

SUPPLEMENT I

HEMATOLOGY FELLOWSHIP DESCRIPTION AND OBJECTIVES Revised 11/15/2010

Overview

Supervising Faculty:

General Hematology: A Arbini, MD; F Fuda, DO; N Karandikar, MD, PhD;
B Levenson, MD; Hung Luu, MD
Pediatric Hematology: A Arbini, MD; F Fuda, DO; B Levenson, MD; Hung Luu, MD
D Noland, MD; C Timmons, MD, PhD
Flow Cytometry: A Arbini, MD; F Fuda, DO; B Levenson, MD; N Karandikar, MD, PhD
Molecular Diagnostics: P Koduru, PhD; D Oliver, MD
Cytogenetics: P Koduru, PhD; C Tirado, PhD
Coagulation: J Burner, MD; R Sarode, MD

Duration: 1 or 2 years

Rotation Schedule (1 year fellowship)

4 months general hematology including coagulation, bone marrow and lymph node diagnosis. (Coagulation can be a separate month rotation)	1 month cytogenetics	1 month molecular diagnostics
4 months flow cytometry	2 months research/elective	

Note: The fellow may elect to receive coagulation laboratory training in the form of a dedicated month, rather than as part of the general hematology rotation.

Rotation Schedule (2 Year Fellowship)

Year 1 (Identical to the 1-year fellowship)

4 months general hematology including coagulation, bone marrow and lymph node diagnosis. (Coagulation can be a separate month rotation)	1 month cytogenetics	1 month molecular diagnostics
4 months flow cytometry	2 months research/elective	

Year 2

4 months general hematology including coagulation, bone marrow and lymph node diagnosis	1 month coag or clinical elective	
4 months flow cytometry	3 months research/elective	

General Goals

The overall goal of the hematopathology fellowship training program is to provide broad-based training in the laboratory approach to diagnosis of hematologic disorders, both benign and malignant, as well education in the structure, function and management of hematology-related laboratories. A multimodality approach is stressed, with incorporation of information from multiple sources, including clinical, hematologic, cytogenetic, flow cytometric, and molecular data. Although all fellow work will proceed under the supervision of an attending pathologist, development of increasing degrees of independence and responsibility commensurate with his or her ability and level of training is encouraged. The ultimate goal is to allow the fellows to function as effective laboratory consultants to their clinical colleagues, both in the interpretation of pathologic material, as well as by providing input into the proper utilization and interpretation of laboratory tests for the patient work-up. Furthermore, through participation in research projects, conferences, journal club, and teaching activities, it is hoped that an academic approach to hematopathology will be fostered, thus preparing fellows for careers in either academic or community practice.

Research Projects

Fellows are expected to perform, with the guidance and assistance of one or more faculty members in the division, at least one research project of their own choosing. The expectation is for the fellow to present the results of the project(s) at national meetings, such as those of the United States and Canadian Academy of Pathology, or the American Society of Clinical Pathologists.

Hematopathology Fellowship

General Hematology Rotation

Duties: The fellow will serve as the “point” person for the general hematology service at Parkland Hospital and Health System. This will include, but not be limited to:

1. Attendance at a series of general orientation sessions (along with junior residents) at beginning of their first general hematology rotation. This rotation will include morphology training and orientation to automated analyzers, QC and QM procedures, special hematology tests, bone marrow processing, and body fluid analysis.
2. Attendance at daily sign-out sessions (Consult sign-out at 8:00 am and Parkland/ UT and CMC afternoon signouts). These sign-out sessions will include review of peripheral blood, bone marrow, body fluid, hemoglobin electrophoresis, lymph nodes, and other hematolymphoid tissue specimens.
3. Screen new bone marrow aspirates on the day they are performed.
4. Grossing and triaging of diagnostic lymph node biopsies at Parkland and University Hospitals. Residents will order any necessary immunohistochemical stains. The lymph nodes will be reviewed at afternoon and/or morning sign-out and a final disposition will be determined on each case.
5. Be first line resource for hematology wet lab problems (when on “day call”) or second line resource after heme “day call” resident; coordination of daily workflow.
6. Attendance at weekly hematology laboratory management meetings with medical director and lab managers.
7. Guidance and instruction of residents on service.
8. Management of consult service. This will include immediate review of new consults with initiation of appropriate procedures such as contacting the referring physician, ordering special studies, etc. If the consult is deemed urgent by the fellow, it will be reviewed with the attending on service at the earliest available time. Otherwise, it will be brought to 8AM Consult sign-out session the day after receipt for attending review. Following this, the fellow is responsible for dictation of consults, which after correction and fellows review will be reviewed and signed by the attending hematopathologist.
9. Attendance at required departmental and inter-departmental conferences (see below).
10. Presentation of cases at departmental and inter-departmental conferences, including but not limited to monthly pediatric heme/onc conference, and Friday Tumor Board.

11. Presentation of didactic material at Tuesday CP Rounds and Thursday Hematopathology cases conference, as scheduled.
12. Performance of mock CAP inspection of Parkland and University hematology labs, when appropriate.
13. Performance of off-site CAP inspection, when possible.
14. Review of periodic QC data prior to attending review.
15. Performance of sufficient bone marrow biopsies under the supervision of hematology/oncology personnel to become familiar and optimally proficient at the technique.
16. Act as primary contact person for inquiries from clinical services regarding ongoing cases, including demonstration of pathologic findings to clinical services at the multi-headed microscope.

Objectives

1. Understand the principles of operation of automated hematology analyzers. The fellow should be able to interpret the output of the CBC analysis, including indices, histograms, differentials, and system flags, and be able to correlate these results with other clinical and laboratory data. He/she should be aware of possible sources of error and corresponding methods of correction.
2. Understand the principles, indications, application, interpretation, and sources of error of a variety of special hematology tests, including reticulocyte counts, sedimentation rates, Kleihauer-Betke test for fetal hemoglobin, sickle cell screens, osmotic fragility, and manual counting procedures.
3. The fellow should understand basic principles of hemoglobin electrophoresis, including alkaline, acid, isoelectric focusing and HPLC techniques. He/she should be able to interpret the results and correlate these with the peripheral smear findings and other laboratory data in the diagnosis of common hemoglobinopathies and thalassemia disorders.
4. Be able to evaluate and interpret peripheral blood and body fluid smears. This should include the ability to generate a differential diagnosis based on the morphologic findings, and to suggest appropriate follow-up laboratory tests. The fellow should be able to identify cases in which clinical consultation is indicated, and be able to communicate effectively with the responsible clinician regarding the morphologic findings and their implications.

5. Be able to evaluate and trouble-shoot problem cases and situations identified by the laboratory staff or others, conferring with the attending pathologist when necessary.
6. Understand principles of laboratory quality control and quality assurance.
7. Be familiar with issues of hematology laboratory management, including personnel issues, budgeting, instrument evaluation and purchase, workflow, etc.
8. Understand the indications and uses of bone marrow evaluation.
9. Understand the basic procedures for bone marrow processing, including factors that may compromise specimen adequacy, and the advantages and disadvantages of the various preparations.
10. Be able to interpret peripheral blood smears, bone marrow aspirate smears and clot sections, and core biopsy sections. Understand the ways in which both hematopoietic and non-hematopoietic disorders alter bone marrow morphology, and be able to gather appropriate clinical and laboratory data and generate differential diagnoses based on the morphologic findings and clinical history.
11. Be able to perform bone marrow and peripheral blood differential counts.
12. Be able to select and order special studies when indicated, eventually without the input of the attending pathologist.
13. Communicate preliminary bone marrow results to clinicians, when appropriate, eventually prior to evaluation by the attending pathologist.
14. Learn to effectively synthesize bone marrow and other laboratory results into a cohesive written report that provides all necessary information for the clinician to be able to effectively treat his/her patient.
15. Be able to evaluate lymph nodes and other tissue specimens, and be able to recognize the full spectrum of reactive and neoplastic lymphoid disorders.
16. Be able to utilize immunohistochemistry in an effective and cost efficient manner. Understand the purpose, utility, and limitations of various tissue antigens in the differentiation of hematolymphoid disorders.
17. Understand the basic principles of thrombosis and hemostasis, as well as the purpose and application of a variety of basic and advanced coagulation tests in the work-up of hemostatic disorders. Be able to provide consultative guidance in the choice of tests, and have an understanding of their usefulness and their limitations.

