

## Department of Neurology and Neurosurgery & Neuropathology Clinical Research Fellowship ONE YEAR FELLOWSHIP

Type of Fellowship: Neuromuscular Pathology

Name of the Fellowship Supervisors: Dr. Erin O'Ferrall

Fellowship Information:

- Number of fellowship positions requested: 1
- Duration: 1 year
- Hospitals involved in training: Mainly MNH with optional participation at the MGH, RVH/MCH (Glen site)

### **Description of Fellowship**

The Neuromuscular group at McGill University was originally established by the late Dr George Karpati, a world recognized expert in Neuromuscular Disease. Today the Neuromuscular group, also called the Rare Neurological Diseases Group, at the Montreal Neurological Institute (MNI) and Hospital (MNH) is co-directed by Dr. B. Brais and Dr. E. Shoubbridge and continues to be an integrated clinical and basic science environment for research and clinical training in Neuromuscular Diseases. The Neuromuscular clinic and EMG laboratory at the MNH, the Neuropathy and Myasthenia Clinics at the Montreal General Hospital and the Neuromuscular Clinic and EMG laboratory at the Montreal Children's Hospital are provincial referral centers for neuromuscular patients and provide excellent exposure to patients with neuromuscular diseases. The Neuropathology laboratory at the MNH was originally established by Dr. George Karpati (a world-recognized Myologist) and has a long history of excellence in Neuromuscular pathology. The Neuropathology lab at the MNI is the dedicated lab for muscle and nerve tissue processing for the entire McGill University Hospital system and processes approximately 130 muscle biopsies and 15 nerve biopsies per year. The MNI also receives and provides evaluations of histological slides performed at outside hospitals.

The Neuromuscular Pathology Fellowship provides the trainee with exposure to patients with diseases of the nerve and muscle and will be under the supervision of Drs. O'Ferrall and Karamchandani. Dr. O'Ferrall is a neuromuscular neurologist with a focus on muscle disease. She performs the muscle biopsy procedure and provides consultation in EMG and Neuromuscular clinics. Her areas of interest include genetically-determined myopathies and inflammatory muscle diseases. Dr. Karamchandani is a neuropathologist with interest in neuromuscular diseases. He is interested in exploiting informatics combined with new genetic techniques, including RNA sequencing, to improve diagnostic resolution. The Neuromuscular group also consists of other clinicians including: Drs. Brais, Chalk, Gendron, Massie, Oskoui, Poulin, Rouleau and Genge. Dr. Bernard Brais is a Neurogeneticist with expertise in the clinical and genetic aspects of neuromuscular diseases. Dr. Colin Chalk is the director of the Neuropathy and Myasthenia clinics at the Montreal General Hospital. Dr. Rami Massie is a neuromuscular specialist with a special interest in neuropathy and pathological interpretation of nerve biopsies. Dr. Guy Rouleau works on genetic diseases and has special interests in ALS and motor neuropathies. Drs. Oskoui and Poulin are Pediatric Neurologists with expertise in Neuromuscular Disorders. They offer a monthly multidisciplinary Pediatric Neuromuscular Clinic. Dr. Poulin also performs EMG evaluations for pediatric patients. The neuropathology group at the MNI also includes Drs. Steffen Albrecht (pediatric neuropathology) and Marie-Christine Guiot (adult neuropathology). The MNI is in the process of recruiting a fourth neuropathologist at this time.

Academic Facilities

Within the environment of the Neuromuscular Group/Rare Neurological Disease Group at the MNI/MNH, there are excellent opportunities for participating in basic science research on neuromuscular diseases. The Montreal Neurological Hospital, the Montreal General Hospital and McGill University host a number of excellent clinical and basic science researchers who may collaborate with the fellow. The Neuromuscular Group/Rare Neurological Disease Group at the MNI is co-directed by Drs. B Brais and E. Shoubridge and includes the following researchers: H. McBride, H. Tsuda, H. Durham, K. Hastings, G. Rouleau and E O'Ferrall. Please see the following website for a more detailed list of the scientists and their respective areas of interest:  
<https://www.mcgill.ca/neuro/research/groups/rare-neurological-diseases-0>

At the MNI there is also a clinical research unit directed by Dr. Angela Genge. This unit is responsible for the organization and implementation of many clinical trails, including those implicating patients with neuromuscular disease.

### Fellow Duties and Responsibilities

The fellow will design, implement and complete a research project relevant to Neuromuscular Pathology. He/she is expected to submit a manuscript for publication and, if possible, to present his/her findings at a scientific meeting. The fellow is expected to attend Neuromuscular Pathology Rounds, Neuromuscular Academic Half Day and Neuromuscular Journal Club meetings. The fellow is also encouraged to participate in the pre-operative muscle biopsy evaluations and may receive instruction on the muscle biopsy procedure, if desired. Attendance at city-wide Neuromuscular Pathology rounds is also strongly encouraged.

