

## ACGME CORE COMPETENCIES

### TRAINING GOALS, EDUCATION METHODS, OUTCOMES ASSESSMENT

#### Patient Care

**DFN:**

- Provides appropriate diagnostic support for clinical staff.

**Skills:**

- Understands and directs the collection and processing of specimens for diagnostic studies.
- Gathers essential and accurate information about patients.
- Develops an appropriate diagnostic plan/differential diagnosis based on clinical questions and available laboratory data.
- Interprets pathology and integrates clinical, flow cytometric, immunohistochemical and genetic data to make a correct diagnosis.
- Uses literature/internet to support diagnoses in difficult cases.
- Effectively communicates findings to clinical staff both orally and in written reports.

**Education: (with graduated faculty supervision and feedback)**

- Practical experience in working up cases for signout, developing appropriate differential diagnoses and interpreting morphologic findings and the results of flow cytometric, genetic and immunohistochemical studies.
- Active participation in divisional, departmental, interdepartmental and national conferences that discuss optimization of diagnostic approaches in hematopathology.

**Assessment:**

- Global ratings by faculty.
- 360 degree examination including evaluation by clinical colleagues.
- Clinical examination (informal oral review and written report review).

#### Medical Knowledge

**DFN:** Demonstrates appropriate knowledge of established and evolving biomedical and clinical sciences and their application to diagnostic hematopathology.

**Skills:**

- Demonstrates sufficient knowledge of medicine to generate differential diagnoses appropriate to clinical and pathological findings.
- Works diligently to continually acquire relevant medical knowledge and apply it to constructing and testing new paradigms in the practice of pathology.

**Education:**

- Didactic lectures and self-directed learning on the science and practice of hematopathology.
- Participation in departmental and inter-departmental case conferences.
- Departmental or institutional training programs on research design and implementation.

**Assessment:**

- Global ratings by faculty.
- Program-developed or other (e.g., Fellow In-Service Examination) written examination.
- ABP examination in hematology.

**Interpersonal and Communication Skills****DFN:**

- Demonstrates effective interpersonal communication skills that result in appropriate information exchange with patients, patient family members, medical students, residents, supervising faculty, laboratory and secretarial staff, referring physicians and other members of the health care team.

**Skills:**

- Provides clear, informative and concise written reports which include a precise diagnosis, a differential diagnosis when appropriate and relevant supportive morphologic and laboratory data as well as related literature.
- Demonstrates effectiveness in face-to-face listening and speaking to clinical staff and support personnel.
- Possesses appropriate telephone communication skills.
- Effectively presents pathologic findings, differential diagnosis and relevant literature at conferences with house staff and colleagues.

**Education:**

- Observation of faculty in their interactions with staff and clinical faculty.

**Assessment:**

- 360° Evaluation by staff, clinical faculty and residents.

- Ongoing observation by faculty of fellow's behavior and presentations at conferences and seminars.

### **Professionalism**

#### **DFN:**

- Committed to placing the needs of patients above self-interest and adhering to ethical principles of medical practice.

#### **Skills:**

- Responsibility - Punctual and prepared for signout. Assumes ownership of cases and responsible for diagnosis.
- Altruistic – recognizes the opportunity to serve patients as a privilege.
- Compassionate in understanding and respecting the needs of patients, their families and the staff and physicians caring for patients.
- Demonstrates professional excellence in providing diagnostic services to patients.
- Honest.
- Interacts with others without discriminating on the basis of religion, ethnic, sexual, or educational differences and without employing sexual or other types of harassment.
- Demonstrates knowledge of issues of impairment (physical, mental, alcohol and substance abuse) and obligations for impaired physician reporting.
- Demonstrates an understanding of the broad principles of biomedical ethics.
- Understands and adheres to principles of patient confidentiality.
- Demonstrates knowledge of regulatory issues pertaining to the use of human subjects in research.

