Cytopathology, University of Minnesota Medical Center, East and West Bank

The cytopathology rotation at University of Minnesota Medical Center is designed to instruct physicians in training in cytopathology in a combined academic and community hospital setting. The rotation encompasses both gynecologic and non-gynecologic cytopathology. The case mix of the two campuses is complementary, as the Riverside campus has a larger proportion of gynecologic specimens and the University campus has a larger proportion of non-gynecologic specimens. On the University campus residents have the opportunity to perform fine needle aspirations under faculty supervision. Physicians in training are instructed in the cytopreparation, microscopic evaluation, relevant ancillary studies, and formulation of a diagnosis of cytological specimens. By providing the residents with increasing responsibilities and duties as their level of training increases, the teaching faculty hope to instill within the resident the skills and tools necessary for developing a life-long method of continued professional development.

Institutional Site Director
Steven Debol, MD, PhD

Coordinating Teaching Faculty Member
East Campus: Jimmie Stewart, III, MD
West Campus: Stephen Larkin, MD

Teaching Faculty Members (East Campus)
Khalid Amin, MD
Tetyana Mettler, MD
Jimmie Stewart, III, MD

Teaching Faculty Members (West Campus)
Monna Grotte, MD
Stephen Larkin, MD

Lead Technical and Support Personnel
Jana Holler, CT (ASCP), Cytology Supervisor
Tessa Ten Haken, CT (ASCP), Cytology Lead

Training Site:
University of Minnesota Medical Center, East and West Campuses

Duration of Rotation:
1 month
Post Graduate Level of Residents Involved
PGY levels 1-5

Supervisory Guidelines for Patient Care and Specimen Handling:

Residents are instructed to perform fine needle aspirations under the direct supervision of a faculty member who will be available on site. The resident will learn the prerequisites to the performance of fine needle aspirations on surgical pathology specimens and good technical skills of preparing smears and performing Diff-Quik stains. Physicians in training discuss specific specimen handling and processing questions with the technologists and teaching staff. These discussion include documentation of patient care and prognostic staging information, the approach to the specimen, and procurement of tissues in special fixatives or frozen, as necessary. With the assistance of the supervising faculty, residents are required to review the microscopic findings all cytopathology cases that require pathologist's review. Residents are also involved in primary screening of gynecologic specimens (Pap smears), under the supervision of the lead cytotechnologists and the cytopathology supervisor. Under the guidance of the teaching faculty, residents are responsible for directly deciding what additional ancillary studies are necessary in order to complete each case. Under direct faculty and technologist supervision, residents perform fine needle aspirations, participate in the cytopreparation of the sample (cell block, smears, cytospins, monolayer preparations), and order additional tests on the FNA samples (cultures for aerobic and anaerobic organisms, cultures for mucobacteria and fungi; immunoperoxidase stains on cell blocks, immunophenotyping on cytospins of by flow cytometry). Residents are also involved in decisions involving adequacy of cytopathology samples, especially the ones obtained by imaging guided fine needle aspirations.

Overview of Daily Duties and Responsibilities:

Based on their level of training, residents are provided with increasing autonomy with close faculty supervision. During the rotation, the resident will have the responsibility for the management of all the cytopathology cases that were accessioned in the laboratory during the day. The residents will be responsible for the pre-screening, screening or re-screening of the slides (depending on their level of training), review of relevant previous histologic material from their patients, performing cytohistologic correlations on both gynecologic and non-gynecologic specimens, microscopic evaluation of their cases and ordering of ancillary studies as necessary. The resident will gather all clinical, laboratory and imaging information relevant for the understanding of their cases. The residents will further be responsible for preparing the original draft of the interpretive cytopathology reports and to present the case with a summary of clinical findings to the faculty member responsible for case sign-out. During the rotation, the resident will be responsible for presenting a didactic lecture on a cytopathology topic to the cytotechnologists and to conduct a journal club with the cytotechnologists.

Daily duties:
1. Screen a small number (5-10) of gynecologic specimens and then review them with a cytotechnologists
2. Answer cytotechnologists' questions concerning medical and management issues
3. Review all current abnormal gynecologic and all non-gynecologic material, correlate with clinical information and previous pathologic samples and formulate a diagnosis
4. Be available during the day to perform fine needle aspirations on short notice
5. Perform the on-site evaluation of fine needle aspirates, formulate a preliminary diagnosis, suggest additional tests and report the preliminary diagnosis to the clinician
6. Answer all the clinician's questions regarding the utility and limits of cytologic tests, the correct sampling method, the correct fixation and preparation of a particular sample, etc.
7. Contact clinicians for pertinent history
8. Discuss diagnoses with clinicians and demonstrate microscopic findings if requested
9. Study: when not involved in the microscopic review of cytologic specimens, residents are encouraged to read the textbooks in an organized fashion (ie by organ system) and use the glass slide study sets to test their newly acquired theoretical knowledge. Review the transparency study sets and the computerized study sets by organ system or topic. Try to clarify any problems in understanding the diagnostic reasoning by reading the appropriate references or reviewing the case with a faculty member
10. Participate in the gynecologic and non-gynecologic proficiency tests (CEIC CYTOQUEST) and review your performance with a staff pathologist
11. Follow-up on subsequent surgical specimens and contribute cases of interest to the study set.
12. Perform FNAs on interesting surgical pathology specimens
13. Prepare and present the weekly cytology conference.

Goals and Objectives

Objective 1: Master the basic technical aspects of cytopathology

1. Be thoroughly familiar with the accessioning, labeling, staining, and archiving of gynecologic and non-gynecologic specimens (and their troubleshooting)
2. Be familiar with and competently perform various methods for procuring cells from different body sites (swabs, scrapings/spatula, brushings, washings taps, FNAs, imprints, crush-preps)
3. Be thoroughly familiar with different fixatives, their use, and indications; including air-drying, ethanol (95% and other), methanol, formalin, glutaraldehyde, proprietary fixatives (Thin-Prep, Citric)
4. Be thoroughly familiar with the techniques of specimen preparation (smears, filters, cytospins, monolayer preparations, cell blocks), specimen staining techniques (Papanicolaou, ultra-fast Papanicolaou, Wright or Diff-Quik, H&E and fast H&E) and slide coverslipping
5. Be familiar with the basic cytopathology automated equipment (stainer, coverslipper, Auocyte, cytospins) and the basic troubleshooting techniques used
6. Be thoroughly familiar with procedures for handling highly infectious specimens, including HIV, hepatitis, etc.

7. Be familiar with new technologic advances in cytopathology such as new preparatory techniques and new screening devices

Objective 2: Master the basic clinical and communication skills required in cytopathology

1. Be able to analyze the patient's clinical and imaging information in the fine-needle aspiration clinic in a short time in order to decide the usefulness and technical problems of FNA in a particular case
2. Be able to analyze the patient's clinical and imaging information in a short time, in the radiology suite in order to be able to quickly judge the adequacy of the sample obtained by the radiologist
3. Be able to communicate effectively to the patient explaining the need for a FNA, the technique used, the possible complications and alternatives, answer the patient's questions and obtain informed consent.
4. Be able to communicate effectively with the radiologist and clinician in order to obtain, and transmit pertinent information during the performance of fine-needle aspirations, the diagnostic evaluation of the case and the communication of the cytopathology diagnosis
5. Be familiar with biologic behavior of common lesions and common management issues and suggest appropriate clinical follow-up
6. Be able to present a case for microscopic review to the clinician, after discussing it with the appropriate pathology staff member
7. Communicate adequately with laboratory personnel to request specific studies in any given case, to solve issues regarding accessioning, cytopreparation or screening of the slides.
8. Be thoroughly familiar with the medico-legal aspects of cytopathology and the handling and procedures used for medico-legal cases

Objective 3: Master the basic technical skills required to perform a FNA

1. Be familiar with the fine needle aspiration sampling techniques, their use and limitations
2. Perform adequate clinical assessment of masses for fine needle aspiration; discuss the specific indication for FNA with the clinician
3. Be able to sample representative tissue through fine needle aspiration, perform and stain smears and perform an on-site evaluation of adequacy and formulate a preliminary diagnosis.
4. Be able to assess the need for additional work-up on the FNA sample

