Anatomic (Surgical and Autopsy) Pathology, University of Minnesota Medical Center, West Bank Campus

The anatomic pathology rotation at University of Minnesota Medical Center, West Bank Campus, is designed to instruct physicians-in-training in anatomic pathology in the community practice setting. The rotation encompasses primarily surgical and some autopsy pathology. Physicians-in-training are instructed in the gross and microscopic evaluation of specimens from inpatient surgery, outpatient surgery, physician offices and specimens sent from rural hospitals.

Institutional Site Director
    Mahmoud Khalifa, MD, PhD

Riverside Campus Associate Institutional Site Director
    Stephen Larkin, MD

Coordinating Teaching Faculty Member
    R. David Dexter, MD

Teaching Faculty Members
    David Dexter, MD
    Monna Grotte, MD
    Stephen Larkin, MD
    Priscilla Porter, MD

Lead Technical and Support Personnel
    Wendy Sundelius-Tschampl
    Sally Englund,
    Jennifer Morocho, HTL, Histology Supervisor
    Samy Amirouche, CT(ASCP) Supervisor, Anatomic Pathology Office

Training Site:
    University of Minnesota Medical Center, West Bank

Duration of Rotation:
    3 months (2.5 months surgical and 0.5 months autopsy)

Post Graduate Level of Residents Involved
    PGY levels 2-5

Supervisory Guidelines for Patient Care and Specimen Handling

Physicians-in-training discuss biopsies as necessary and all resection specimens with the supervising faculty member prior to its dissection. This discussion includes a review of the
relevant prognostic and staging information, approaching the specimen's dissection, and as necessary, procurement of tissues in special fixatives or freezing.

With the assistance of the supervising faculty, residents review the microscopic findings of each specimen they gross, except when performing autopsy duties. Under the guidance of the teaching faculty, residents are responsible for deciding if and what additional ancillary studies are necessary for each case.

Due to the lower number of autopsies performed at this institution, autopsies are integrated into the rotation over the course of the three months. When an autopsy occurs, the teaching faculty assume responsibility for the grossing and signing out of surgical cases, while the physician-in-training completes the autopsy. The physician-in-training is responsible for reviewing the patient's clinical history and discussing the case with relevant clinical care teams. The autopsy is then thoroughly discussed with the responsible teaching faculty member and a plan for approaching the post-mortem examination developed. Under the faculty member's supervision, the physicians-in-training completes the external examination and gross dissection. After reviewing these findings with the staff pathologist, the physician-in-training dictates the clinical history, gross anatomic findings, and provisional autopsy diagnoses (PAD). Subsequently, the physician-in-training will review the histologic findings and prepare an outline for the summary and interpretation. The physician-in-training presents the microscopic findings and summary to the responsible faculty member. After discussing the case with the faculty member, the physician-in-training completes the final autopsy report.

Faculty Supervision and Availability

The teaching faculty members are continuously available during standard operating hours either by phone or pager. At all times, a faculty member is on-call for evening and weekend questions.

Overview of Daily Duties and Responsibilities

Based on their level of training, residents are provided increasing autonomy with close faculty supervision. Due to the lower number of autopsies available at this site, the residents alternate gross and microscopic surgical evaluations for the entire three-month period. Each week, the resident will gross two days, review histology two days, and have the fifth day to finish cases, catch up on autopsy work, and study/read current pathology topics.

When autopsy cases are available, the teaching faculty will complete the gross and microscopic evaluations during the period in time in which the resident is performing the autopsy. In this fashion, resident participation in both surgical and autopsy pathology is maximized. Residents are expected to be fully involved in all aspects of the post-mortem examination, including but not limited to review of the medical record, summation of the circumstances of death, external examination of the body, evisceration, dissection of the organs, preparation of the written autopsy report, preparation of the preliminary anatomic diagnosis, review of microscopic findings, review of all ancillary testing, and determination of the cause and manner of death.
The above level of involvement is expected for both individual and shared autopsies. Depending on the case, the resident is expected to cut the brain fresh or after fixation and directly review the neuropathology with the staff and/or neuropathologist. In order to consider an autopsy educationally effective, it needs to be completed within 30 days of the patient’s death. Therefore, trainees can only count those autopsies that are completed within this time frame toward their graduation requirement.

During the rotation, the resident will be responsibility for the processing of a reasonable number of the gross specimens, which come into the laboratory on their designated day. The residents will, on the subsequent day, participate in the histologic evaluation and ordering of ancillary studies as necessary. Residents are expected to review as many of their cases as possible prior to signing them out with a staff pathologist. All cases grossed by a resident will be reviewed together with a staff pathologist at the time of sign-out. The residents will also be responsible for preparing the original draft of the interpretive surgical pathology reports. During the rotation, the resident will be responsible for presenting a didactic lecture on a surgical pathology topic to the University of Minnesota Medical Center, Fairview, Riverside Campus faculty, technologists, and related healthcare professionals.

Goals and Objectives

Problems in accomplishing any specific objective should be discussed with Dr. Dexter.