#### **Education:**

- Discussion of conflicts of interest and the ethics of conducting research during departmental or institutional conferences and daily clinical work.
- Training programs (i.e. videotapes) on the issues of harassment and discrimination.
- Didactic presentations of the recognition and management of the “impaired physician.”
- Participation in hospital-sponsored core curriculum educational activities (i.e. lectures, web-based programs on HIPPA, Conflict of Interest, etc.)
- Didactic lecture/training program on the broad principles of medical ethics.
- Institutional web-based self-directed learning and assessment programs on human subjects research guidelines.

#### **Assessment:**

- Global ratings by faculty.
- 360 degree evaluations.
- Conference attendance logs.
- Fellow self-assessment.

- In-house written case studies with discussion.

### **Practice-Based Learning and Improvement**

#### **DFN:**

- Fellows must be able to investigate and evaluate their patient care practices and appraise and assimilate scientific evidence to improve the accuracy, efficiency and cost effectiveness of their approach to practice.

#### **Skills:**

- Analyze practice experience and perform practice-based improvement in cognitive knowledge, observational skills, formulating a synthesis and impression, and procedural skills.
- Demonstrate critical assessment of the scientific literature.
- Demonstrate knowledge of and apply the principles of evidence-based medicine in practice.
- Use multiple sources, including information technology, to optimize life-long learning and support patient care decisions.
- Facilitate the learning of students, peers, and other health care professionals.

#### **Education:**

- Participate in critical assessment of the scientific literature through journal clubs, clinical conferences and independent learning.
- Didactic lectures on the assessment of scientific literature, study designs and statistical methods.
- Teaching students, peers and other health care professionals, with graduated supervision and feedback from supervising faculty.
- Active participation in departmental or institutional quality assurance (QA)/quality improvement (QI) activities with faculty supervision.

#### **Assessment:**

- Global ratings by faculty at Journal Club Presentations, participation in case conference, etc.
- QA/QI conference attendance logs.
- Procedure logs.

### **Systems-Based Practice**

#### **DFN:**

- Demonstrates an awareness and responsiveness to the larger context and system of health care (departmental, institutional and national) to optimize resources in the provision of health care.

#### **Skills:**

- Demonstrate the ability to design or improve cost effectiveness of care plans based on knowledge of best practices.
- Demonstrate knowledge of the sources of financing for U.S. health care including Medicare, Medicaid, the Veteran's Affairs and Department of Defense, public health systems, employer-based private health plans, and patient's own funds.
- Demonstrate knowledge of basic health care reimbursement methods.
- Demonstrate knowledge of the regulatory environment including state licensing authority, state and local public health rules and regulations, and regulatory agencies such as Centers for Medicaid and Medicare Services (CMS) and Joint Commission for the Accreditation of Healthcare Organizations (JCAHO).
- Demonstrate knowledge of basic practice management principles such as budgeting, record keeping, medical records, and the recruitment, hiring, supervision and management of staff.

**Education:**

- Systematic review of appropriate literature (ASCP, WHO practice/diagnostic guidelines) with application to current practice.
- Attendance and active participation in departmental and multi-disciplinary conferences where there is discussion of the diagnostic evaluation of diseases and most appropriate and cost-effective methods for establishing a diagnosis (e.g., Friday morning Hematology Patient Rounds).
- Interaction with department administrators and knowledgeable faculty to gain an understanding of the costs of diagnostic examinations and the influence of the type of payer system on reimbursement.
- Membership and active participation in local and national pathology societies.
- Departmental or institutional presentations on health care funding and regulation.

**Assessment:**

- Global ratings by faculty.
- Multi-disciplinary conference attendance logs.
- Documented membership and participation in pathology societies and other health care organizations.

# **ABRIDGED EDUCATIONAL GOALS AND OBJECTIVES**

## **FELLOWSHIP PROGRAM**

The educational goals for the first year fellowship are to:

1. Achieve clinical competence in signing out diagnostic bone marrow, lymph node and cytology specimens.
2. Attain an in-depth knowledge of the current literature in hematopathology.
3. Participate in oral presentations at clinical pathologic conferences as well as demonstrate effective communication skills that result in appropriate information exchange with patients, patient families, medical students, residents, supervising faculty, laboratory and secretarial staff, referring physicians and other members of the health care team.
4. Further develop professionalism that incorporates the highest ethical principles of medical practice.
5. Develop the ability to investigate and evaluate your patient care practices and appraise and assimilate scientific evidence to improve the accuracy, efficiency and cost effectiveness of your approach to practice.
6. Demonstrate an awareness and responsiveness to the larger context and system of health care (departmental, institutional and national) to optimize resources in the provision of health care.
7. Develop an area of active research interest in applied or basic research in hemepath.
8. Fulfill all prerequisites for board certification in hematopathology.

During the optional second year of the fellowship the emphasis is on:

1. Research (basic or applied) with the goal of producing work worthy of presentation at national meetings and publication and serving to support applications for fundable research.
2. Developing increasing autonomy in clinical sign-out of lymph node, bone marrow, and cytology specimens.

# TRAINING GOALS FOR HEMATOPATHOLOGY A SERVICE (VUMC)

## ***ROTATION DESCRIPTION:***

The Hematopathology A service is predominantly covered by VUMC pathology residents. Residents participate in the work-up, sign out, and report generation of a wide variety of cases of hematopoietic/lymphoid disorders, including lymphomas, leukemias, and reactive disorders. Residents are responsible in cooperation with the attending Pathologist for the sign-out of in-house bone marrow biopsies from VUMC Adult and Pediatric Hospitals as well as outside consultations/referred cases involving bone marrow and tissue biopsies for patients to be seen at Vanderbilt. These cases may include VPLS bone marrow cases which are managed with the standard diagnostic procedures used for in-house bone marrow cases. In addition, residents are responsible for outside consultations/referred bone marrow and tissue biopsies for patients to be seen at Vanderbilt. Residents will be responsible for up to 8 cases per day on the HPA service. Overflow cases will be handled by the attending. Lastly, residents are responsible for generating the daily case list with clinical histories and prior testing for patients undergoing bone marrow biopsies at VUMC that day. As residents gain experience, they are given increasing responsibility for the triage of cases, including upfront immunohistochemical orders and communication of final diagnoses with clinicians after the sign-out of cases. Fellows on the Hematopathology B service are responsible for ensuring that the case load is appropriate for the more junior resident's knowledge level and ability and for training them in the work flow. When there is no fellow on the Hematopathology B service, this will become the role of the senior resident covering the HPB service. A study set of key advanced diagnoses is provided for independent study. Residents will participate in the hematopathology intradivisional consensus conference and may also participate in the medical student education activities of the division.

## ***ROTATION FACULTY:***

**Mary Ann Arildsen, M.D., Ph.D., Rotation Director (Residency);** Jonathan Douds, M.D., Emily Mason, M.D., Ph.D., Claudio A. Mosse, M.D., Ph.D.; Adam Seegmiller, M.D., Aaron Shaver, M.D., Ph.D.

## ***RESIDENTS AND FELLOWS ARE EXPECTED TO GAIN THE FOLLOWING COMPETENCIES:***

### **Patient Care**

- To correlate clinical findings with morphology of lymph nodes, bone marrow biopsies, and peripheral blood smears.
- To develop proficiency in making accurate and cost effective diagnoses of reactive and neoplastic diseases of the lymph nodes and hematopoietic system.
- To understand the significance of various diagnoses of diseases involving the hematology system, in determining treatment plans.
- To learn appropriate selection of diagnostic tests, including flow cytometry, immunohistochemistry, and other ancillary FISH or molecular studies and the integration of all ancillary test results into a comprehensive diagnosis.

### **Medical Knowledge**

- To develop basic knowledge of the clinical, pathogenetic, morphologic, immunophenotypic, and genetic features of the more common diseases of the hematopoietic and lymphoid systems.
- To learn the WHO classification schemes for lymphoma and bone marrow cases, and to apply currently used schemes to individual cases in an appropriate fashion.
- To become familiar with outcomes and prognoses of common diseases of the lymph nodes and common hematologic diseases.