Objective 4: Master the basic concepts of cytopathologic diagnosis

1. Be conversant with the concepts of proplasia (reactive changes), retroplasia (degenerative changes), dysplasia (pre-neoplastic changes) and neoplasia as well as with the concept of atypia, as applied to gynecologic and non-gynecologic cytopathologic specimens.
2. Be conversant with the concepts of adequacy, technical limitations, diagnostic versus non-diagnostic specimen
3. Be familiar with the degrees of diagnostic certainty implied in the cytologic diagnosis (atypical, suspicious, positive)
4. Recognize normal structures in cytological preparations
5. Using microscopic criteria, determine the reactive versus neoplastic nature of a lesion in most cases
6. In most common neoplastic lesions, determine the benign versus malignant nature of a tumor using microscopic criteria
7. In neoplastic lesions, determine the general category (e.g. epithelial, mesenchymal, lymphoid, etc.)
8. Recognize common viral cytopathic effects including herpes, CMV, RSV and polymavirus in cytological specimens
9. Recognize common fungal organisms including Aspergillus, Candida, Mucor, Histoplasma, Blastomyces, Cryptococcus and others in cytological specimens
10. Recognize common parasites such as Pneumocystis, Giardia, toxoplasma and ova that may be encountered in cytological specimens
11. Recognize specific bacterial infections such as Helicobacter pylori, in cytological specimens
12. Recognize the need for additional studies to clarify the diagnosis or prognosis
13. Be thoroughly familiar with histochemical stains for infectious organisms (e.g. Gram, Fite, Ziehl Neelsen, Gomori methenamine silver for fungi or Pneumocystis, PAS), including indications for stains and morphologic appearance of organisms
14. Be thoroughly familiar with special stains; their indications in cytopathology and interpretation, including PAS with and without diastase and mucicarmine.
15. Be thoroughly familiar with immunohistochemical panels for common diagnostic problems (e.g. small blue cell tumors, carcinoma versus mesothelioma, carcinoma versus sarcoma, differential diagnosis of spindle cell tumors, differential diagnosis of melanoma, diagnosis and subtyping of lymphoma, immunostains for infectious organisms)
16. Be familiar with immunostains for prognostic markers (e.g. ER/PR, p53, PCNA, Ki-67) as relevant to cytologic specimens
17. Provide a reasonable differential diagnosis in neoplastic lesions
18. Formulate specific diagnoses of the more commonly encountered conditions, and with increasing level of training of most if not all encountered conditions

Objective 5: Master the basic skills of cytopathologic presentation and teaching

1. Provide adequate morphologic description of cytological slides.
2. Prepare and present cases for clinicopathologic conferences after discussion with the staff pathologist
3. Recognize the unusual features of a case and search the literature to assess the frequency and/or importance of that feature
4. Be able to abstract relevant information from an article and do a focused literature review for discussion during Cytology Journal Club
5. Master the basics of computerized presentation in order to be able to prepare and present a theoretical Cytopathology conference after review of the pertinent literature

Objective 6: Master basic Cytopathology administrative skills

1. Be familiar with the regulations regarding Cytopathology (CLIA)
2. Participate in the QA/QC activities

Resident Opportunities to Function as Consultant to Other Physicians:

During this rotation the residents will have the responsibility, under faculty supervision, of discussing the interpretive consultative reports on cytopathologic cases with the appropriate members of the clinical team. Through their discussions with the clinical team members, the residents will have the opportunity to directly impact the patient's care.

During the rotation the residents will be exposed to laboratory correlation studies. These will include, but not limited to, the following:

1. Correlation of fine needle aspiration studies with subsequent surgical pathology specimens.
2. Correlation of cervical PAP smear findings with cervical biopsies.
3. Correlation of ancillary studies with cytology in the work-up of lymphomas and hematologic disorders.

On-Call Duties:

The resident is expected to be available to laboratory personnel and our clinical colleagues, either in person or by pager, throughout the working day. No on-call duties outside of regular laboratory working hours are assigned to the resident.

Prompt and Reliable Communication with On-duty Faculty:

The teaching faculty members are continuously available during standard operating hours either by phone or pager. At all times, a supervising faculty member is on call for evening and weekend questions. During general working hours, the supervising teaching faculty is available either in person, by scheduled appointment, by phone, and in emergencies by pager. During the on call hours, the teaching faculty is continuously available either by at home phone or pager. No diagnosis is communicated to clinicians before a faculty member has evaluated the case.

