

How neuropathologists are trained – the world view

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No financial interests to disclose

Learning objectives

- *At the end of this activity learners should be able to:*
- Describe different pathways for training neuropathologists
- Describe how the medical service delivery environment puts demands on training requirements
- Describe how web-based (distance learning) methods can be used to homogenize and improve training across sites and across borders

How to attract potential trainees in NP

- Teach in medical schools (make lectures current and interesting); offer summer research projects
- Use every opportunity to make students aware of the discipline – most will not (and should not) become neuropathologists, but they should have some understanding of what we do
- For the few who show interest during medical school (e.g. elective time), or during another residency (e.g. from which a switch or subsequent training is being considered), spend personal time to gauge level of interest and potential

- Explain the education path & career options
- Prospective “residents seek information predominantly from the Internet” (Lagwinski 2009)
- Web based resources reach broadly, but not all are of good quality

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How Do I Become a Neuropathologist?

Category: Education

Ads by Google **GED High School Diploma** **Pathology Residency** **Become a Medical Doctor** **Clinical Pathology** **Neurology Doctor**

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Becoming a neuropathologist requires an extended amount of education and training. A person who wants to become a neuropathologist typically starts out by earning a high school diploma and then goes on to complete college and attend medical school. After medical school, an aspiring neuropathologist still has more training ahead of him. He'll usually go on to complete not only an internship, but also a few additional years of training pertinent to his field.

Neuropathologists specialize in conditions that involve the brain and nervous system. They help diagnose conditions such as brain tumors, studying and evaluating tissue and cell samples to look for signs of certain conditions. A person in this field also interprets fluid biopsy samples. When evaluating brain tumor tissue, these doctors seek to discover the cell the cancer developed from and how rapidly the cancer is growing.

While attending high school, a person who wants to become a neuropathologist may do well to take science classes, such as biology, anatomy, and chemistry as well as advanced math, such as algebra and pre-calculus. This may help prepare him for the complex coursework he'll have to complete in both college and medical school. A person who has not earned a high school diploma will not necessarily have a problem pursuing this career, however. Many colleges do accept applicants who have General Educational Development (GED) diplomas instead of high school diplomas. As long as the aspiring neuropathologist does well in college and meets other admissions requirements, he will usually have a good chance of getting into medical school.

Most people spend four years in college, working toward a bachelor's degree and then go on to complete four years of medical school in order to become neuropathologists. After graduating from college, they generally go on to complete residency training at a hospital. This residency training is often referred to as an internship. Upon completion of the internship, a person who wants to become a neuropathologist completes about three years of laboratory training focused on this field.

Once a person has become a neuropathologist, there are many settings in which he may work. He may work in a hospital or laboratory, for example. Some in this field work in clinics, while others go on to work in colleges and research facilities. Though there are different job settings from which a neuropathologist may choose, most people in this field opt to work in hospitals or research facilities. Many choose to teach medical students as well.

Med school graduates must complete a residency training program.

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Neuropathology Job Description
by Maureen Malone, Demand Media

Neuropathologists study degenerative brain conditions.

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Neuropathologists are specialized doctors who study diseases that affect the nervous system. Some of the conditions neuropathologists are concerned with include Alzheimer's disease and Parkinson's disease. Unlike most doctors, neuropathologists spend more time examining and analyzing tissue samples than working directly with patients. Many neuropathology jobs also include teaching and research responsibilities.

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Role

A neuropathologist's primary duties are examining and analyzing specimens obtained from patients. These specimens may be from nerve, muscle or brain tissue or cerebral spinal fluid. In many cases, these samples are obtained during a biopsy or other procedure and sent to the neuropathologist. In some cases, they meet with patients and perform biopsies themselves. They work with other medical staff including neurosurgeons and neurophysiologists to assess and manage patient care and treatment.

Other Duties

Many neuropathologists work in teaching hospitals and universities and teach graduate and medical students as a part of their job description. In addition, they might conduct research on neurological diseases to better understand how the disease progresses and to develop treatments. Research often involves studying tissue from patients with a particular disease.

Requirements

Neuropathologists must be certified by the American Board of Pathologists. After completing a four-year medical degree and obtaining a state license to practice medicine, neuropathologists must undergo additional training. They complete a graduate medical education program in pathology for primary certification in anatomic or clinical pathology approved by the Accreditation Council for Graduate Medical Education. Neuropathologists may also opt for a combination primary certificate in both anatomic and clinical pathology. Then they must get a subspecialty certification in neuropathology which requires two years of neuropathology training. They must complete a one year of anatomic pathology training for the subspecialty certification if they do not have an anatomic pathology or combination primary certification. Neuropathologists must complete continuing education courses throughout their careers to maintain their medical licenses and certifications.