1. Patient care

Procedural skills

(A) Objective: What procedural skills must be acquired on this rotation?

- a). Grossing and triaging of diagnostic lymph node biopsies and hematolymphoid tissue biopsies at Parkland and University Hospitals.
- b). Understand the basic procedures for bone marrow processing, including factors that may compromise specimen adequacy, and the advantages and disadvantages of the various preparations.
- c). Observe and perform sufficient bone marrow biopsies under the supervision of hematology/oncology personnel to become familiar and optimally proficient at the technique

(B) Plan

- a) How are the procedural skills taught and by whom?

Lymph node and tissue procedural skills are taught by observation and actual performance under the supervision of faculty in the beginning of the fellowship. Bone marrow procedural skills are taught by observation and actual performance under the supervision of fellows or faculty in Hemo/Oncology department.

- b) Is a specified minimum number of procedures required, and if so, how is this documented?

No specified number for grossing lymph nodes and tissue. For bone marrows, the trainees must partake in 5-10 procedures and these should be documented by an online log (ACGME website).

- c) What is the level of responsibility and supervision, and how is this documented?

The fellow's responsibility is to complete these exercises. The fellows are responsible for maintaining a log of each bone marrow procedure they perform. For grossing lymph node and tissue, fellows will supervise residents and order any necessary immunohistochemical stains. The lymph nodes and tissue will be reviewed at afternoon and/or morning sign-out and a final disposition will be determined on each case.

(C) Assessment:

How and by whom are the procedures supervised and the skills assessed, and how is this documented?

Procedures are supervised and skills assessed by direct interaction, observation, verbal and written assessment by hematopathology faculty and clinicians.

Interpretive skills.

(A) Objective:

- a). Attendance at a series of general orientation sessions (along with junior residents) at beginning of their first general hematology rotation.
- b). Attendance at daily sign-out sessions (Consult sign-out at 8:00 am and Parkland/ UT and CMC afternoon signouts).
- c). Management of consult service.
- d). Guidance and instruction of residents on service.

(B) Plan

- a). The general orientation will include morphology training and orientation to automated analyzers, QC and QM procedures, special hematology tests, bone marrow processing, and body fluid analysis.
- b). The daily sign-out sessions will include review of peripheral blood, bone marrow, body fluid, hemoglobin electrophoresis, lymph nodes, and other hematology tissue specimens.
- c). Screen new bone marrow aspirates on the day they are performed.
- d). Management of consult service will include immediate review of new consults with initiation of appropriate procedures such as contacting the referring physician, ordering special studies, etc. If the consult is deemed urgent by the fellow, it will be reviewed with the attending on service at the earliest available time. Otherwise, it will be brought to 8AM Consult sign-out session the day after receipt for attending review. Following this, the fellow is responsible for dictation of consults, which after correction and fellows review will be reviewed and signed by the attending hematopathologist.
- e). Be first line resource for hematology wet lab problems (when on “day call”) or second line resource after heme “day call” resident; coordination of daily workflow.

(C) Assessment:

How are the interpretive skills assessed and by whom?

Interpretive skills are assessed by direct observation by hematopathology faculty, as well as through daily interaction during sign-out and interaction at unknown conferences, and quality (promptness and completeness) of written pathology reports.

2. Medical Knowledge.

(A) Objective: What is the medical knowledge base the fellows expected to attain on this rotation?

- a). Understand the basic and updated knowledge of hematopoietic and lymphoid diseases and multimodality approach in the diagnosis including the utility of ancillary techniques of special stains, flow cytometry, cytogenetics, and molecular diagnosis.
- b). Understand the principles of operation of automated hematology analyzers. The fellow should be able to interpret the output of the CBC analysis, including indices, histograms, differentials, and system flags, and be able to correlate these results with other clinical and laboratory data. He/she should be aware of possible sources of error and corresponding methods of correction.
- c). Understand the principles, indications, application, interpretation, and sources of error of a variety of special hematology tests, including reticulocyte counts, sedimentation rates, Kleihauer-Betke test for fetal hemoglobin, sickle cell screens, osmotic fragility, and manual counting procedures.
- d). Understand basic principles of hemoglobin electrophoresis, including alkaline, acid, isoelectric focusing and HPLC techniques. He/she should be able to interpret the results and correlate these with the peripheral smear findings and other laboratory data in the diagnosis of common hemoglobinopathies and thalassemia disorders.
- e). Be able to evaluate and interpret peripheral blood and body fluid smears. This should include the ability to generate a differential diagnosis based on the morphologic findings,

- and to suggest appropriate follow-up laboratory tests. The fellow should be able to identify cases in which clinical consultation is indicated, and be able to communicate effectively with the responsible clinician regarding the morphologic findings and their implications.
- f). Be able to evaluate lymph nodes and other tissue specimens, and be able to recognize the full spectrum of reactive and neoplastic lymphoid disorders.
 - g). Understand the indications and uses of bone marrow evaluation.
 - h). Be able to perform bone marrow and peripheral blood differential counts. Be able to select and order special studies when indicated, eventually without the input of the attending pathologist.
 - i). Be able to interpret peripheral blood smears, bone marrow aspirate smears and clot sections, and core biopsy sections. Understand the ways in which both hematopoietic and non-hematopoietic disorders alter bone marrow morphology, and be able to gather appropriate clinical and laboratory data and generate differential diagnoses based on the morphologic findings and clinical history.
 - j). Understand the use and limitations in hematopathology of ancillary diagnostic tools.. Be able to utilize immunohistochemistry in an effective and cost efficient manner. Understand the purpose, utility, and limitations of various tissue antigens in the differentiation of hematolymphoid disorders.
 - k). Learn to effectively synthesize bone marrow and other laboratory results into a cohesive written report that provides all necessary information for the clinician to be able to effectively treat his/her patient.
 - l). Appropriately respond to questions posed by clinicians, pathology residents regarding tests, results and clinical significance.
 - m). Take the initiative to know and research the answers to unknown posed hematopathology questions.
 - n). Preparation and be knowledgeable about cases presented at multidisciplinary conferences.

(B) Plan: How is the knowledge base attained?

1) What is the basic reading requirement for the rotation?

See reading list below.

Journal articles.

2) What teaching conferences and lectures are the fellows expected to attend?

There is constant twice daily sign-outs. In addition, the following are applicable:

Weekly flow cytometry conference

Weekly Hematology/Hematopathology Grand Round and Tumor Board.

Monthly consultant's conference and Monthly pediatric heme/onc conference

Hematopathology lecture series [entire series repeats once a year]

(C) Assessment: How is the fellow's medical knowledge assessed and by whom?

Assessment is performed during direct daily interaction with the teaching faculty.

Objective assessment is performed by the ASCP in-service examination and the ABP boards.

