

## **Neuropathology Rotation for Neurology Residents**

Andrew W. Bollen, M.D.  
Professor of Clinical Neuropathology

The goal of the neuropathology rotation is for neurology residents to gain an understanding of the spectrum of gross and cellular pathologic reactions in the central nervous system and peripheral nervous system. Residents will focus on specific areas, both in their reading and by reviewing a spectrum of representative slides. These areas include cerebrovascular disease, trauma, infectious disease, demyelinating disease, metabolic and toxic disease, developmental malformations and neoplastic disease. There will also be an introduction to neuromuscular disease and to the role of intraoperative frozen section diagnosis in CNS disease.

The neurology resident will attend brain cutting conferences, microscopic reviews of cases, and review of current cases conducted jointly with neurosurgery. Attendance is required at the weekly neuromuscular case review. Neuropathology faculty will meet individually to review cases at the multi-headed scope with the rotating resident.

### **Core Competencies:**

**Patient Care**-Resident is able to provide compassionate, appropriate and effective patient care for the treatment of health problems and promotion of health. Resident understands how to appropriately prioritize patient problems and develop an appropriate diagnostic plan, prescribes medications appropriately, shows an appropriate balance between attention to the details of patient care and the overall context of treating the patient's illness. Resident obtains consultations appropriately, and is able to perform technical procedures adequately, when appropriate.

**Medical Knowledge**-Resident demonstrates knowledge of established and evolving biomedical, clinical, epidemiological, and social/behavioral sciences as well as the application of this knowledge to patient care. Resident is able to assess diagnostic information critically and constructively, and recognizes the psychosocial aspects of illness. Resident is able to critically evaluate the medical literature and apply new knowledge to the delivery of safe and effective patient care.

**Practice-Based Learning and Improvement**- Resident is able to critically evaluate the care of their patients, appraise and assimilate scientific evidence, and continuously improve patient care delivered on the basis of ongoing self-evaluation and learning. The resident uses knowledge to educate patient families, medical students, allied health personnel, peers, and other health professionals as appropriate. Resident is capable of self-identifying strengths, deficiencies, and the limits of their knowledge and expertise. The Resident is receptive to constructive criticism (formative evaluation feedback) regarding the care of patients and physician performance. Resident is able to set learning and improvement goals, and identify and perform activities appropriate to meeting those goals.

**Interpersonal and Communication Skills**-The Resident demonstrates interpersonal and communication skills that result in effective information exchange and collaboration with patients, families and other health professionals.

These skills include the ability to communicate across a broad range of socio-economic and cultural backgrounds and ability to communicate with physicians, health professionals, and health related agencies effectively. Resident is able to maintain comprehensive, timely and readable medical records. Resident can work effectively as a member or leader of a healthcare team and serve appropriately as a consultant to other

physicians and health professionals. Resident is able to clearly lead daily work rounds, when appropriate.

**Professionalism-** Committed to carrying out professional responsibilities and adhering to ethical principles. Resident demonstrates respect for patient privacy and autonomy and is accountable to patient, society and the medical profession for actions. Resident demonstrates compassion, integrity and respect for others as well as responsiveness to patient needs that supersede self-interest. The Resident demonstrates sensitivity and responsiveness to a broad patient population including diversity in gender, age, culture, race, religion, disability, and sexual orientation. Resident demonstrates the ability to manage personal stress effectively. Answer pages or messages in a timely fashion. Resident understands how to maintain appropriate professional boundaries, and demonstrates integrity, honesty and compassion. Resident completes assigned tasks in a timely fashion.

**Systems-Based Practice-**Resident understands and is capable to interact effectively with different systems of care. Demonstrates the ability to provide high-quality care in a cost-effective manner. Resident incorporates consideration of cost-awareness and risk-benefit analysis in patient care decisions. Resident advocates for high quality care for all patients.

**Rotation Goals:** (list 3 – 6 goals)

- Gain an understanding of the spectrum of pathologic cellular reactions in the central nervous system and peripheral nervous system (Competencies Addressed: Medical Knowledge, Practice-Based Learning and Improvement)
- Begin to understand the gross and microscopic pathology of cerebrovascular disease, trauma, infectious disease, demyelinating disease, metabolic and toxic disease, developmental malformations, and neurologic neoplastic disease (Competencies Addressed: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement)
- Begin to understand normal peripheral nerve anatomy, common reactions of peripheral nerve to disease, and the pathologic spectrum of vasculitic neuropathy (Competencies Addressed: Medical Knowledge, Practice-Based Learning and Improvement)
- Understand how a muscle biopsy is performed and be able to describe common morphological changes of muscle in common muscle diseases (Competencies Addressed: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement)

**Rotation Objectives:** (list 3 – 10 training objectives)

- 1) Be able to describe the common types of cellular reaction to injury of CNS neurons and glia (Competencies Addressed: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills)
- 2) Know how to describe the indications, risks, and benefits of muscle and brain biopsy to patients and families (Competencies Addressed: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills, Professionalism, Systems-Based Practice)
- 3) Be able to describe common gross and microscopic pathology findings of cerebrovascular disease, trauma, infectious disease, demyelinating disease, metabolic and toxic disease, developmental malformations, and neurologic

- neoplastic disease (Competencies Addressed: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills)
- 4) Be able to describe the microscopic pathology findings in common axonal and demyelinating neuropathies (Competencies Addressed: Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills)
  - 5) Be able to describe the general microscopic pathology findings in myopathies-including steroid, inflammatory, and mitochondrial myopathies. Know the categories of hereditary myopathy and the typical microscopic pathology findings in dystrophies (Competencies Addressed: Medical Knowledge, Practice-Based Learning and Improvement, Interpersonal and Communication Skills)

**Bibliography/Study List:** The following references are required reading for the neuropathology rotation:

Neuropathology References

Ellison, D et. Al. **Neuropathology: A Reference Text of CNS Pathology.** Mosby, 2003. Use as a reference text.

Engel, AG (Ed.): **Myology\***, 2004. Read the following chapters: "The Muscle Biopsy," and "Basic Reactions of Muscle." Additional reading is encouraged.

Davis, RL and Robertson, DM (3<sup>rd</sup> Ed): **Textbook of Neuropathology**, 1997. Read the following chapters: "Central Nervous System Herniation Phenomenon," "Perinatal Neuropathology," and "Circulatory Disorders and Their Effects on the Brain." Additional reading is encouraged.

Richardson, EP and DeGirolami, U: **Pathology of the Peripheral Nerve\***, 1995. Read the following chapters: "Normal Anatomy," "General Reactions of Peripheral Nerve to Disease," and "Vasculitic Neuropathy."

\*Completion of the chapters on muscle and peripheral nerve disease is expected in the first two weeks of the rotation. This will enable residents to gain maximum benefit from the weekly neuromuscular conference.