### **Practice-Based Learning and Improvement**

- To use case-based learning as a tool for additional insight into the basis of disease.
- To locate, appraise, and assimilate pertinent evidence from scientific studies.
- To demonstrate effective problem solving skills in diagnostic lymph node and bone marrow pathology, using a wide variety of information resources.
- To understand how quality assurance, quality control and quality improvement practices must be monitored and applied to Hematopathology to assure the optimum delivery of care to patients.

### **Interpersonal and Communication Skills**

- To communicate clearly with clinical colleagues to obtain clinical information in case evaluation.
- To communicate diagnoses and describe the features that support those diagnoses effectively, both verbally and in written reports.
- To present cases at interdivisional and intradivisional conferences to support continuing medical education of staff, residents, and fellows.
- To participate in the medical school teaching activities of the division by teaching medical students. Residents will clarify clinicopathologic issues, direct students to appropriate faculty with specific expertise, and participate in assigned laboratory sessions for the course.

### **Professionalism**

- To recognize and be sensitive to the needs of patients and clinicians in making timely diagnoses in a cost-effective manner appropriate to the clinical circumstances of each case.
- To work effectively and efficiently with support and administrative staff in the hematology lab, flow cytometry, and hematopathology to maximize productivity and maintain the quality of the work environment.
- To complete written reports in a timely fashion.

### **Systems-Based Practice**

- To learn the process of case evaluation, from the acquisition of pertinent clinical and pathologic data to sign-out and delivery of patient reports.
- To use awareness of laboratory work flow to optimize efficiency and turn-around time through working with laboratory, administrative, and secretarial staff.
- To develop skills in selecting the most cost-effective diagnostic studies that provide quality medical care.



***SITUATIONS IN WHICH EVEN AN EXPERIENCED RESIDENT/FELLOW MUST CALL AN ATTENDING:***

- When the resident/fellow is called to look at a peripheral blood smear for blasts (>5%) on a new patient and he/she is unsure if they are blasts or if there is a possibility that the patient has APL.
- Before the clinical team starts preparations for therapy for a new diagnosis of leukemia, lymphoma, or metastatic tumor in a bone marrow.
- When there is contact by an attorney, a relative, or any party not secured by HIPAA requesting information.
- When there is contact by an upset clinician.
- When a possible specimen loss or misidentification has occurred.

# TRAINING GOALS FOR HEMATOPATHOLOGY B SERVICE (VUMC)

## ***ROTATION DESCRIPTION:***

The Hematopathology B service is covered jointly by Hematopathology fellows and VUMC pathology senior residents. Fellows participate in the work-up, sign out, and report generation of a wide variety of cases of hematopoietic/lymphoid disorders, including lymphomas, leukemias, and reactive disorders. Fellows are responsible in cooperation with the attending Pathologist for the sign-out of in-house bone marrow biopsies as well as in-house tissue biopsies from VUMC Adult and Pediatric Hospitals. In addition, fellows are responsible for outside consultations/referred bone marrow biopsies for patients to be seen at Vanderbilt. Residents and fellows will be responsible for up to 10 cases per day on the HPB service. Overflow cases will be handled by the attending. As fellows gain experience, they are given increasing responsibility for the triage of cases, including upfront immunohistochemical orders and communication of final diagnoses with clinicians after the sign-out of cases. Fellows on the HPB service will take the role of supporting the junior resident on the HPA service, ensuring that the case load is appropriate for the more junior resident's level, and training them in the work flow. Fellows will participate in the hematopathology intradivisional consensus conference and may also participate in the medical student education activities of the division.

Many of the in-house tissue biopsies come from patients who are seriously ill and require an expedited diagnosis. Fellows learn how to respond appropriately to such stressful circumstances and learn to communicate appropriately with clinical colleagues facing complex diagnostic/therapeutic challenges.