3. Practice-based learning and improvement.

(A) Objectives: What constitutes practice-based learning and improvement (e.g. the application of the medical literature, research and statistical methods, and data

management technology for self-evaluation and improvement) on this rotation?

- a). Fellows review a large number of cases and are constantly taught to integrate information with other diagnostic modalities.
- b). Journal clubs are held for presentation of new literature with assigned reading for fellows. Fellows should regularly attend the monthly hematopathology journal club in order to participate in a literature-based discussion of cutting edge information relevant to the practice of hematopathology.
- c). Demonstrate gradual increase in the fund of knowledge, and show improvement in competence, efficiency, and confidence in all areas of hematopathology.

(B) Plan: How does the fellow achieve the objectives of practice-based learning and improvement?

1) How is practice-based learning and improvement incorporated into the fellow's service work?

Fellows review a large number of cases and are constantly taught to integrate information with other diagnostic modalities.

Attendance at morning signout of consult cases, where integration of data is stressed.

2) What informal exercises, formal conferences (e.g. journal clubs, peer review conferences), and lectures exist on this rotation to facilitate practice-based learning and improvement?

- a) Daily Signouts and discussions on multiple cases.
- b) Weekly flow cytometry conference (peer review is an implicit function)
- c) Monthly morphology conference.
- d) Monthly journal club.

(C) Assessment: How are the objectives of practice-based learning and improvement assessed and by whom?

Assessment is through daily interactions with faculty.

4. Interpersonal and communication skills.

(A) Objectives: What interpersonal and communication skills are the fellows expected to develop and use on this rotation?

Communicate effectively with hematology and oncology clinical colleagues by demonstrating knowledge of the significance of the reported diagnostic findings and clearly explain the results (including morphologic findings and ancillary studies) to clinicians, residents and students.

- a) Procurement of appropriate clinical information from source pathologist or clinician
- b) Production of a well-described final pathology report
- c) Communication of results to referring pathologists or clinicians
- d) Procurement of histologic sections for morphologic review on challenging cases
- e) Preparation and running of weekly Hematology/Hematopathology Grand Round and monthly morphology conferences
- f) Supervision and teaching of residents rotating on service
- g) Effectively integrate morphologic and phenotypic findings into a coherent and useful report.
- h) Effective communication with clinical and pathologist colleagues regarding appropriate test utilization, limitations of techniques, and final interpretation.

i) Appropriate interaction with faculty and staff, clinicians, hospital staff, other UTSW faculty.

(B) Plan: How does the fellow learn the skills necessary for effective personal interaction and communication?

1) How are interpersonal and communication skills incorporated into the fellow's service work?

Daily duties of communication and interaction with faculty and staff.

2) What informal conferences and formal presentations and reports exist on this rotation to facilitate the development of communication skills?

Presentations at Hematology/Hematopathology Grand Rounds.

Running of monthly morphology conference

Presentation of papers and/or abstracts at monthly journal club

Didactic Teaching sessions with faculty.

(C) Assessment: How are the fellow's interpersonal and communication skills assessed and by whom?

Communication skills are assessed by daily interactions with faculty and staff, presentations at conferences, journal clubs and didactic teaching sessions.

5) Professionalism.

(A) Objectives: What aspects of professionalism should the fellow learn on this rotation?

a). Public speaking skills.

b). Team-building. Demonstrate proper respect for technologists, clinician, medical students, and all other staff.

c). Adherence to ethical principles. Demonstrate a knowledge of and commitment to the ethical principles pertaining to patient care and the conduct of clinical research in hematopathology.

d) Sensitivity to a diverse patient population and work environment. Demonstrate respect, compassion, integrity, and responsiveness to the needs of hematology and oncology patients and their health care providers.

e) Commitment to carrying out professional responsibilities.

(B) Plan: How does the resident go about learning professionalism on this rotation?

a) Development and review of conference presentations with faculty.

b) Interactions with clinicians, other pathologists and staff.

(C) Assessment: How is the fellow's professionalism assessed and by whom?

Professionalism is assessed by daily interactions within the laboratory, presentations at conferences and didactic teaching sessions and adherence to the IRB guideline in translational or clinicopathologic study.

6. Systems-based practice.

(A) Objectives: What knowledge and skills in laboratory management and the greater context of the health care system should the fellow learn on this rotation?

a). Understand principles of laboratory quality control and quality assurance, and appreciate the role of diagnostic testing in patient management and the role of the

pathologist as a clinical consultant.

b). Participate in interpreting proficiency testing (PT) survey materials with the residents and faculty.

c). Demonstrate sensitivity to hematology and hematopathology laboratory testing requirements in deliberations regarding the selection of laboratory methods and equipment, cost analysis/benefits ratios, and timelines of results.

d). Be familiar with issues of hematology laboratory management, including personnel issues, budgeting, instrument evaluation and purchase, workflow, etc.

e) Procurement of appropriate clinical information from source pathologist or clinician

f) Communication of results to referring pathologists or clinicians and procurement of clinical information to integrate the diagnostic thought process during these discussions [i.e., providing EXPERT advice]

g) Preparation and running of Weekly Hematology/Hematopathology Grand Round and Tumor Board, Monthly consultant's conference and Monthly pediatric heme/onc conference that emphasize integration of data from multiple resources

(B) Plan:

How does the fellow through this rotation develop an awareness of the context of pathology in the health care system?

a) Daily interaction with other pathology services (Flow cytometry, Cytogenetics, Molecular Diagnostics, Immunohistochemistry) and other UTSW departments (Hematology/Oncology Services, Pediatrics) in obtaining important clinical or laboratory information to perform the appropriate test or assist in accurate interpretation of a result.

b) Interaction and utilization of the knowledge base of individuals from other services rotating (often concurrently) on the hematopathology rotations.

Services that rotate:

UT Southwestern Adult Hematology/Oncology fellows

UT Southwestern Pathology residents (entire program)

c). Understand principles of laboratory quality control and quality assurance. Be able to evaluate and trouble-shoot problem cases and situations identified by the laboratory staff or others, conferring with the attending pathologist when necessary.

d). Attendance at hematology laboratory management meetings with medical director and lab managers. Review of periodic QC data prior to attending review.

e). Performance of mock CAP inspection of Parkland and University hematology labs, when appropriate.

f). Performance of off-site CAP inspection during fellowship, when possible.

(C) Assessment: How is the fellow's systems-based practice assessed and by whom?
Assessment by faculty and staff.

Graded Responsibility

Recognizing the limits imposed by law on the degree of autonomy permissible for a trainee, hematopathology faculty will strive to provide as much independence and responsibility as possible, commensurate with the abilities and progress of a given fellow. However, **all** cases will ultimately be reviewed by a member of the faculty, as dictated by

law.

At the beginning of the general hematology rotation, the fellow will essentially function as a senior resident on the service. In other words, the fellow will receive bone marrow, problem-box, and interesting-box cases for work-up in rotation along with residents on the service. These work-ups will include the performance of differential counts, the gathering of appropriate clinical and laboratory data, communication with clinical services, and production of a written report.

As the fellow gains expertise, he or she will be permitted to withdraw from the in-house case rotation, and shift into a supervisory role for the rotating residents. This will include review of cases with residents, assurance that appropriate supportive information is being accrued, ordering of appropriate ancillary tests, and acting as primary consultant to clinical services in matters involving the hematology laboratory.