Surgical Pathology:

- Understand the operation of a surgical pathology service in a community based hospital.
- Develop effective communication skills for interacting with clinical team members.
- Develop an understanding for the role of the surgical pathologist in providing education within a community hospital setting.
- Become familiar with the basis of specimen photography and digital imaging.
- Learn CPT coding.
- Become thoroughly familiar with procedures for handling highly infectious specimens including HIV, hepatitis, etc.
- Develop the skills required for accurate and complete gross descriptions of specimens.
- Recognize normal gross anatomy and normal histology.
- Become thoroughly familiar with sampling of lesions and surgical margins in gross room; including gross identification, labeling (India ink, acetic acid or Bouin fixation), adequacy of sampling, microscopic interpretation of margins.
- Be thoroughly familiar with photographic techniques.
- Be thoroughly familiar with the different fixatives, their use, and indications; including formalin, zenker, AZF, glutaraldehyde, Bouin.
- Provide adequate morphologic description of histologic slides.
- Develop the skills required to know when additional case workup is necessary; (in additional sampling, deeper levels, electron microscopy, histochemical stains, cell surface markers, immunofluorescence, radiologic, clinical, and laboratory correlation).
• Become thoroughly familiar with indications and interpretation of special stains, including trichrome, elastic, myelin, axons, amyloid (congo red, crystal violet), copper binding protein (Shikata's orcein), PAS, mucicarmine; use of digestive enzymes, such as hyaluronidase, diastase.
• Become thoroughly familiar with histochemical stains for infectious organisms (e.g. Gram, Fite, Ziehl Neelsen, Gomori methenamine silver, periodic acid-Schiff), including indications for stains and morphologic appearance of organisms.
• Become 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, immunostains for infectious organisms).
• Become thoroughly familiar with immunostains for prognostic markers (e.g. p53, BerH2, PCNA, etc.).
• Recognize common viral cytopathic effects, including herpes, CMV, RSV and others.
• Recognize common fungal organisms, including Aspergillus, Candida, Mucor, Histoplasma, Blastomyces, and Cryptococcus.
• Recognize common parasites, including Pneumocystis, Giardia, Toxoplasma and others.
• Recognize specific bacterial infections, including Helicobacter pylori, pseudomembranous colitis and others.
• Review cases with clinicians/surgeons after discussion with staff pathologist.
• Demonstrate fundamental knowledge of histotechnology, including tissue dehydration, paraffin embedding, cutting, staining and coverslipping.
• Learn advanced medical terminology and become aware of common errors in grammar and style.
• Learn to organize dictation of surgical pathology reports, to include all relevant diagnostic and prognostic information.
• Become thoroughly familiar with procedures used for medico-legal cases.
• Learn basic structure and function of light microscopy, basic optional theory and proper techniques for using the microscope.
• Know how to use ocular micrometer (e.g. Breslow's thickness in melanomas)
• Become thoroughly familiar with laboratory safety and chemical hazard guidelines.
• Be able to critically analyze information from an article, and put it in context with the literature available.
• Develop competence to handle common cases independently.
• Become capable of signing out the majority of cases with staff guidance.

Autopsy Pathology

• Ability to conduct a complete autopsy examination regardless of age or sex, including removal of the brain and spinal cord.
• Develop an understanding of the rational and techniques of neonatal and still birth autopsies.
• Development of integrative thinking and writing such that preliminary and final autopsy reports reflect an understanding of the relationship between organ pathology structure/function and the patient's symptoms.
• Ability to individualize and innovate the performance of an autopsy and the preparation of tissues and reports derived from an autopsy examination.
• Formally and informally communicate the significant aspects of autopsy cases.

**Resident Opportunities to Function as Consultant to Other Physicians**

During this rotation, the residents have the responsibility, under faculty supervision, of discussing the interpretive consultative reports on surgical and autopsy cases with the members of the clinical team. Through their discussions with the clinical team, the residents 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 histology in the work-up of lymphomas and hematologic disorders.

**On Call Duties**

On call duties during this rotation, the residents will on average have one out of every seven days free of hospital duties. Due to the at-home nature of the call and the limited number of emergencies, the call duties are constructed in the following fashion. The residents will be on at-home pager call every third week. The on-call period will last from 7:00 a.m. Monday morning through the following weekend, ending at 7:00 a.m. on Monday of the subsequent week. During their call, the residents will be supervised by a member of the University of Minnesota Medical Center, Fairview, Riverside Campus teaching faculty, who will be available at all times, either via their office phone, pager, or home phone. On call activities are reviewed with the residents on an on-going basis, as evening and weekend calls are received.

**Prompt and Reliable Communication with On-duty Faculty**

During general working hours, the supervising teaching faculty members are 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.

**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.
Required Conference/Seminars

- **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. Residents are responsible for reviewing the cases prior to the conference. Slides are put out for review one week in advance. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases.
- **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.
- **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.

Optional Conferences:

There a large number of additional high-quality conferences on the University Campus that involve pathology correlation. Residents are encouraged to attend these conferences whenever possible as time permits.

