Neuropathology, University of Minnesota Medical Center

The major purpose of the neuropathology rotation is to impart in the residents a working familiarity with the gross and microscopic anatomy of the nervous system and to acquire elementary dissection and diagnostic skills using both autopsy and surgical material. Although the residents' role in the rotation is not primarily to provide a service function to the Division, residents are expected to take part in gross dissection and directed learning coupled with didactic and Socratic teaching conferences that allow the residents to concentrate primarily on increasing their knowledge of neuropathology rather than service-related concerns.

Consultation visits to the Minneapolis Veterans' Affairs Medical Center, Hennepin County Medical Center, and Hennepin County Medical Examiner's Office are incorporated into the rotation to enhance the mixture of neuropathological cases seen and substantially broaden the practical experience of the residents on the rotation.

Institutional Site Director / Teaching Faculty
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Lead Technical and Support Personnel
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Training Site:
  University of Minnesota Medical Center, East Bank Campus

Duration of Rotation:
  One month

Post Graduate Level of Residents Involved
  PGY level 1-5

Supervisory Guidelines for Patient Care and Specimen Handling:

As specimen handling is not a specified part of the rotation, specimen handling in the Neuropathology Laboratory is the direct responsibility of the laboratory personnel and the teaching faculty. Resident decision making in the laboratory is under the direct supervision of the teaching faculty. The on service teaching faculty members are physically present during standard operating hours; faculty members not physically present are rapidly available by phone or pager. No diagnosis is communicated to the clinicians before a faculty member has evaluated the case.

Overview of Daily Duties and Responsibilities:
The focus of this rotation is not on providing a service function for the Division of Neuropathology. The major goal of the rotation is to have the residents gain familiarity with neuropathological problems and to develop the necessary tools to perform a competent postmortem examination of the central nervous system.

1. Participate with the attending neuropathologist in the two weekly conferences at the University Medical Center on gross and microscopic neuropathology for the residents in pathology, neurology and neurosurgery.
2. Assist the attending neuropathologist at the brain-cutting conference held at the University of Minnesota Medical Center, Hennepin County Medical Center, Hennepin County Medical Examiner's Office, and Minneapolis Veterans' Affairs Medical Center. These activities include gross dissection and description of the autopsy brains, blocking tissues for microscopy, photography of specimens.
3. Attendance at sign-out of neurosurgical specimens with the attending neuropathologist and the residents on the surgical pathology service who are responsible for dictating the cases.
4. Participate with the attending neuropathologist in all frozen sections of neurosurgical material.
5. Review all neurosurgical consultation cases with the attending neuropathologist.
6. Fulfill explicit requests of the attending neuropathologist to review cases of special neuropathological interest from the autopsy, surgical or consult services.

Goals and Objectives:

1. Develop a systematic approach to the pathological analysis of the nervous system, including gross examination and dissection with selection of appropriate sections for microscopic examination.
2. Be able to describe the gross and microscopic anatomy and pathology of the nervous system with appropriate terminology and conclusion.
3. Be able to recognize and diagnose the basic neoplastic processes that affect the nervous system. This includes understanding the clinical settings in which these diseases arise and the prognostic implications of the diagnoses.
4. Become familiar with the interpretation of intraoperative diagnostic techniques, e.g., frozen sections, touch preparations and cytological smear preparations, for lesions of the nervous system.

Opportunities to Function as Consultant to Other Physicians:

Due to the brevity of the rotation, the lack of experience of the rotating residents and the specialized requirements of the Physicians requesting consultations, there is limited opportunity for the residents to function in the capacity of a consultant while on this rotation. The residents are responsible for presenting their autopsy brains to the University of Minnesota Medical Center Neurology Service at a weekly conference. In some circumstances residents will make presentations at conferences involving clinical services.
On-call Duties:

The resident is expected to be available to laboratory personnel, either in person or by pager, throughout the working day. In an urgent situation, the resident should contact either the supervisor or a faculty member. No on-call duties outside of regular laboratory working hours are assigned to the resident.

Communication with On-Duty Faculty:

The residents have office space in the Division of Neuropathology and are expected to spend the majority of time within the Division. Teaching faculty members on service are physically present during standard operating hours (8:00 am - 5:00pm); specific faculty members when not physically present in the laboratory are available by phone or pager. At all times, a supervising faculty member is on call for evening and week-end questions. No diagnosis is communicated to clinicians before a faculty member has evaluated the case.

Structured Education and Management of the Surgical Pathology Laboratory:

Residents may be involved on an ad hoc basis when issues of laboratory management arise. Due to the brevity of the rotation, no formal arrangement for such activities can be guaranteed.

Required Conference/Seminars:

- **Gross Neuropathology Conferences**, weekly, Socratic session with attending neuropathologists to review gross neuropathology using museum specimens. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases.

- **Neuro-Oncology Conference**, weekly, the conference reviews patients seen in the Neuro-Oncology clinic at the University of Minnesota Medical Center. Selected cases have pathology shown. This is primarily a working conference but it can be a good role model for physician-pathologist interaction. Presentation of pathology by the resident may be done on selected cases at the attending neuropathologist's discretion. This clinical conference provides trainees with the opportunity to correlate and discuss pathologic findings. Issues related to systems-related restrictions on therapeutic intervention frequently arise at this conference.

- **UMMC Neuropathology Brain Cutting**, weekly, residents dissect the brains from their University of Minnesota Medical Center autopsy cases. Dissecting autopsy brains and submitting blocks for microscopic sections; followed by a review of the cases with the residents and medical students on the University of Minnesota Medical Center Neurology Service in which the residents on the NP rotation present the cases. This conference provides an avenue for trainee peer teaching. This clinical conference provides trainees with the opportunity to present pathologic findings for correlation and discussion.