Ultimately, after sufficient confidence and expertise is obtained, the fellow will be given time within the sign-out rotations in which he/she will act as attending pathologist. He/she will review cases with residents, formulate diagnoses, review resident reports, and communicate results to clinicians, all independent of the hematopathology faculty. **However, as stated previously, all cases will be personally reviewed by attending staff prior to final verification.**

Conferences

As part of their hematology rotation the fellow is expected to attend the following departmental and interdisciplinary conferences:

1. Hematology/Oncology/Hematopathology Grand Round. Thursday, 7:30AM. The fellow will share responsibility for presenting at this conference with the hematopathology faculty.
2. Flow Conference (run by the fellow on flow cytometry). Wednesdays, 10:00AM.
3. Pediatric leukemia/lymphoma conference. The fellow has responsibility for presenting at this conference with hematopathology faculty back-up.
4. Hemepath Unknown Conference, as scheduled in the published resident case conference schedule.
5. Multidisciplinary Tumor Board. The fellow is expected to attend and present when hematology-related cases are being discussed.
6. Benign Hematology discussion series; 1st and 3rd Thursdays at noon.

7. Hemepath journal club. 2nd Thursday at noon.
8. Fellow morphology conference, 4th Thursday, noon.
9. Selected management/informatics conferences [within residents' seminar series]
10. Other conferences in which attendance is encouraged when appropriate, but not required: Pathology seminar series; Clinical Pathology (CP) Rounds; Medicine Grand Rounds (Thursday 11AM); Medicine CPC (Friday 12PM); Intake Conference, CMC (daily); CMC Research Conference (Monday 4PM).

Call Responsibility

The fellow on service will rotate with residents in the weekly "Day Call" rotation. This person will be the primary contact person for lab staff regarding problem cases and situations. After hours call will be handled by the resident on call for the department.

The fellow on hematology does not take any in-house overnight or weekend call. The fellow is expected to be the first line (after on-call resident) for after hours or weekend calls regarding hematology laboratory matters. The fellows will alternate this weekend and after-hours "beeper call" among themselves according to a mutually agreeable schedule. Note, however, that a hemepath attending is available at all times to back up the fellow.

Suggested Resources

Books

1. Knowles. Neoplastic Hematopathology, 2nd edition
2. Hoffman, et al. Hematology: Basic Principles and Practice, 3rd edition
3. Williams. Hematology, 6th edition
4. Lee et al. Wintrobe's Clinical Hematology, 10th edition
5. Nathan and Orkin. Hematology of Infancy and Childhood, 5th edition
6. Foucar. Bone Marrow Pathology.
7. Brunning and McKenna. AFIP Bone Marrow Fascicle
8. Warnke, et al. AFIP Lymph Node Fascicle
9. Steinberg, et al. Disorders of Hemoglobin: Genetics, Pathophysiology and Clinical Management.
10. Hoyer, et al. Color Atlas of Hemoglobin Disorders: A Compendium Based on Proficiency Testing.
11. Fairbanks. Hemoglobinopathies and thalassemias. Laboratory Methods and Clinical cases.
12. Jaffe. Surgical Pathology of Lymph Nodes and Related Organs.
13. Jaffe, et al. WHO Monograph: Pathology & Genetics – Tumours of Haematopoietic

and Lymphoid Tissues.

14. Kjeldsberg. Practical Diagnosis of Hematologic Disorders.

15. His, Hematopathology (a volume in the series of Foundations in Diagnostic Pathology)

Journals (available in library and from attending staff)

1. Blood
2. British Journal of Hematology
3. American Journal of Clinical Pathology
4. American Journal of Surgical Pathology
5. Modern Pathology
6. Archives of Pathology and Laboratory Medicine
7. Human pathology
8. Leukemia

Teaching Sets

1. Hematopathology case database
2. Bone marrow lab teaching file
3. CMC hematopathology teaching set
4. Private teaching sets of Dr. McKenna, available for fellow review.
5. ASCP CheckPath Materials

Hematopathology Fellowship **Flow Cytometry Rotation**

Duties

As in the general hematology rotation, the fellow will serve as the “point-person” for the flow cytometry laboratory. This includes, but is not limited to:

- 1) Triage of new cases, with selection of appropriate antibody panels
- 2) Procurement of appropriate clinical information from source pathologist or clinician
- 3) Initial analysis of raw data (“painting”)
- 4) Interpretation of data with ordering of any additional antibodies required for completion of flow work-up
- 5) Morphologic analysis of available material (e.g., smears, cytopspins, touch imprints, frozen sections) with generation of a morphologic description
- 6) Photography of appropriate abnormal cells
- 7) Production of final flow cytometry report
- 8) Communication of results to referring pathologists or clinicians
- 9) Procurement of histologic sections for morphologic review at daily 8 am sign-out
- 10) Preparation and running of Wednesday flow conference
- 11) Supervision and teaching of residents rotating on service
- 12) Observation of various lab benches and QC procedures. Involvement in technical trouble-shooting.
- 13) Attendance at daily 8AM consult sign-out session

Goals

- 1) Understand the principles of operation of flow cytometers. He/she should be aware of possible sources of error and corresponding methods of correction.
- 2) Be able to identify normal and abnormal cellular populations in flow analysis.
- 3) Understand issues of quality control and quality assurance as applied to the flow cytometry lab.

4) Be able to effectively integrate morphologic and phenotypic findings into a coherent and useful report.

5) Effective communication with clinical and pathologist colleagues regarding appropriate test utilization, limitations of techniques, and final interpretation.

1. Patient care.

Procedural skills.

(A) Objective: What procedural skills must be acquired on this rotation?

- a) Triage of new cases, with selection of appropriate antibody panels
- b) Procurement of appropriate clinical information from source pathologist or clinician
- c) Initial analysis of raw data (“painting”)
- d) Interpretation of data with ordering of any additional antibodies required for completion of flow work-up
- e) Morphologic analysis of available material (e.g., smears, cytopins, touch imprints, frozen sections) with generation of a morphologic description
- f) Photography of appropriate abnormal cells
- g) Production of final flow cytometry report
- h) Communication of results to referring pathologists or clinicians
- i) Procurement of histologic sections for morphologic review at daily 8 am sign-out
- j) Preparation and running of Wednesday flow conference
- k) Supervision and teaching of residents rotating on service
- l) Observation of various lab benches and QC procedures. Involvement in technical trouble-shooting.
- m) Attendance at daily 8AM consult sign-out session
- n) Understand the principles of operation of flow cytometers. Be aware of possible sources of error and corresponding methods of correction.
- o) Be able to identify normal and abnormal cellular populations in flow analysis.
- p) Understand issues of quality control and quality assurance as applied to the flow cytometry lab.
- q) Be able to effectively integrate morphologic and phenotypic findings into a coherent and useful report.
- r) Effective communication with clinical and pathologist colleagues regarding appropriate test utilization, limitations of techniques, and final interpretation.

(B) Plan:

a) How are the procedural skills taught and by whom?

Procedural skills are taught by actual performance of specimen triage, antibody selection and data analysis and by observation of technical procedures through the laboratory. These skills are taught by direct participation of faculty and by laboratory technologists.

b) Is a specified minimum number of procedures required, and if so, how is this documented?

There is no SPECIFIED number.

c) What is the level of responsibility and supervision, and how is this documented?
The fellow's responsibility is to participate in all the steps. Observation of laboratory procedures is documented by a Checklist signed off by the technologist who is directly involved in teaching that procedure. Participation in triages and cases is documented by signature on case worksheet as well as name in the case database.

(C) Assessment:

How and by whom are the procedures supervised and the skills assessed, and how is this documented?

Procedures are supervised and skills assessed by direct interaction, observation, verbal and written assessment by the teaching faculty and technologists.

Interpretive skills.