## ***ROTATION FACULTY:***

**Aaron Shaver, M.D, Ph.D., Rotation Director (Residency);** Mary Ann Arildsen, M.D., Ph.D., Jonathan Douds, M.D., Emily Mason, M.D., Ph.D., Claudio A. Mosse, M.D., Ph.D.; Adam Seegmiller, M.D.,

## ***RESIDENTS/FELLOWS ARE EXPECTED TO GAIN THE FOLLOWING COMPETENCIES:***

### **Patient Care**

- Understand and direct the collection and processing of specimens for diagnostic studies.
- Gather essential and accurate information about patients.
- Develop an appropriate diagnostic plan/differential diagnosis based on clinical questions and available laboratory data.
- Interpret pathology and integrate clinical, flow cytometric, immunohistochemical and genetic data to make a correct diagnosis.
- Understand the importance of timeliness in delivery of diagnosis.
- Use literature/internet to support diagnoses in difficult cases.
- Effectively communicate findings to clinical staff both orally and in written reports.

### **Medical Knowledge**

- Demonstrate sufficient knowledge of medicine to generate differential diagnoses appropriate to clinical and pathological findings.
- Acquire relevant medical knowledge and apply it to constructing and testing new paradigms in the practice of pathology.

### **Practice-Based Learning and Improvement**

- Analyze practice experience and perform practice-based improvement in cognitive knowledge, observational skills, formulating a synthesis and impression, and procedural skills.
- Demonstrate critical assessment of the scientific literature.
- Demonstrate knowledge of and apply the principles of evidence-based medicine in practice.
- Use multiple sources, including information technology to optimize life-long learning and support patient care decisions.
- Facilitate the learning of students, peers, and other health care professionals through presentations at intramural conferences.

### **Interpersonal and Communication Skills**

- Provide clear, informative and concise written reports which include a precise diagnosis, a differential diagnosis when appropriate and relevant supportive morphologic and laboratory data as well as related literature.
- Understand the importance of timeliness in delivery of diagnosis.
- Demonstrate effectiveness in face-to-face listening and speaking to clinical staff and support personnel.
- Possess appropriate telephone communication skills.
- Effectively present pathologic findings, differential diagnosis and relevant literature at conferences with house staff and colleagues.

### **Professionalism**

- Responsibility - Punctual and prepared for sign-out. Assumes ownership of cases and responsible for diagnosis.
- Compassionate in understanding and respecting the needs of patients, their families and the staff and physicians caring for patients.
- Demonstrate professional excellence in providing diagnostic services to patients.
- Demonstrate knowledge of regulatory issues pertaining to the use of human subjects in research.
- Understand the importance of timeliness in delivery of diagnosis.

### **Systems-Based Practice**

- Demonstrate the ability to design or improve cost effectiveness of care plans based on knowledge of best practices.

# TRAINING GOALS FOR THE VA SERVICE

## ***ROTATION DESCRIPTION:***

The VA service is covered jointly by Hematopathology fellows and VUMC pathology senior residents. Fellows participate in the work-up, sign out, and report generation of a wide variety of cases of hematopoietic/lymphoid disorders, including lymphomas, leukemias and reactive disorders. Fellows are responsible in cooperation with the attending Pathologist for the sign-out of in-house bone marrow biopsies and tissue specimens. In addition, fellows are responsible for outside consultations/referral cases for patients to be seen at the Nashville VAMC. Fellows are responsible for review of peripheral blood smears and body fluid specimens flagged by the hematology bench. As fellows gain experience, they are given increasing responsibility for the triage of cases, including upfront immunohistochemical orders and communication of final diagnoses with clinicians after the sign-out of cases.

Fellows participate in the work-up, sign out, and report generation for a wide variety of flow cytometry cases of hematopoietic/lymphoid disorders, including lymphomas, leukemias and reactive disorders. These specimens will include peripheral blood, bone marrow biopsies, tissue biopsies and cytology specimens. This will include specimens delivered from referring VA medical centers in which morphology is frequently not available. As fellows gain experience, they are given increasing responsibility for triage of cases, upfront addition of relevant flow cytometry panels, independent re-gating analysis, and communication of final diagnoses with outside pathologists. Fellows will participate in the hematopathology intradivisional consensus conference and may also participate in the medical student education activities of the division.

## ***ROTATION FACULTY:***

Jonathan Douds, M.D., Claudio A. Mosse, M.D., Ph.D.