Salary

Although the Association of American Medical Colleges does not break down pathologist salary information by subspecialty, as of 2010, pathologists earned an annual salary between \$239,000 and \$333,842. The Bureau of Labor Statistics reports the median salary for specialty medical practitioners was \$256,885 in 2010.

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A career in neuropathology
Authors: Nicki Cohen
Publication date: 15 Aug 2012

Nicki Cohen outlines what it's like to be a neuropathologist

If you're captivated by the anatomical complexity of the brain; interested in looking at disease processes and tissue reactions rather than shadows on imaging; fascinated by biological study of familial diseases with devastating consequences in patients; and less than satisfied with juggling anti-parkinsonian medication, shunt revisions, or monotonous glass crunching; then a career in neuropathology may be for you.

Neuropathology is the pathological study of disease of the nervous system, in life and in death. The specialty has the equivalent of roughly 50 full time NHS consultants, many with combined NHS and academic roles. Currently, there are nine subspecialty neuropathology trainees in the United Kingdom. Junior doctors often spend time in neurology, neurosurgery, or other "neuro-related" junior posts before discovering neuropathology. Run-through training has been deleterious for this sort of later career choice.

What do we do?

Formal selection of trainees

- Some countries (Canada, UK, et al.) have a mandatory centralized “matching” program
- Others formalize contracts on a local basis (e.g. US – although using the match is discussed periodically)
- No guarantee of filling spots; e.g. US programs had a 52% fill rate in 2006-7 (Lagwinski 2009)

Role of specialist societies in relation to trainees

- Some are focussed on the medical / diagnostic neuropathologist
- Others are more diverse in their goals (e.g. Japan
“The feature of our society is a unique one in which brain researchers, practitioners in neurological medicine (neurologists, brain surgeons, psychiatrists, etc.) are included, and together study various topics in neuropathology”
- Engaging, current websites attract browsers thereby increasing understanding and awareness
- Links to training program sites may be useful

What are trainees looking for?

- “Residents seeking fellowships (training spots) are particularly concerned with selecting programs that provide job connections, an increase in their marketability, and the opportunity to develop diagnostic expertise.”
(Lagwinski, 2009)

Training neuropathologists

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MISCELLANEOUS: Neuropathologist Training

Neuropathology Training Worldwide—Evolution and Comparisons

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Specialty vs. subspecialty

- Specialty – a discipline one can begin training directly after medical school, or a discipline from which distinct subdisciplines arise
- Neuropathology is recognized as a specialty discipline in: Canada (since 1965), Germany (1985), Austria (1994), Ireland (2005), Switzerland (2007) and United Kingdom (2011)
- Subspecialty (usually of Anatomical Pathology) with formal examination, certification, and recognition (USA, Poland, France, Finland, Australia / New Zealand, Mexico)
- Euro-CNS provides an examination for trainees in European nations (with oversight by the European Board of Pathology)
- Some others consider NP a subspecialty but do not have national certification or formal recognition (e.g. Brazil, Japan, Spain)

Specialization in Neuropathology – Pros & Cons

- For
 - Devote oneself to a specific vast body of knowledge to ensure quality (e.g. Austria)
 - Protection against larger groups (e.g. Canada)
 - Prior training in other discipline takes too long (e.g. too few trainees in the UK)
 - Jobs are (almost) exclusively NP (university hospitals, neuroscience institutes)
- Against
 - Job market for pure specialist too small (e.g. choice in Australia, US)
 - Opposition from larger groups / administration prevails
 - Organization of health care makes launching of program difficult

- “Another reason graduates pursue fellowships is that both they and their future employers realize that the current way we train pathologists is falling short of the goal to train competent practitioners in 4 years in a 2-plus-2 combined training program.”
 - Domen 2014, comment on the US system

How much time is needed to train?

- Countries with NP designated as specialty (and EuroCNS): 5-6 years total with 3-4 full time in neuropathology (\pm research), 6-12 months clinical neurosciences, 1 year surgical / autopsy / cytology
- Subspecialty countries: 5-8 years total with 1-3 years full time in neuropathology

“Experiments” in NP as a subspecialty

- Canada - 2003-8, the RCPSC demoted NP to subspecialty status (total training time increased from 5 to 7 years); during this time not a single Canadian medical school graduate enrolled
- UK - 1967 survey by Marion Smith shortage of NP “attributed in part to the protracted training duration”; 2004 selected histopathologists offered “Conversion Fellowship” of abbreviated NP education and training; 2011 NP was granted specialty status.