(A) Objective:

- a) Initial analysis of raw data ("painting")
- b) Interpretation of data with ordering of any additional antibodies required for completion of flow work-up
- c) Morphologic analysis of available material (e.g., smears, cytopspins, touch imprints, frozen sections) with generation of a morphologic description
- d) Photography of appropriate abnormal cells
- e) Production of final flow cytometry report
- f) Communication of results to referring pathologists or clinicians
- g) Be able to identify normal and abnormal cellular populations in flow analysis.
- h) Be able to effectively integrate morphologic and phenotypic findings into a coherent and useful report.

(B) Plan:

- a) How are the interpretive skills taught and by whom?

Direct participation in flow cytometric diagnosis and reporting.

- b) What is the level of responsibility and supervision, and how is this documented?

The fellow is responsible for completion of these exercises and is supervised directly by teaching faculty. There is graded responsibility as more independence is attained.

(C) Assessment:

How are the interpretive skills assessed and by whom?

Interpretive skills are assessed by direct daily interaction and interaction at weekly didactic sessions, verbal and written assessment by the teaching faculty.

2. Medical Knowledge.

(A) Objective: What is the medical knowledge base the resident is expected to attain on this rotation?

The fellows are supposed to gain expertise in the flow cytometric detection of normal and abnormal hematolymphoid populations. They are expected to become familiar with flow cytometric features of lymphomas and leukemias and have a nuanced understanding of exceptions and differential diagnoses. Also, integration of these data into the final hematologic diagnosis is stressed.

(B) Plan: How is the knowledge base attained?

1) What is the basic reading requirement for the rotation?

See reading list below.

Journal articles.

2) What teaching conferences and lectures are the residents expected to attend?

There is constant one-on-one teaching on a daily basis. In addition, the following are applicable:

Weekly flow cytometry conference

Monthly consultant's conference

Hematopathology lecture series [entire series repeats once a year]

(C) Assessment: How is the resident's medical knowledge assessed and by whom?

Assessment is performed during direct daily interaction with the teaching faculty.

Objective assessment is performed by the ASCP in-service examination and the ABP boards.

3. Practice-based learning and improvement.

(A) Objectives: What constitutes practice-based learning and improvement (e.g. the application of the medical literature, research and statistical methods, and data management technology for self-evaluation and improvement) on this rotation?

Fellows review a large number of cases and are constantly taught to integrate information with other diagnostic modalities.

Journal clubs are held for presentation of new literature with assigned reading for fellows.

(B) Plan: How does the resident achieve the objectives of practice-based learning and improvement?

1) How is practice-based learning and improvement incorporated into the resident's service work?

Fellows review a large number of cases and are constantly taught to integrate information with other diagnostic modalities.

Attendance at morning signout of consult cases, where integration of data is stressed.

2) What informal exercises, formal conferences (e.g. journal clubs, peer review conferences), and lectures exist on this rotation to facilitate practice-based learning and improvement?

a) Daily Signouts and discussions on multiple cases.

b) Weekly flow cytometry conference (peer review is an implicit function)

c) Monthly morphology conference.

d) Monthly journal club.

(C) Assessment: How are the objectives of practice-based learning and improvement assessed and by whom?

Assessment is through daily interactions with faculty.

4. Interpersonal and communication skills.

(A) Objectives: What interpersonal and communication skills are the resident expected to develop and use on this rotation?

a) Procurement of appropriate clinical information from source pathologist or clinician

b) Production of a well-described final flow cytometry report

- c) Communication of results to referring pathologists or clinicians
- d) Procurement of histologic sections for morphologic review on challenging cases
- e) Preparation and running of Wednesday flow conferences
- f) Supervision and teaching of residents rotating on service
- g) Effectively integrate morphologic and phenotypic findings into a coherent and useful report.
- h) Effective communication with clinical and pathologist colleagues regarding appropriate test utilization, limitations of techniques, and final interpretation.
- i) Appropriate interaction with faculty and staff, clinicians, hospital staff, other UTSW faculty.

(B) Plan: How does the resident learn the skills necessary for effective personal interaction and communication?

1) How are interpersonal and communication skills incorporated into the resident's service work?

Daily duties of communication and interaction with faculty and staff.

2) What informal conferences and formal presentations and reports exist on this rotation to facilitate the development of communication skills?

Presentations at Clinical Pathology Rounds.

Running of weekly flow conference

Presentation of papers and/or abstracts at monthly journal club

Didactic Teaching sessions with faculty.

(C) Assessment: How are the resident's interpersonal and communication skills assessed and by whom?

Communication skills are assessed by daily interactions with faculty and staff, presentations at conferences, journal clubs and didactic teaching sessions.

5) Professionalism.

(A) Objectives: What aspects of professionalism should the resident learn on this rotation?

a) Public speaking skills.

b) Team-building.

c) Adherence to ethical principles.

d) Sensitivity to a diverse patient population and work environment.

e) Commitment to carrying out professional responsibilities.

(B) Plan: How does the resident go about learning professionalism on this rotation?

a) Development and review of conference presentations with faculty.

b) Interactions with clinicians, other pathologists and staff.

(C) Assessment: How is the resident's professionalism assessed and by whom?

Professionalism is assessed by daily interactions within the laboratory, presentations at conferences and didactic teaching sessions.

6. Systems-based practice.

(A) Objectives: What knowledge and skills in laboratory management and the greater context of the health care system should the resident learn on this rotation?

- a) Awareness and responsiveness to the larger context of the health care system and as it pertains to submission of flow specimens and flow cytometric diagnoses.
- b) Ability to call on system resources to provide optimal flow cytometric evaluation.
- c) Procurement of appropriate clinical information from source pathologist or clinician
- d) Communication of results to referring pathologists or clinicians and procurement of clinical information to integrate the diagnostic thought process during these discussions [i.e., providing EXPERT advice]
- e) Preparation and running of Wednesday flow conferences that emphasize integration of data from multiple resources
- f) Effectively integrate morphologic and phenotypic findings into a coherent and useful report.

(B) Plan:

How does the resident through this rotation develop an awareness of the context of pathology in the health care system?

- a) Daily interaction with other pathology services (Cytogenetics, Molecular Diagnostics, Immunohistochemistry) and other UTSW departments (Hematology/Oncology Services, Pediatrics) in obtaining important clinical or laboratory information to perform the appropriate test or assist in accurate interpretation of a result.
- b) Interaction and utilization of the knowledge base of individuals from other services rotating (often concurrently) on the flow cytometry or heme rotations.

Services which rotate:

- UT Southwestern Adult Hematology/Oncology fellows
- UT Southwestern Immunopathology fellows
- UT Southwestern Pediatric Hematology/Oncology fellows
- UT Southwestern Pathology residents (entire program)
- UT Southwestern Allergy/Immunology fellows

(C) Assessment: How is the resident's systems-based practice assessed and by whom? Assessment by faculty and staff.

Graded Responsibility

As in the general hematology rotation, progressive autonomy and responsibility will be granted as the fellow gains expertise. Initially, essentially all aspects of the diagnostic process will require close supervision, including triage, data analysis, and reporting. However, by the end of rotation, the trainee should be able to produce reports independently with only final review of the finished product by the supervising staff.

Conferences

The fellow on the flow service is primarily responsible for preparing and running the weekly flow conference (Wednesdays). When possible, attendance is strongly encouraged at all of the conferences listed under the General hematology (Morphology) rotation.

Call Responsibility

The fellow on flow cytometry is not responsible for after hours or weekend flow cytometry-related calls.