## ***RESIDENTS/FELLOWS ARE EXPECTED TO GAIN THE FOLLOWING COMPETENCIES:***

### **Patient Care**

- Gather essential and accurate clinical information and prior pathology results on patients.
- Develop appropriate diagnostic plans/differential diagnoses based on clinical questions and available laboratory data.
- Interpret pathology and integrate clinical, flow cytometric, immunohistochemical and genetic data to make a correct diagnosis.
- Use the literature to support diagnoses in difficult cases.
- Effectively communicate findings to clinical staff both orally and in written reports.
- Learn current applications of flow cytometry to patient care.
- Understand laboratory techniques used in flow cytometry.
- Be able to correlate morphology with flow cytometric results and other diagnostic studies.
- Understand the criteria for flagging by the hematology analyzer, criteria for pathology review of peripheral blood smears, and criteria that are considered crisis values.

### **Medical Knowledge**

- Demonstrate sufficient knowledge of medicine to generate differential diagnoses appropriate to clinical and pathological findings.
- Acquire relevant medical knowledge and apply it to patient care.
- Identify abnormal leukocytes in the peripheral smear, including blasts, circulating lymphoma cells, and atypical lymphocytes.
- Understand the principles by which the hematology analyzer operates.

### **Practice-Based Learning and Improvement**

- Analyze practice experience and perform practice-based improvement in cognitive knowledge, observational skills, formulating a synthesis and impression, and procedural skills.
- Demonstrate critical assessment of the scientific literature.
- Demonstrate knowledge of and apply the principles of evidence-based medicine in practice.
- Use multiple sources, including information technology, to optimize life-long learning and support patient care decisions.

### **Interpersonal and Communication Skills**

- Provide clear, informative and concise written reports which include a precise diagnosis, a differential diagnosis when appropriate and relevant supportive morphologic and laboratory data as well as related literature.
- Understand the importance of timeliness in delivery of diagnosis.
- Develop appropriate telephone communication skills.
- Demonstrate effective writing skills in preparing interpretive flow cytometry reports.
- Serve as “first call” for clinicians who have questions related to cases.
- Communicate clearly with clinical colleagues to obtain clinical information in case evaluation and to communicate final diagnostic interpretations.
- Communicate effectively with laboratory staff to facilitate proper patient evaluation.

### **Professionalism**

- Responsibility - Punctual and prepared for signout. Assumes ownership of cases and responsible for diagnosis.
- Show compassion in understanding and respecting the needs of patients, their families and the staff and physicians caring for patients.
- Demonstrate professional excellence in providing diagnostic services to patients.
- Understand the importance of timeliness in delivery of diagnosis.
- Interact in a professional, helpful, and respectful manner with clinicians, other house staff, and technical and administrative staff.

- Communicate complex, unusual or urgent diagnoses to clinicians or referring pathologists in a timely manner.

### **Systems-Based Practice**

- Demonstrate the ability to design or improve cost effectiveness of care plans based on knowledge of best practices.
- Develop awareness and accurate use of coding to ensure accurate billing for appropriate level of effort.
- Learn the specificity, sensitivity, limitations and interpretation of flow cytometry data.
- Learn the limitations and interpretation of ancillary testing in developing diagnoses or a differential diagnosis.