The fellow may also choose to attend Neuromuscular, Neurogenetics, Neuropathy, EMG and Myasthenia Gravis Clinics. There are no on-call or in-patient duties.

### Curriculum

The fellow will spend most of his/her time on the neuromuscular pathology research project. The fellow will be exposed to all muscle and nerve biopsy cases during the fellowship year and may contribute to the preparation of the reports at the discretion of the Neuropathologist. The fellow is expected to attend the Neuromuscular Academic Half Day on Friday mornings. The Neuromuscular half days consist of presentations given by the fellows or consultants on topics relevant to Neuromuscular Diseases. These occur at a frequency of approximately twice per month or more. The fellow will also be expected to organize the weekly Neuromuscular Pathology Rounds. He /She is encouraged to also attend or give presentations at the other academic rounds including the regular neuromuscular journal club and city-wide Neuromuscular Pathology Rounds.

If the fellow chooses to attend clinic, the fellow will evaluate 2-4 patients per half day of clinic. The patient population will vary depending on the clinic. In the Neuromuscular Clinic approximately 50% of the patients have muscle or neuromuscular junction disorders and 50% of the patients have primary nerve disorders. In the Neurogenetics clinic the fellow will learn to use genetic testing and other genetic technologies for the diagnosis, genetic counselling and gene discovery of neuromuscular diseases. In the pre-biopsy assessment clinic one or two patients are evaluated on the same day as their planned biopsies. Attendance at the muscle or nerve biopsy procedure is optional.

### Evaluation

The fellow will be given regular feedback (both in person and in writing) every 3 months. There is no final examination but the fellow may wish to obtain certification in EMG through the Canadian Neurological Sciences Federation.



# McGill

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## **Department of Neurology and Neurosurgery and Pathology Neuromuscular Pathology Fellowship (General and Specific Objectives)**

### **1. Medical Expert/Clinical Decision-Maker**

#### ***General Requirements***

- Demonstrate diagnostic skills for ethical and effective patient care.
- Access and apply relevant information to clinical practice.
- Demonstrate effective consultation services with respect to patient care, education and legal opinions.

#### ***Specific Requirements***

Provide scientifically based, comprehensive and effective diagnosis for patients with diseases affecting the muscle, nerve and neuromuscular junction.

#### **Clinical:**

For a biopsy of a patient with a neuromuscular disorder, the fellow will be able to:

- Outline an appropriate plan of laboratory investigation on muscle or nerve tissue including:
  - Determining which basic histological and enzyme histochemical stains to include
  - Determining when additional investigations, such as immunostaining or electron microscopy would be appropriate
  - Identifying what further testing on muscle tissue may be helpful in solidifying the diagnosis
  - Identifying when to target the muscle tissue for research testing
- Have knowledge of the laboratory techniques of tissue collection, storage and preparation of histological slides
- Interpret the results muscle and/or nerve biopsy
- Interpret the neurological history

- Formulate an appropriate localization, differential and provisional diagnosis of the neuromuscular disorder
- Demonstrate a basic ability to interpret genetic testing and EMG

### **Technical Skills**

- To learn/review detailed, practical anatomy of the muscle, nerve and neuromuscular junction
- Other technical skills related to fellowship
  - Collection, processing and preparation of muscle and nerve tissue for histological evaluation
  - Histological interpretation of muscle biopsies
  - Performance of the muscle and nerve biopsy procedure (optional)
  - Interpretation of genetic tests and EMG

### **Knowledge**

- Acquire and understand the neuroanatomic principles and pathological substrates of diseases affecting the muscle, nerve and neuromuscular junction.
- Become familiar with the neurophysiological principles, the basic mechanisms related to diseases affecting the muscle, nerve and neuromuscular junction.
- Learn the major categories or classifications related to diseases affecting the muscle, nerve and neuromuscular junction.
- Learn the normal and abnormal histological findings for muscle
- Learn the normal and abnormal histological findings for nerve
- Learn the basic principles of electron microscopy including the normal and abnormal findings in nerve and muscle
- Become familiar with possible pathological findings with diseases of the neuromuscular junction
- Acquire an understanding of the genetic diagnosis of neuromuscular disorders.

## **2. Communicator**

### ***General Requirements***

- Communicate effectively with other pathologists and neurologists
- Write clear and concise pathology reports
- If the resident chooses to attend clinics (optional):
  - Establish therapeutic relationships with patients/families
  - Obtain and synthesize relevant history from patients/families/communities.