Suggested Resources

Books

1. Jaffe, et al. WHO Monograph: Pathology & Genetics – Tumours of Haematopoietic and Lymphoid Tissues
2. Knowles. Neoplastic Hematopathology
3. Brunning and McKenna. AFIP Bone Marrow Fascicle
4. Keren. Flow Cytometry and Clinical Diagnosis
5. Shapiro. Practical Flow Cytometry
6. Riley. Clinical Applications of Flow Cytometry
7. Warnke, et al. AFIP Lymph Node Fascicle

Journals

1. Cytometry
2. Blood
3. British Journal of Hematology
4. American Journal of Clinical Pathology
5. American Journal of Surgical Pathology

Teaching Sets

1. Flow cytometry case files

Hematopathology Fellowship **Cytogenetics Rotation**

1. Patient care.

Procedural skills.

(A) Objective: What procedural skills must be acquired on this rotation?

- a) Perform all aspects of culture and analysis of one (their own or another's) peripheral blood specimen, including culture initiation, harvest, slide preparation, staining, microscope analysis, and karyotype preparation.
- b) Observe and participate, where appropriate, in specimen processing and evaluation of each specimen type: amniotic fluids, stimulated peripheral bloods, bone marrow aspirates and leukemic bloods, solid tumors and non-neoplastic tissue specimens.
- c) Observe and participate in all aspects of the fluorescence in situ hybridization (FISH) procedure, including probe and slide preparation, hybridization and detection procedures, fluorescence microscopy and computer analysis.

(B) Plan:

a) How are the procedural skills taught and by whom?

Procedural skills are taught by actual performance of various cytogenetic techniques and/or observation. These skills are taught by cytogenetic technologists and faculty in cytogenetics.

b) Is a specified minimum number of procedures required, and if so, how is this documented?

No specified number.

c) What is the level of responsibility and supervision, and how is this documented?

The resident's responsibility is to complete these exercises. This is documented by a Procedural Skills Checklist signed off by a senior technologist who is directly supervising these resident activities.

(C) Assessment:

How and by whom are the procedures supervised and the skills assessed, and how is this documented?

Procedures are supervised and skills assessed by direct interaction, observation, verbal and written assessment by the senior cytogenetics technologists and faculty in cytogenetics.

Interpretive skills.

(A) Objective:

a) What interpretive skills must be acquired on this rotation?

Appreciation of the G-banded karyotype.

b) Familiarity with scoring patient specimens evaluated by fluorescence in situ hybridization (FISH).

(B) Plan:

a) How are the interpretive skills taught and by whom?

Completing one's own karyotype

Cutting and analyzing normal and abnormal karyotypes
Participation in fluorescence microscopy and interpretation with cytogenetics faculty and staff.

b) What is the level of responsibility and supervision, and how is this documented?

The resident is responsible for completion of these exercises and is supervised by senior cytogenetic technologists and faculty in cytogenetics.

(C) Assessment:

How are the interpretive skills assessed and by whom?

Interpretive skills are assessed by direct daily interaction and interaction at weekly didactic teaching sessions, verbal and written assessment by the senior cytogenetic technologists and faculty in cytogenetics.

2. Medical Knowledge.

(A) Objective: What is the medical knowledge base the resident is expected to attain on this rotation?

Residents participate in scheduled teaching conferences during their rotation. Topics covered include constitutional chromosome disorders, myeloid and lymphoid malignancies, solid tumors, and fluorescence in situ hybridization (FISH). Following these conferences with the teaching faculty, the resident is expected to become proficient with the appropriate indications and specimen requirements for cytogenetic evaluation of each disorder discussed. Residents will be able to discuss the conventional and molecular cytogenetic findings in the context of the clinical presentation of patients with the various disorders, relevant physical examination findings, natural history and implications for family members.

(B) Plan: How is the knowledge base attained?

1) What is the basic reading requirement for the rotation?

a) Basic Reading is organized into modules covered over a four week time period (

-Week One: Constitutional Disorders

-Week Two: Myeloid and Lymphoid Disorders

-Week Three: Fluorescence in situ hybridization (FISH)

-Week Four: Solid Tumors

b) Computer Resources:

Residents will become familiar with computer resources that pertain to cytogenetic disorders. They are required to locate Online Mendelian Inheritance in Man on the Internet and use it as a resource for the teaching conferences.

(<http://www.ncbi.nlm.nih.gov/Omim/>) and also, Atlas of Genetics and Cytogenetics in Oncology and Haematology at (<http://www.infobiogen.fr/services/chromcancer/>)

2) What teaching conferences and lectures are the residents expected to attend?

Weekly didactic sessions with cytogenetics faculty

Clinical Pathology Lecture Series

(PHHS HG.102; see Path Post)

Clinical Pathology Rounds

(PHHS HG.102; see Path Post)

Adult Hematology/Oncology Clinical Case Conference

(Thursdays, 7:30 a.m., 8th floor conference room, Sammons Cancer Center)

Pediatric Hematology/Oncology Leukemia Conference

(Second Tuesday of each month, 4:30 p.m. CMC location TBA)

Clinical Genetics Grand Rounds

(First and third Thursdays of each month, 12 noon, F3.112)

(C) Assessment: How is the resident's medical knowledge assessed and by whom
Assessment occurs at weekly didactic teaching sessions with cytogenetics faculty
Objective assessment by written exam at the end of rotation (See Appendices V- VIII.)

3. Practice-based learning and improvement.

(A) Objectives: What constitutes practice-based learning and improvement (e.g. the application of the medical literature, research and statistical methods, and data management technology for self-evaluation and improvement) on this rotation?
Residents review the majority of all actual cases completed during that month.

(B) Plan: How does the resident achieve the objectives of practice-based learning and improvement?

1) How is practice-based learning and improvement incorporated into the resident's service work?

a) Daily review of cases.

b) Morphologic and clinical correlation for cases which pose diagnostic challenges.

c) Attendance at Cytogenetics Section Meetings (See Appendix IX.)

2) What informal exercises, formal conferences (e.g. journal clubs, peer review conferences), and lectures exist on this rotation to facilitate practice-based learning and improvement?

a) Daily Cytogenetics Intake Meetings.

b) Weekly Cytogenetics Section Meetings (See Appendix IX.)

c) Monthly Cytogenetics Laboratory Meetings.

(C) Assessment: How are the objectives of practice-based learning and improvement assessed and by whom?

Assessment is through daily interactions with faculty and staff.

4. Interpersonal and communication skills.

(A) Objectives: What interpersonal and communication skills are the resident expected to develop and use on this rotation?

1) Presentation of appropriate cases at selected case conferences throughout the rotation month. Cases with cytogenetic findings of interest are discussed with the teaching faculty, recent relevant literature is reviewed, and the resident presents the case.

2) Appropriate interaction with cytogenetics faculty and staff, clinicians, hospital staff, other UTSW faculty which demonstrate effective exchange of information.

(B) Plan: How does the resident learn the skills necessary for effective personal interaction and communication?

1) How are interpersonal and communication skills incorporated into the resident's service work?

Daily interaction with faculty and staff.

2) What informal conferences and formal presentations and reports exist on this rotation to facilitate the development of communication skills?

Presentations at Clinical Pathology Rounds.

Presentations at Clinical Genetics Conference.

Weekly Didactic Teaching sessions with faculty.

(C) Assessment: How are the resident's interpersonal and communication skills assessed and by whom?

Communication skills are assessed by daily interactions with faculty and staff, presentations at conferences, and didactic teaching sessions. Assessment is in writing from cytogenetics faculty and staff.

5) Professionalism.