- **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 the 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 correlation and discussion.
- **Tuesdays** - Neuropathology brain cutting, weekly, residents dissect the brains from their autopsy cases. This conference provides a regular avenue for trainee peer teaching and clinical correlation of the pathologic findings with neurology and neurosurgery residents.
- **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 resident, technologist, and faculty teaching. 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.

- **Thursdays** - Surgery-Radiology-Pathology Conference, 4:00-5:00, weekly, residents present the pathologic findings at this clinicopathologic correlation conference. This clinical correlation conference provides trainees with the opportunity to present pathologic findings for correlation and discussion.

- **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.

Additional Pathology Related Conferences on the University Campus

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<tr>
<th>Name</th>
<th>Day Held</th>
<th>Time</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Adult Kidney</td>
<td>Monday</td>
<td>4:00</td>
<td>Monthly</td>
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<tr>
<td>Pediatric Renal</td>
<td>Last Monday of month</td>
<td>11:00</td>
<td>Monthly</td>
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<tr>
<td>Neuro-oncology</td>
<td>Monday</td>
<td>1:00</td>
<td>Weekly</td>
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<tr>
<td>Neuropathology</td>
<td>Tuesday</td>
<td>10:00</td>
<td>Weekly</td>
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<tr>
<td>Gastrointestinal</td>
<td>Tuesday</td>
<td>12:00</td>
<td>Weekly</td>
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<tr>
<td>Colorectal Tumor</td>
<td>Tuesday</td>
<td>3:30</td>
<td>Rare</td>
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<tr>
<td>ENT (head &amp; neck)</td>
<td>Wednesday</td>
<td>12:30</td>
<td>Weekly</td>
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<tr>
<td>Pediatric Brain Tumor</td>
<td>Wednesday</td>
<td>1:30</td>
<td>3rd week of month</td>
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<tr>
<td>Orthopedics</td>
<td>Thursday</td>
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<td>Weekly</td>
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<tr>
<td>Pulmonary/Thoracic</td>
<td>Thursday</td>
<td>12:00</td>
<td>Weekly</td>
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<tr>
<td>Neurology-Path</td>
<td>Thursday</td>
<td>1:00</td>
<td>Weekly</td>
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<tr>
<td>Surgery/Radiology</td>
<td>Thursday</td>
<td>4:00</td>
<td>Weekly</td>
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<tr>
<td>Breast</td>
<td>Friday</td>
<td>7:00</td>
<td>Weekly</td>
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<tr>
<td>Medicine/Pathology</td>
<td>Friday</td>
<td>Noon</td>
<td>Weekly, Sept-June</td>
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<td>Heart Transplant</td>
<td>Friday</td>
<td>2:00</td>
<td>Every other month</td>
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<tr>
<td>Urologic Pathology</td>
<td>1st Wednesday</td>
<td>5:00</td>
<td>Monthly</td>
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Scholarly Activities and Research During the Rotation

Residents are provided with continuous access to on-line literature searching programs. The residents are expected to use the medical literature to find up-to-date information on their cases and to provide clinical colleagues with up-to-date knowledge related to their case.

During case sign-out, the residents and teaching faculty discuss each case, both from a histologic perspective and a scholarly perspective. In discussing the latter, both normal and abnormal physiology and the mechanisms possibly responsible for creating the morphologic findings observed are reviewed. 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.

Basis and Method of Resident Evaluation

The residents are provided with continuous feedback on their performance during their rotation. In general, only deficiencies are noted in writing during the rotation. Residents are evaluated on their demonstrated ability to provide informative consultation to the clinical service teams, their medical knowledge, their application of this knowledge to efficient/quality patient care, their diagnostic, technical and observational skills both in the gross room and at the microscope, and their interpersonal skills, professional attitudes, reliability, and ethics with members of the teaching faculty, peers, laboratory staff, and clinicians. They are also evaluated on their initiative in completing and fostering quality patient care, their use of the medical literature and other resources, as it relates to their assigned cases. Their timely completion of assigned interpretive reports, including autopsy protocols, is another component of the evaluation.

Educational Resources Available

Residents are provided with access to multiple general and specialty surgical pathology textbooks including:

- Knowles, Neoplastic Hematopathology
- Sternberg, et al. Diagnostic Surgical Pathology
- Silverberg, et al. Principles and Practice of Surgical Pathology and Cytopathology
- Rosai, Ackerman's Surgical Pathology
- Scheithauer's Surgical Pathology of CNS
- Kurman, Blaustein's Pathology of the Female Genital Tract
- Enzinger, Soft Tissue Tumors
- Ming & Goldman, Pathology of GI Tract
- AFIP Tumor Fascicles
- Lever, Histopathology of Skin

Journals:
In addition, the personal libraries of the teaching staff are available, as necessary for temporary use by the residents. In addition to the on-site intradepartmental pathology library and private reference book collections of the teaching faculty, residents have access to the University of Minnesota Medical School Library (Diehl Hall) which is on the University Campus via a 5-minute shuttle ride.

**Computer Information Systems for Resident Education and Service Duties**

Residents have continuous access to the laboratory information systems (AOAC), which relate to patient care on the University of Minnesota Medical Center, West Bank Campus. The residents also have access to on-line literature searching.