What is needed for a successful program?

- Administrative oversight at national and local level
- Planned program training and evaluation of competencies beyond “diagnostic skills” (e.g. ACGME, CanMEDS, GMC, et al.)
- Dedicated teachers, sufficient new case load, modern infrastructure (training for tomorrow, not yesterday)

How many mentors is enough?

- One only = apprenticeship; not acceptable by any formalized training organization
- Two; acceptable in some jurisdictions, but not ideal
- Three (or more); probably best considering the variety of approaches offered a trainee, subspecialty expertise / knowledge needed in a modern neuropathology environment, and the administrative demands of a formal training program

Neuropathology Subspecialty Areas

(& overlap with other disciplines)

| Surgical | Mixed | Autopsy |
|---|--|---|
| Tumor (Anatomical / Molecular pathology) | Pediatric (Fetal / pediatric pathology) | Forensic (Forensic pathology) |
| Nerve / muscle (Neurology) | | Neurodegenerative (Neurology) |
| CSF examination (Cytology) | | |
| Ocular (Ophthalmic pathology) | | |

Should every country have its own training program?

- No
- Some are too small (e.g. in Europe where the EuroCNS has provided an alternate form of certification although not direct oversight of training)
- Some are too poor (much more basic medical needs are not being met)
- Some lack the critical mass of properly trained people or the organizational oversight
- Some, for cultural or historical reasons, do not have sufficient autopsies (i.e. the full breadth of neuropathology is not practiced)

Should every state / province have its own NP training program?

- No.
- Resource and case load concentration not sufficient in smaller jurisdictions.
- Likely cannot justify on grounds of workforce needs.

Policymaking

- Neuropathology (diagnostic) is a relatively small discipline within laboratory medicine.

| Specialty / Discipline | # registered in 2014 |
|-----------------------------|----------------------|
| Internal (General) Medicine | 8646 |
| Anesthesia | 3209 |
| Neurology | 1039 |
| Anatomic Pathology | 1007 |
| Neurosurgery | 482 |
| General Pathology | 313 |
| Hematologic Pathology | 107 |
| Neuroradiology | 52 |
| Neuropathology | 49 |

Source: Royal College of Physicians and Surgeons of Canada – Directory; Sept 2014

Notes: Population Canada 35 million
 All are likely underestimates of real # practicing; ~70 in Canada
 In UK, annual Certificate of Completion of Training is similar proportions

Neuropathologists relative to other disciplines

| Specialty / Discipline | # registered in 2014 |
|-----------------------------|----------------------|
| Internal (General) Medicine | 8646 |
| Anesthesia | 3209 |
| Neurology | 1039 |
| Anatomic Pathology | 1007 |
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Source: Royal College of Physicians and Surgeons of Canada – Directory; Sept 2014

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Policymaking ctd.

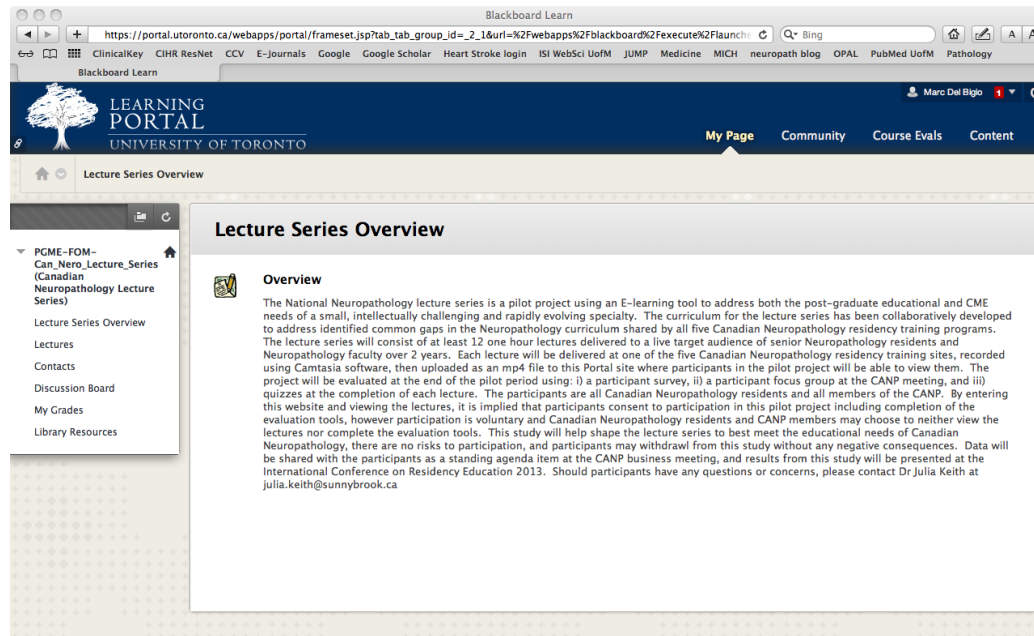
- Potential for interference (or being ignored) by disciplines with more people.
- We need to accept the guidelines dictated by the larger jurisdictions (e.g. ACGME, Royal College, etc.)
- However, a small discipline can be nimble and creative thereby acquiring useful influence