# TRAINING GOALS FOR FLOW CYTOMETRY/IMMUNOPATHOLOGY LAB ROTATION

## ***ROTATION DESCRIPTION:***

The Flow cytometry/IP service is predominantly covered by Hematopathology Fellows. Fellows participate in the work-up, sign out, and report generation for a wide variety of flow cytometry cases of hematopoietic/lymphoid disorders, including lymphomas, leukemias, and reactive disorders. Fellows are responsible in cooperation with the attending Pathologist for the sign-out of in-house flow cytometry cases for peripheral blood, bone marrow, tissue biopsy, and body fluid specimens from VUMC Adult and Pediatric Hospitals. Cases may include VPLS cases, which are managed with the standard diagnostic procedures used for in-house cases. Fellows are also responsible for review of CSF specimens and of peripheral smears and body fluids flagged by the Hematology Bench for pathologist review. Finally, fellows review cases sent in consultation ('true consults') from outside pathologists. As fellows gain experience, they are given increasing responsibility for the triage of cases, including independent review of flagged peripheral blood smears, upfront addition of additional flow cytometry panels, independent re-gating analysis, and communication of final diagnoses with outside pathologists regarding true consult cases. When the Flow cytometry/IP rotation is covered by residents (3-4 months/year), fellows will continue to be responsible for managing true consult cases. Fellows will participate in the hematopathology intradivisional consensus conference and may also participate in the medical student education activities of the division.

## ***ROTATION FACULTY:***

Mary Ann Arildsen, M.D., Ph.D., Jonathan Douds, M.D., Bruce Greig, ASCP, Emily Mason, M.D., Ph.D., Claudio A. Mosse, M.D., Ph.D.; Adam Seegmiller, M.D., Aaron Shaver, M.D., Ph.D.

## ***RESIDENTS/FELLOWS ARE EXPECTED TO GAIN THE FOLLOWING COMPETENCIES:***

### **Patient Care**

- To learn current applications of Flow Cytometry to patient care.
- To understand the laboratory techniques used in flow cytometry.
- To learn to correlate morphology with flow cytometric results and other diagnostic studies.
- To be able to generate a differential diagnosis and appropriate work-up of anemia, platelet abnormalities, or leukocyte abnormalities based upon laboratory values and peripheral blood smear findings.
- To understand the criteria for flagging by the hematology analyzer, criteria for pathology review of peripheral blood smears, and criteria that are considered crisis values.

### **Medical knowledge**

- To understand the immunologic basis and pathogenesis of diseases of lymphoma and leukemia.
- To develop an investigatory and analytic approach to flow cytometry.

- To understand the pathophysiology of the major causes of anemia.
- To be familiar with the biochemical basis of the major benign white blood cell disorders.
- To be able to identify abnormal white blood cells in the peripheral smear, including blasts, circulating lymphoma cells, and atypical lymphocytes.
- To understand the principles by which the hematology analyzer operates.

### **Practice-based learning**

- To use case-based learning as a tool for additional insight into the basis of disease.
- To locate, appraise, and assimilate pertinent evidence from patient case studies and scientific reviews.
- To demonstrate effective problem solving skills, using a wide variety of information resources.

### **Interpersonal and Communication Skill**

- To teach resident and attending staff through presentation of flow cytometry data at departmental and interdivisional conferences.
- To use effective writing skills in preparing interpretive flow cytometry reports.
- To serve as "first call" for clinicians who have questions related to hematology or coagulation results.
- To communicate clearly with clinical colleagues to obtain clinical information in case evaluation and to communicate final diagnostic interpretations.
- To communicate effectively with laboratory staff to facilitate proper patient evaluation.

### **Professionalism**

- To complete interpretive reports in a timely fashion.
- To interact in a professional, helpful, and respectful manner with clinicians, other house staff, and technical and administrative staff.
- To notify clinicians of abnormal hematology and coagulation results in a timely and accurate manner.
- To communicate complex and unusual diagnosis to referring pathologists and other physicians in consultative cases.

### **Systems-based practice**

- To develop an understanding of quality control in Flow cytometry by evaluation of quality control data and review of laboratory results.
- To understand CAP accreditation requirements and review CAP results in the flow cytometry laboratory.
- To learn the specificity, sensitivity, limitations and interpretation of flow cytometry data.



# **TRAINING GOALS FOR HEMATOLOGY AND COAGULATION (AS PART OF FLOW CYTOMETRY AND COAGULATION ROTATIONS)**

## **Patient Care**

- To be able to generate a differential diagnosis and appropriate work-up of anemia, platelet abnormalities, or leukocyte abnormalities based upon laboratory values and peripheral blood smear findings.
- To understand the criteria for flagging by the hematology analyzer, criteria for pathology review of peripheral blood smears, and criteria that are considered crisis values.
- To understand the role of the coagulation laboratory in evaluating patients with bleeding disorders.
- To understand the role of the coagulation laboratory in guiding proper blood transfusion therapy and in monitoring anticoagulation therapy.