(A) Objectives: What aspects of professionalism should the resident learn on this rotation?

1) Public speaking skills.

2) Team-building.

3) Adherence to ethical principles.

4) Sensitivity to a diverse patient population and work environment.

5) Commitment to carrying out professional responsibilities.

(B) Plan: How does the resident go about learning professionalism on this rotation?

1) Development and review of all conference presentations with cytogenetics faculty.

2) All residents contribute to the common teaching materials while on the service. This may include development of cases for additional teaching exercises, identification of recent literature resources, online resources, or technology developments. This exercise provides for consistent improvement of the educational experience for subsequent residents.

3) Attendance at daily cytogenetics intake rounds and all weekly section meetings.

(C) Assessment: How is the resident's professionalism assessed and by whom?

Professionalism is assessed by daily interactions within the laboratory, presentations at conferences and didactic teaching sessions. Professionalism is assessed in writing by cytogenetics faculty and staff.

6. Systems-based practice.

(A) Objectives: What knowledge and skills in laboratory management and the greater context of the health care system should the resident learn on this rotation?

1) Awareness and responsiveness to the larger context of the health care system and as it pertains to submission of cytogenetic specimens and cytogenetic diagnoses.

2) Ability to call on system resources to provide optimal cytogenetic evaluation.

(B) Plan:

1) How does the resident acquire knowledge and skills in laboratory management?

Attendance at Daily Cytogenetics Intake Meeting, Weekly Section Meetings, and Monthly Laboratory Meetings

2) How does the resident through this rotation develop an awareness of the context

of pathology in the health care system?

a) Daily interaction with other pathology services (Flow Cytometry, Molecular Diagnostics, Immunohistochemistry) and other UTSW departments (OB/GYN, Hematology/Oncology Services, Pediatrics) in obtaining important clinical or laboratory information to perform the appropriate cytogenetic test or assist in accurate interpretation of a cytogenetic result.

b) Interaction and utilization of the knowledge base of individuals from other services rotating (often concurrently) on the cytogenetics rotation.

Services which rotate:

UT Southwestern Adult Hematology/Oncology fellows

UT Southwestern Clinical Genetics Training Program (residents)

UT Southwestern Dermatopathology fellows

UT Southwestern Hematopathology fellows

UT Southwestern Pediatric Hematology/Oncology fellows

UT Southwestern Pathology residents (entire program)

Baylor Medical Center Pathology residents (entire program)

3) How does the resident through this rotation learn to access resources within the system in order to optimize the value of pathology services?

The resident's educational experience is integrated with computer and library resources, hospital information systems, and the cytogenetics database.

(C) Assessment: How is the resident's systems-based practice assessed and by whom?

Written assessment by cytogenetics faculty and staff.

Graded Responsibility

Due to the highly specialized nature of this area and the relative brevity of the rotation, little graded responsibility is possible while on the cytogenetics rotation. However, towards the end of the rotation, the fellow should attempt to analyze cases and arrive at his/her own interpretation prior to discussing the case with the attending on service.

Call Responsibility

The fellow is not required to take call on the cytogenetics rotation.

Suggested Resources

Appendices with basic and focused reading materials for each week of the rotation, written and image examination and a schedule of cytogenetic section meetings will be provided to the fellow at the beginning of the rotation.

Hematopathology Fellowship Molecular Pathology Rotation

Duties

1. Observe each of the various assays performed in the laboratory.
2. Coordinate clinical and laboratory data and discussion of pertinent cases with the attending physician.
3. Performance of at least one PCR-based assay.
4. Read pertinent texts and articles.
5. Present at appropriate conferences during course of month, particularly CP Rounds and hematopathology case conference.
6. Act as liaison between hematopathology and molecular pathology services.

Goals

1. Describe the basic principles of the molecular biology techniques used in a molecular pathology laboratory.
2. List the advantages and disadvantages of various molecular methods.
3. Describe the utility of molecular diagnostics as an aide to diagnosis for specific hematologic disorders.
4. Explain sources of error in the molecular pathology laboratory.
5. Diagram the QC and QA process for the molecular pathology laboratory.

Graded Responsibility

Due to the highly specialized nature of this area and the relative brevity of the rotation, little graded responsibility is possible while on the molecular pathology rotation. However, towards the end of the rotation, the fellow should attempt to analyze cases and arrive at his/her own interpretation prior to discussing the case with the attending on service.

Conferences

Molecular diagnostics general lab meeting (weekly)

Conference requirements are the same as for the general hematology rotation.

Call Responsibility

The fellow is not required to take call on the molecular pathology rotation.

Suggested Resources

Books

1. Leonard, DGB. Diagnostic Molecular Pathology
2. O'Leary, TJ. Advanced Diagnostic Methods in Pathology: Principles, Practice and Protocols.
3. Passage ed: Color Atlas of Genetics
4. Killeen eds Molecular Pathology
5. Tsongalis and Coleman ed Molecular Diagnostics Study Guide

Journals

1. Diagnostic Molecular Pathology.
2. Journal of Molecular Diagnostics
3. Pathology and hematopathology journals (see General Hematology Section)

Electronic Resources

Powerpoint presentations on shared server under P: dpayneshare

Including the following links:

<http://www.universalarray.com/images/Univ-sm.mpg>

<http://medicine.iupui.edu/flockhart/table.htm>

http://www.appliedbiosystems.com/support/Taqman_dme.xls

<http://qpcr.gene-quantification.info/>

<http://www.bio.davidson.edu/Courses/genomics/chip/chip.html>

<http://clinicaloptions.com/>

Hematopathology Fellowship **Coagulation Rotation**

Overview:

All fellows in hematopathology will spend a one-month rotation in Coagulation.

Rotation Goals and Objectives:

The fellow will familiarize himself/herself with each of the SOP's in the Special Coagulation Laboratory of Parkland Hospital. Particular emphasis shall be placed on understanding the principles of each of the various tests performed in the lab.

The fellow will observe the various tests being performed on the laboratory analyzers within the Special Coagulation Laboratory, including at least one platelet aggregometry.

The fellow, in conjunction with the senior pathology resident on the coagulation rotation, will evaluate the coagulation test results and draft interpretations based on the each patient's clinical history.

The fellow will be expected to attend and participate in the following conferences:

Transfusion Medicine/Coagulation Rounds (daily)

Coagulation Sign-out (daily)

Transfusion Medicine/Coagulation Journal Club (2nd and 4th Tues. each month)

Coagulation Conference (weekly)

Patient Care

A. Procedural Skills:

1. Objectives:

a. What procedural skills must be acquired on this rotation?

* Ability to gather essential and accurate information about the patients by discussing with referring clinical resident/fellows, chart review and patient interview.

* Ability to make informed decisions about diagnostic testing and therapeutic intervention based on patient information and preferences, up-to-date scientific evidence and clinical judgment

2. Plan:

a. How are the procedural skills taught and by whom?

* Procedural skills are taught by senior residents, transfusion medicine fellows, attending physicians and apheresis nurses.

b. Is a specified minimum number of procedures required, and if so, how is this documented?

* No specific minimum is set. Patients are divided among residents daily (1-3 per resident) and are followed by that resident for the duration of their treatment. The fellow would function predominantly in an observer role.

c. **What is the level of responsibility and supervision, and how is this documented**

The fellow would observe the senior residents and transfusion medicine fellow. He/she would be supervised by the transfusion medicine fellow and attending physicians.