- Discuss appropriate information with patients/families and the health care team.
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- Listens effectively

### ***Specific Requirements***

Communicate effectively with other pathologists, neurologists and, when applicable, patients, their families and other medical colleagues (particularly referring physicians), and other health care professionals in both the inpatient and outpatient settings. The fellow will:

- Communicate effectively and regularly with Neuropathologists and neurologists.
- Learn to write concise reports of the histological findings with conclusions and recommendations comprehensible to the non-specialist.
- Communicate effectively and appropriately with the laboratory technicians, nurses and paramedical personnel.
- Be considerate and compassionate in communicating with patients and families, willingly provide accurate information appropriate to the clinical situation, with a reasonable attempt at prognosis.
- When ordering investigative procedures, ensure there has been adequate communication about the patient with the person who will actually be doing and/or reporting the diagnostic study.

## **3. Collaborator**

### ***General Requirements***

- Consult effectively with other physicians and health care professionals.
- Contribute effectively to other interdisciplinary team activities.

### ***Specific Requirements***

Be an effective teacher of other physicians (including medical students and house officers), other health care personnel, and patients. The fellow will:

- Provide instruction to clinical neuromuscular fellows, pathology and neurology residents, medical students and other physicians at a level appropriate to their clinical education and professional competence.
- Willingly share knowledge with others with whom they are associated, thus ensuring the most effective delivery of health care to patients.

## **4. Manager**

### ***General Requirements***

- Utilize resources effectively to balance patient care, learning needs, and outside activities.
- Allocate finite health care resources wisely.
- Work effectively and efficiently in a health care organization.
- Utilize information technology to optimize patient care, life-long learning and other activities.

### ***Specific Requirements***

Be proficient in professional skills related to the diagnosis and treatment of neuromuscular diseases.

Demonstrate the following professional skills in time management:

- Recognize that effective use of time depends upon punctuality.
- Recognize that effective use of time requires planning.
- Develop speed as well as accuracy in clinical skills.
- Reserve time for reading and keeping current with the neurological literature.
- Establish routines for carrying out regular activities and adhere to them.

Maintain complete and accurate medical records:

- Record and maintain a complete and accurate medical record for every biopsy specimen (or where applicable patient) seen; this record will include the patient's history, the findings (basic histology as well as immunostaining and electron microscopy where applicable), and a provisional diagnosis and interpretative comments.

## **5. Health Advocate**

### ***General Requirements***

Identify the important determinants of health affecting patients.

Contribute effectively to improved health of patients and communities.

Recognize and respond to those issues where advocacy is appropriate.

### ***Specific Requirements***

Educate, be able to generate and access information and be available as a resource person to counsel other physicians effectively on neuromuscular neurological disorders.

Understand the role of national and international bodies (e.g. AAN, AANEM, Canadian Neurological Sciences Foundation) in the promotion of neurological health, and the prevention, detection, and treatment of peripheral nervous system disorders.

## **6. Scholar**

### ***General Requirements***

Develop, implement and monitor a personal continuing education strategy.

Critically appraise sources of medical information.

Facilitate learning of patients, house staff/students and other health professionals.

Contribute to development of new knowledge of Neuromuscular Diseases by designing and implementing a research project. This should result in a scientific publication and, possibly, a presentation at a National or International meeting.

### ***Specific Requirements***

Be able to critically assess the neurological literature as it relates to patient diagnosis, investigation and treatment:

- Develop criteria for evaluating neurological literature.
- Critically assess the neurological literature using these criteria.
- Be familiar with the design of experimental and observational studies, especially randomized controlled trials.
- Be able to calculate absolute risk reductions, relative risk reductions and numbers needed to treat or harm.

Be able to participate in research project::

- Be able to describe principles of good research.
- Use the above principles, design a research project
- Implement and complete the research project
- Be prepared to present research findings to peers at local, national or international conferences.
- Prepare a manuscript for publication in a research journal

## **7. Professional**

### ***General Requirements***

Deliver highest quality care with integrity, honesty and compassion.

Exhibit appropriate personal and interpersonal professional behaviours with patients/families, peer residents, fellows and other health care professionals.

Practice medicine ethically consistent with obligations of a physician.

### ***Specific Requirements***

Demonstrate personal and professional attitudes consistent with a consulting physician role:

- Periodically review his/her own personal and professional performance against national standards set for the specialty.
- Show appropriate respect for the opinions of fellow consultants and referring physicians in the management of patient problems and be willing to provide means whereby differences of opinion can be discussed and resolved.

Be willing and able to appraise accurately his/her own professional performances and show that he/she recognizes his/her own limitations with regard to skill and knowledge by appropriately consulting other physicians and paramedical personnel when caring for the patient.

Be willing and able to keep his/her practice current through reading and other modes of continuing medical education and develop a habit of maintaining current his/her clinical skill and knowledge base through continuing medical education.