Structured Education and Management of the Surgical Pathology Laboratory:

During this rotation, the residents will attend scheduled quality assurance, laboratory safety, and other appropriate staff meetings as they relate to laboratory management. As opportunity provides, residents will be allowed to participate in CAP laboratory inspections of the laboratory, both self-inspection and inspection of other laboratories.
Required Conference/Seminars:

Residents are required to attend all Anatomic Pathology conferences, as most of these are essential for cyto-histologic correlations and for the better understanding of the place of cytopathology within Anatomic Pathology. Additionally, the rotating resident is required to attend specific Cytopathology Conferences, including the Monthly Cytopathology Conference and the Cytopathology QA/QC Conference.

- **Mondays** - Surgical Pathology Fellow Unknown Conference, 7:00-8:00 a.m., weekly, residents evaluate and present their interpretation of unknown cases. This conference provides a weekly forum for trainee discussion of difficult and unusual cases and provides a regular avenue for peer teaching.
- **Tuesdays** - Autopsy and Gross Pathology Conference, 8:00-9:00 a.m., weekly, residents present and discuss gross pathology findings from autopsy and notable surgical cases. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases and provides a regular avenue for trainee peer teaching. This clinical correlation conference provides trainees with the opportunity to present pathologic findings for discussion.
- **Wednesdays** - Surgical Pathology Unknown Conference, 7:00-8:00 a.m., weekly, residents present their interpretation of unknown cases. Conference is held in the Division of Surgical Pathology at University of Minnesota Medical Center, Fairview. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases. Residents are responsible for reviewing the cases prior to the conference. Slides are put out for review one week in advance.
- **Wednesdays** - Laboratory Medicine Grand Rounds, 8:00-9:00 a.m., weekly, residents attend conferences on a variety of basic science and clinical topics. Conference is held on the University of Minnesota Medical School Campus.
- **Wednesdays** - Head and Neck Oncology Conference, 12:30-1:30 p.m., weekly, in which fine needle aspiration biopsy and histology findings are correlated with the clinical and radiology imaging data. This clinical correlation conference provides trainees with the opportunity to correlate and discuss pathologic findings.
- **Thursdays** - City Wide Surgical Pathology Conference, 8:00-9:00 a.m., weekly, pathologists from the Twin Cities bring interesting and difficult cases to share and discuss. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases.
- **Thursdays** - Cytology Conference, 11:30-12:30, weekly, residents review cytology cases mixed with didactic teaching. The rotating resident will be responsible (under staff guidance) for presenting this conference. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases and provides a regular avenue for trainee peer teaching.
- **Thursdays** - Surgery-Radiology-Pathology Conference, 4:00-5:00, weekly, residents present the pathologic findings at this clinicopathologic correlation conference. This conference provides a regular avenue for trainee peer teaching. This clinical correlation conference
provides trainees with the opportunity to present pathologic findings for correlation and discussion.

- **Fridays** - Rosai/Sinard Conference, 7:15-8:00 a.m., weekly, residents present a variety of real cases on a theme related to a recent or up-coming faculty Resident's Conference. This conference provides a regular avenue for trainee peer teaching with feedback given by the Chief Resident's Subcommittee.

- **Fridays** - Resident's Conference, 8:00-9:00 a.m., weekly, residents attend conferences on a variety of scheduled pathology topics given by the faculty.

- **Fridays** - Neuropathology Conference 9:00-10:00 a.m., weekly, neuropathology staff reviews cases with the residents at a multi-headed scope. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases.

**Optional Conferences**

- **Tuesdays** - Clinical Pathology Conference, 7:30-8:30 a.m., weekly, residents and faculty present and discuss interesting clinical pathology cases, recent advancements in clinical pathology, and the interpretation of laboratory values in terms of a clinical setting. The conference is composed of both a 30 minute resident and 30 minute faculty presentation. Residents develop their presentation under the guidance of a faculty member with whom they are currently rotating. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases. This conference provides a regular avenue for trainee peer teaching and the opportunity to present pathologic findings for correlation and discussion.

There a large number of high-quality conferences on campus that involve pathology correlation. Residents are strongly encouraged to attend these conferences whenever possible.