## **Medical Knowledge**

- To understand the pathophysiology of the major causes of anemia.
- To be familiar with the biochemical basis of the major benign white blood cell disorders.
- To be able to identify abnormal white blood cells in the peripheral smear, including blasts, circulating lymphoma cells, and atypical lymphocytes.
- To understand the principles by which the hematology analyzer operates.
- To develop an understanding of the physiology and pathophysiology of the plasma and platelet components of hemostasis, and how these components interact with blood vessels.
- To understand the processes by which an aPTT and PT are performed, the process for evaluating coagulation inhibitors, and how coagulation factor levels are determined.
- To understand the pathophysiology of consumptive coagulopathies, and the clinical setting in which consumptive coagulopathies should be suspected.
- To understand the clinical signs of platelet dysfunction, the screening tests used for evaluating platelet function, and appropriate use of von Willebrand factor and platelet aggregation assays.

## **Practice Based Learning**

- To use case-based learning as a tool for additional insight into the basis of blood-related diseases.
- To locate, appraise, and assimilate pertinent evidence from scientific studies.
- To demonstrate effective problem solving skills in diagnosis of blood-related diseases.

## **Interpersonal and Communication Skills**

- To serve as "first call" for clinicians who have questions related to hematology or coagulation results.
- To communicate clearly with clinical colleagues to obtain clinical information in case evaluation and to communicate final diagnostic interpretations.
- To communicate effectively with laboratory staff to facilitate proper patient evaluation.

- To teach medical technology staff, medical students, and residents by going over cases and giving CME talks.

### **Professionalism**

- To interact in a professional, helpful, and respectful manner with clinicians, other house staff, and technical and administrative staff.
- To work effectively and efficiently with support and administrative staff in the clinical laboratory to maximize productivity and maintain the quality of the work environment.
- To notify clinicians of abnormal hematology and coagulation results in a timely and accurate manner.

### **Systems-Based Practice**

- To understand principles of QA (quality assurance) and QC (quality control) in the hematology and coagulation labs, including CAP (College of American Pathologists) proficiency testing.
- To understand CAP and CLIA guidelines and requirements for the laboratory.
- To understand LIS (laboratory information systems) issues relevant to the laboratory.
- To understand how to check the validity of historic normal value ranges and to generate new normal value ranges.

# TRAINING GOALS FOR MOLECULAR GENETICS LAB ROTATION

## **Patient Care**

- To learn current applications of molecular diagnostics to patient care.
- To understand the laboratory techniques used in molecular diagnostics.
- To become familiar with molecular nomenclature.
- To learn to correlate other laboratory results with molecular genetic results.
- To learn the clinical implications of genetic test results.

## **Medical Knowledge**

- To understand the molecular basis and pathogenesis of diseases for which testing is performed.
- To develop an investigatory and analytic approach to molecular diagnostics.

## **Practice-Based Learning**

- To use case-based learning as a tool for additional insight into the basis of disease.
- To locate, appraise, and assimilate pertinent evidence from patient case studies and scientific reviews.
- To demonstrate effective problem solving skills, using a wide variety of information resources.

## **Interpersonal and Communication Skills**

- To teach medical technology staff through presentation of continuing education lectures.
- To use effective writing skills in preparing complex interpretive molecular genetics reports.

## **Professionalism**

- To complete interpretive reports in a timely fashion.
- To interact in a professional, helpful, and respectful manner with clinicians, other house staff, and technical and administrative staff.
- To understand ethical issues relating to genetic testing.

## **Systems-Based Practice**

- To develop an understanding of quality control in molecular genetics by evaluation of quality control data and review of laboratory results.
- To understand CAP accreditation requirements and review CAP results in the molecular genetics lab.
- To learn the specificity, sensitivity, limitations, and interpretation of each assay performed in the molecular genetics lab.
- To understand the implications of genetic testing results and patient insurability.