3. **Assessment:**

a. **How and by whom are the procedures supervised and the skills assessed, and how is this documented? N/A**

B. **Interpretive Skills:**

1. **Objectives:**

a. **What interpretative skills must be acquired on this rotation?**

* Ability to use information technology to support diagnostic decisions and clinician education

* Ability to demonstrate technical skills necessary to perform diagnostic and therapeutic services in an efficient and effective manner based upon the patient care objectives for this rotation

* Ability to provide or suggest health care services aimed at preventing health problems or maintaining health

2. **Plan:**

a. **How are the interpretative skills taught and by whom?**

* Interpretive skills are taught by senior residents, transfusion medicine fellows and attending physicians.

* These are taught during afternoon sign out sessions and morning transfusion medicine/coagulation rounds on patients.

b. **What is the level of responsibility and supervision, and how is this documented?**

* The fellow would work with senior resident to investigate the appropriateness of coagulation test orders. He/she would also assist the senior resident in interpreting the results in a consultation format.

3. **Assessment:**

a. **How are the interpretative skills assessed and by whom?**

* Interpretive skills are assessed by transfusion medicine fellows and attending physicians by observation and critique of the written consultations.

Medical Knowledge

A. **Objectives:**

1. **What is the medical knowledge base the fellow is expected to attain on this rotation?**

The fellow will familiarize himself/herself with each of the SOP's in the Special Coagulation Laboratory of Parkland Hospital. Particular emphasis shall be placed on understanding the principles of each of the various tests performed in the lab.

The fellow will observe the various tests being performed on the laboratory analyzers within the Special Coagulation Laboratory, including at least one platelet aggregometry.

The fellow, in conjunction with the senior pathology resident on the coagulation rotation, will evaluate the coagulation test results and draft interpretations based on the each patient's clinical history.

B. Plan:

1. How is the knowledge base attained?

The fellow will be expected to attend and participate in the following conferences:

Transfusion Medicine/Coagulation Rounds (daily)

Coagulation Sign-out (daily)

Transfusion Medicine/Coagulation Journal Club (2nd and 4th Tues. each month)

Coagulation Conference (weekly)

2. What is the basic reading requirement for the rotation?

The fellow will be required to read all SOPs related to coagulation testing. He/she will also be encouraged do additional reading from a coagulation textbook of his/her choosing to supplement his understanding of principles of the various tests.

3. What teaching conferences and lectures are the fellows expected to attend?

Transfusion Medicine/Coagulation Rounds (daily)

Coagulation Sign-out (daily)

Transfusion Medicine/Coagulation Journal Club (2nd and 4th Tues. each month)

Coagulation Conference (weekly)

C. Assessment:

1. How is the fellow's medical knowledge assessed and by whom?

* The fellow's medical knowledge is assessed via daily interaction with attending physicians, transfusion medicine fellows and laboratory personnel during morning rounds, afternoon sign-out and individual one-on-one interactions.

Practice-based Learning and Improvement

A. Objectives:

1. What constitutes practice-based learning and improvement (e.g. the application of the medical literature, research and statistical methods, and data management technology for self-evaluation and improvement) on this rotation?

* Trainees are expected to:

- * Apply knowledge of study design and appropriate statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness, both in current medical literature and in practice.
- * Demonstrate awareness of the variety of pathology practice settings
- * Demonstrate the ability to effectively utilize library, web-based, and other educational sources
- * Use information technology and other methods to support monitoring of patient laboratory testing and enhancing clinician education in appropriate and cost-effective utilization of testing for patient management

B. Plan:

1. How does the fellow achieve the objectives of practice-based learning and improvement?

- * Fellows are evaluating patients for bleeding and clotting disorders by chart and patient evaluation, interaction with clinicians and advise appropriate component therapy and testing.

2. How is practice-based learning and improvement incorporated into the fellow's service work?

- * Fellows sign out coagulation reports

3. What informal exercises, formal conferences (e.g. journal clubs, peer review conferences), and lectures exist on this rotation to facilitate practice-based learning and improvement?

- * Fellows participate in a biweekly Transfusion Medicine journal club including presentation of a recent peer-reviewed journal article.

C. Assessment:

1. How are the fellows' practice-based learning and improvement assessed and by whom?

- * The fellow's practice-based learning and improvement are assessed by observation of participation, interaction and knowledge-base in daily rounds, conferences and other informal teaching settings.

Interpersonal and Communication Skills

A. Objectives:

1. What interpersonal and communication skills are the fellows expected to develop and use on this rotation?

- * Trainees are expected to:
- * Sustain ethically sound and appropriate professional relationships with colleagues, clinicians, laboratory personnel, administration, patients, and patients' families

- * Provide effective and professional consultative and educational services to clinicians and other health care providers in a timely, organized and coherent manner
- * Display effective listening skills and the ability to carry out both standard operating procedures and verbal instructions

B. Plan:

1. How does the fellow learn the skills necessary for effective personal interaction and communication?

- * Effective skills for personal interaction and communication are acquired through patient interaction, as well as interaction with medical colleagues, including physicians, and laboratory personnel.

2. How are interpersonal and communication skills incorporated into the fellow's service work?

- * Interpersonal and communication skills are incorporated into fellow's service work through interaction with patients, other medical personnel and through presentations at various conferences.

3. What informal conferences and formal presentations and reports exist on this rotation to facilitate the development of communication skills?

- * Daily morning rounds, afternoon-sign-out rounds, twice-monthly transfusion-medicine journal club.

C. Supervision/Assessment:

1. How are the fellow's interpersonal and communication skills assessed and by whom?

- * Interpersonal and communication skills are assessed and communicated to the fellow by attending physicians, transfusion medicine fellows, and laboratory personnel on an ongoing informal manner as well as in an end of rotation written review.

Professionalism

A. Objectives:

1. What aspects of professionalism should the fellow learn on this rotation?

- * Fellows are expected to:
- * Demonstrate sensitivity and responsiveness to diversity of culture, age, gender and ability in patients, colleagues and laboratory personnel
- * Demonstrate commitment to ethical principles pertaining to confidentiality of patient information, informed consent, and business practices
- * Demonstrate respect, compassion and integrity
- * Adhere to guidelines and regulations set forth by regulatory and accrediting agencies
- * Recognize and respond appropriately to deficiencies in peer performance

B. Plan:

1. How does the fellow go about learning professionalism on this rotation?

* Professionalism is learned by both observing other medical colleagues and their interactions with patients and hospital personnel, as well as the resident's own interactions with these groups of people.

C. Supervision/Assessment:

1. How is the fellow's professionalism assessed and by whom?

* The fellow's professionalism is assessed by other residents/fellows, attending physicians, nurses and laboratory personnel on an ongoing basis as well as in a formal end of rotation written review.

System-Based Practice

A. Objectives:

1. What knowledge and skills in laboratory management and the greater context of the health care system should the fellow learn on this rotation?

* Fellows are expected to:

* Demonstrate knowledge of the effect of laboratory management on other health care professionals, organizations, and society

* Understand and effectively utilize the resources, providers, and systems necessary to deliver optimal pathology services

B. Plan:

1. How does the fellow acquire knowledge and skills in laboratory management?

* Management skills in coagulation are acquired via participation in the following:

1. Compliance and cGMP regulations
2. Appropriate test ordering in hemostasis lab
3. Cost analysis of testing

2. How does the fellow through this rotation develop an awareness of the context of pathology in the health care system?

*Fellows learn about calculating cost per test, appropriate test ordering to reduce the cost

C. Supervision/Assessment:

1. How is the fellow's systems-based practice assessed and by whom?

The fellow's system-based practice is assessed by other residents/fellows, attending physicians, and laboratory personnel on an ongoing basis as well as in a formal end of rotation written review.