How can small training programs compensate for relative deficiencies?

- Allow trainees to spend time at larger centers or attend formal courses (e.g. EuroCNS)
- Good teaching sets
- Shared lecture series (e.g. online)

National (Canada) Neuropathology lecture series

- Funded by Canadian Association of Neuropathologists (CANP) beginning 2014
- Organized by Dr. Julia Keith, University of Toronto
- Operated through University of Toronto Learning Portal
- All CANP members and neuropathology trainees in Canadian programs have access



- Target ~20 lectures
 - disease topics presented by authorities in discipline
 - Non-medical expert topics
- Self evaluation modules

The screenshot shows the 'Lectures' page of the Learning Portal. It lists several lecture topics with brief descriptions and a 'Mark Reviewed' button for each. The first lecture is 'Introduction to lecture 1' by Dr. Ekaterina Rogueva. The second is 'Lecture #1 - AD Genetics - Genetics of Alzheimer's Disease'. The third is 'Introduction to lecture 2' about ARX's role in brain development. The fourth is 'Lecture #2 - An Expanding Role for ARX in normal & Abnormal brain Development'. The fifth is 'Introduction to lecture 3' about Dystroglycanopathies. The sixth is 'Lecture #3 - Dystroglycan-related Congenital Muscular Dystrophies' by Steven A Moore MD, PhD, featuring a video player showing brain tissue slides.

The screenshot shows the 'My Grades' page, which displays a table of grades for various assessments. The table has columns for 'ITEM', 'FEEDBACK', 'LAST ACTIVITY', and 'GRADE'. The 'Weighted Total' and 'Total' are both marked as '-'. Below the table, there are four quiz entries for different lectures, each with a status of 'UPCOMING' and a grade of '- /30' or '- /20'.

| ITEM | FEEDBACK | LAST ACTIVITY | GRADE |
|----------------|----------|---------------|-------|
| Weighted Total | | | - |
| Total | | | - |

| ITEM | FEEDBACK | LAST ACTIVITY | GRADE |
|---|----------|---------------|-------|
| Quiz for Lecture 1: Genetics of Alzheimer's disease | | UPCOMING | - /30 |
| Quiz for lecture 2: ARX in normal and abnormal brain development | | UPCOMING | - /30 |
| Quiz for lecture 4: a neuropathologic approach to cases of suspected child abuse. | | UPCOMING | - /20 |
| Quiz for lecture 6: diagnostic approaches to CMD and LGMD | | UPCOMING | - /20 |

The screenshot shows a video player interface. The main content is a presentation slide titled 'Quality Management in Neuropathology' by Dr. Mahmoud Khalifa, Joint Chief, Anatomic Pathology, University Health Network and Sunnybrook Health Sciences Centre, Professor, University of Toronto. Below the video player, there is a 'Media Details' section with the following information:

| Media Details | |
|---------------|---------------------------------|
| Title | Lecture 9: QA in Neuropathology |
| Uploaded By | Julia Keith |
| Description | |
| Duration | 00:43:05 seconds |
| File Size | 5688862 bytes |
| Keywords | |

Why become a neuropathologist?

- Because it is interesting work.
 - Keep it interesting. Adopt (or at least test) advances from the research world.
- Will there be a job for me?
 - Markets vary from country to country
- Will there be a job for me where I want?
 - Don't count on it. Typically large city medical centers, limited number of positions.

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