalysis

Medical knowledge

- To identify the components of a complete blood count
- To become familiar with common hematology disorders
- To become familiar with the components of urine chemistry and microscopy testing

Interpersonal and communication skills

- To identify automated workflow for Sysmex and IRIS workstations
- To communicate with staff in the hematology section of the laboratory

Professionalism

- To appreciate the role of a chemist in support of hematology and urinalysis services in lab outreach
- To understand the hematology instrument middleware and how auto-verification rules are applied in hematology

Systems-based practice

- To understand the rules governing when the automated differential is followed up by a manual differential and/or pathology review.
- To attend a hematopathology DMT where morphological review of the bone marrow is integrated with flow cytometry, immunohistochemistry, and molecular technologies

Practice-based learning

- To understand the basic methodology of the Sysmex and IRIS instruments
- To understand the role of neural networking technology in the Cellavision and IRIS instruments
- To consider how hematology and urinalysis tests are integrated into patient care

FELLOW'S GOALS AND OBJECTIVES COAGULATION ROTATION

ROTATION GOALS:

This rotation is intended to provide the fellow with an appreciation for the various assays performed in the coagulation laboratory, their limitations and the clinical context to perform such testing. The fellow will learn how to interpret standard hemostasis and thrombosis assays including PT/INR, aPTT and thromboelastography.

ROTATION TIMING:

Minimum 2 Day Rotation, or longer as needed to achieve all expected objectives.

ROTATION FACULTY:

David Gailani, M.D., Allison P. Wheeler M.D., MSCI, Benjamin F. Tillman, M.D.

THE FELLOW IS EXPECTED:

Patient care

- To understand the risk factors for arterial vs venous thrombosis
- To understand the pre-clinical variables and interferences affecting test results
- To know what coagulations tests are indicated in the evaluation of a bleeding or thrombotic disorder and the appropriate follow up testing.

Medical knowledge

- To learn the basic assays utilized in the coagulation laboratory and their interpretation
- To distinguish factor deficiencies from inhibitors
- To understand the use of oral anticoagulants and their effects on coagulation testing

Interpersonal and communication skills

- To identify the results of coagulation testing
- To communicate with the coagulation technical staff

Professionalism

- To respect patient confidentiality in all clinical contexts

Systems-based practice

- To appreciate the role and appropriateness of coagulation laboratory services in patient Care

Practice-based learning

- To correlate results with the patient clinical history