- **Neuroimaging Conference**, weekly. Cases from the Neurology and Neurosurgery services at University of Minnesota Medical Center are presented with an emphasis on neuroimaging studies. Pertinent pathological results also are presented when available. This clinically
oriented conference emphasizes the correlations among clinical presentation, neuroimaging and neuropathology.

- **Hennepin County Medical Center Brain Cutting and Neuropathology Conference**: semimonthly. The brain cutting session includes brains from the Hennepin County Medical Examiner’s Office and cases from HCMC. This session is followed by a CPC conference with the faculty, residents and medical students on the Hennepin County Medical Center Neurology Service. Some of the cases presented are cases that are dissected that day at the brain-cutting session but in other instances they may be archival cases chosen by the attending neuropathologist. In cases where the residents on the rotation are unaware of the diagnosis they participate in the clinical discussion. This clinical conference provides trainees with the opportunity to correlate and discuss pathologic findings.

- **Surgical Pathology Unknown Conference**, Wednesday, 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. 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.

- **Laboratory Medicine Grand Rounds**, Wednesday, 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.

- **Veterans' Affairs Medical Center Brain Cutting Conference**: weekly, Residents participate in dissecting autopsy brains and submitting blocks for microscopic sections; followed by a review of the cases with the residents and medical students on the Veterans' Affairs Medical Center Neurology Service. A Socratic microscopic sign-out of the previous week's Veterans' Affairs Medical Center cases follows and is conducted with the attending neuropathologist on the multi-headed microscope. This clinical conference provides trainees with the opportunity to present pathologic findings for correlation and discussion.

- **Rosai/Sinar Conference**, Friday, 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.

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

- **Microscopic Neuropathology Conference**, weekly. Neuropathology staff with the residents at a multi-headed scope in a Socratic session to review microscopic neuropathology. A teaching set of microscopic examples of different neuropathological processes is the basis of the conference. Often these slides are supplemented by interesting recent case material. Unknown slides are put out for previewing prior to several of these conferences. This conference provides a weekly forum for trainee and faculty discussion of difficult and unusual cases.

**Optional Conference/Seminars:**
- **Neurology Grand Rounds**: weekly didactic Grand Rounds for Neurology, Neurosurgery, Neuropathology, and Neuroradiology. This conference introduces trainees to scientific and clinical developments in the clinical neurosciences.
- **Surgical Pathology Fellow Unknown Conference**, Mondays, 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 trainee peer teaching.
- **Autopsy and Gross Pathology Conference**, Tuesdays, 8:00-9:00 a.m., weekly, residents present and discuss gross pathology findings from autopsy and notable surgical cases. This conference provides a regular avenue for trainee peer teaching. This clinical conference provides trainees with the opportunity to correlate and discuss pathologic findings.
- **City Wide Surgical Pathology Conference**, Thursday, 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.
- **Cytology Conference**, Thursday, 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 an avenue for trainee peer teaching.
- **Neurology Clinical Grand Rounds**, weekly. A patient is presented from the University of Minnesota Medical School Department of Neurology. Review of the history, physical examination, laboratory and imaging studies are discussed with emphasis on diagnosis and management. This conference reinforces the importance of neuropathology in the interpretation of clinical and radiological findings.

**Scholarly Activities and Research During Rotation:**

Research within the Division of Neuropathology is an option that our residents may choose for research elective activities. Incorporation of residents into experimental neuropathological work ongoing in the Division or selection of projects in clinically related research, e.g., immunohistochemistry of tumors are possible avenues of pursuit.

**Basis and Method of Resident Evaluation:**

The residents will be expected to perform autopsy brain dissections and descriptions in a competent manner such that appropriate materials are submitted for microscopic examination and an accurate diagnosis can be rendered by the attending neuropathologist. Residents who put forth an honest effort to develop neuropathological skills will be evaluated favorably. Residents who fail to attend the required functions or who fail to progress in the development of neuropathological dissection techniques or in their understanding of neuropathological processes will be evaluated unfavorably.

The residents are provided with continuous feedback on their performance during the rotation. In general, only deficiencies are noted in writing. 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, and their gross and microscopic diagnostic, technical and observational skills. Their understanding of the necessity for special testing (immunohistochemistry, special stains, ISH) for individual cases also will be ascertained. Residents will be evaluated on their interpersonal skills, professional attitudes, reliability, and ethics with members of the teaching faculty, peers, laboratory staff, and clinicians. They are further evaluated on their initiative in fostering quality patient care and use of the medical literature, as it relates to their assigned cases. Their timely completion of assigned interpretive reports is another component of the evaluation. Residents on probation receive a written mid-rotation evaluation.

**Educational Resources Available:**

The residents on the rotation have an office in the Division of Neuropathology that is shared with residents from other services (Neurology and Neurosurgery) who also rotate in Neuropathology. This office is equipped with a multthead-microscope and numerous individual microscopes. The interaction among the residents from different services complements the educational experiences of each group of residents and creates an environment requiring strong interpersonal communication. The office also includes a library with textbooks of neuropathology and neurology. There are microscopic teaching sets, consisting of microscopic slides with a self-directing syllabus. There also is a large collection of gross neurological specimens that can be used both for self-directed study and serve as the basis for the weekly gross neuropathology conference. The neuropathology microscopic slides and reports from the past 40 years also are housed in the Division and the residents have access to them via indexed diagnosis files. Files of gross Ektachrome slides also are available for many cases of neuropathological interest. Included in these files are over 400 detailed CPC cases with clinical protocols.

The Division of Neuropathology is located in Diehl Hall, one floor below the University of Minnesota's Biomedical Library, where the residents have access to computers for literature searches as well as to the entire library collection of journals and books.

Books that are available and recommended for use by the residents include the following: