



Columbia University
MOVEMENT DISORDERS FELLOWSHIP PROGRAM

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INTRODUCTION

Movement disorders is devoted to the study and treatment of several neurological disorders, including Parkinson's disease (PD), Huntington's disease, dystonia, tremor, myoclonus, tic disorders, gait disturbances, chorea, tardive dyskinesia and other disorders of the basal ganglia. The field is one of the most active areas of neurology, both in its clinical complexity (e.g., active medical and surgical therapeutic applications) and in basic research, particularly in mechanisms of cell death, pharmacology of the dopamine system, and in genetics. Movement disorders is closely related to many other areas within neurology and psychiatry, and its research tools include molecular biology, epidemiology, electrophysiology, pharmacology, and biochemistry.

MOVEMENT DISORDERS DIVISION AT COLUMBIA-PRESBYTERIAN

The Department of Neurology at Columbia-Presbyterian Medical Center is divided into divisions, of which Movement Disorders is one of the largest. Its history indicates that its origins, other than epilepsy, is one of the oldest. The Movement Disorder Clinic (originally called Parkinson Clinic) was started by Dr. Lewis Doshay in the 1950's, making it perhaps the oldest Parkinson Clinic anywhere. Dr. Doshay introduced many of the anticholinergic drugs for PD. After his retirement, the Clinic head was Dr. Melvin Yahr until he left to become Chairman of Neurology at Mount Sinai Medical Center in 1973. At that time, Dr. Stanley Fahn became the Clinic Director; the name was changed to Movement Disorder Clinic to reflect the growing connection between PD and other disorders of movement. In turn, and with growth, this developed into the Center for Parkinson's Disease and Other Movement Disorders, and the personnel became the Movement Disorders Division in the Department of Neurology.

The Movement Disorder Division pioneered many advances, covering broad areas of clinical and basic science investigations. In experimental therapeutics, the Columbia group conducted the first double-blind studies 1) on levodopa for PD, 2) amantadine for PD, 3) on a dopamine antagonist for chorea, and 4) on high dosage trihexyphenidyl for dystonia. The group has participated in many multicenter clinical trials on PD, and pioneered the use of botulinum toxin for many of the focal dystonias. In PD, we are active participants in the Parkinson Study Group, and have investigated all the drugs currently marketed in the U.S. for this disease. We have pioneered investigations and published on all the drugs currently available for dystonia, and we are active investigators on surgical treatments for PD and dystonia. Clinical genetics has been another major focus, and have discovered the mapping of several genes for idiopathic torsion dystonia, for dopa-responsive dystonia, and for X-linked dystonia-parkinsonism. We also mapped the gene location of a dementia-parkinsonian-amyotrophy syndrome and discovered that several families in the literature all have this same disorder, leading to the renaming of the disorder as frontotemporal dementia on chromosome 17. We also participated in the discovering of the gene defect to the tau protein gene. PET scanning studies are done in collaboration with Dr. David Eidelberg at North Shore University Hospital in Manhasset, Long Island.

The basic science research laboratories of the Center have had a long interest in PD. Current interests are in the causes of cell death in this disorder. We are investigating trophic factors, programmed cell death, oxidative stress, and neurotoxins affecting dopamine neurons. Our research utilizes transgenic mouse models to decipher the mechanisms of cell death. Our group has been recognized as a Morris K. Udall Parkinson's Disease Center of Excellence by the N.I.H.

MOVEMENT DISORDER FELLOWSHIP PROGRAM

The Fellowship Program is a major activity of the Movement Disorders Division, which has a large faculty and extensive clinical and research resources. The fellowship training program at Columbia University was established in the early 1980s by Dr. Stanley Fahn. To date, the program has graduated over 60 trainees, many of whom have made important contributions to the field, and developed successful academic careers.

The fellowship experience is busy and rewarding, with ample opportunity to observe and investigate all aspects of movement disorders. Research directed towards understanding and solving the problems of movement disorders is an important objective of the fellowship experience. Fellows are encouraged to develop, conduct and publish valuable research, with help from the faculty. It is expected that Fellows will attend academic conferences and present their work.

The Fellowship Program consists of two parts: a clinical program in movement disorders and a laboratory program in one of our laboratories in the fields of neuropharmacology, neurochemistry, immunohistochemistry, tissue culture, molecular genetics, or motor control physiology. The Fellowship can be taken in either one, or in a combination of the two. The time commitments in the combination program can be arranged to fit the individual needs of the Fellow. The decision on which program to select depends predominantly on what one expects to do in the future. We anticipate that most Fellows would spend 2 to 3 years in training, but appointments are for a single year, with the decision to renew dependent upon performance during the past year.

THE CLINICAL PROGRAM

This program involves participating in the diagnosis and care of patients with movement disorders in both an out-patient and an in-patient situation. Direct teaching is carried out in out-patient evaluations, in-patient consultations, weekly videotape rounds, hospital rounds, weekly luncheon meetings, and weekly movement disorder conferences. Each clinical Fellow is assigned three half-days a week for out-patient care, with each session interfacing directly with a Movement Disorder attending. In an average week, the Fellow will evaluate approximately three new patients and nine old patients. For in-patient care, the Fellow is responsible for daily management of his/her assigned movement disorder patient under supervision of the faculty staff. The clinical fellows share call schedule, and the fellow on call carries the beeper for the week on call. Out-patient care is provided in our new, modern facility, in which an entire floor in the Neurological Institute is dedicated to Movement Disorders, including office space for Fellows, a large conference/video room, videotape library, and housing offices for faculty staff and supporting staff. The Fellow evaluates the patient first and then discusses the patient with the supervising faculty member. We see a wealth of patients, including referrals of many unusual diagnostic and therapeutic problems from all over the U.S. and also from other countries. To give an indication of the size and diversity of our patient population, we have entries of more than 10,000 patients with various forms of movement disorders in our database (24% Parkinson's disease, 9% other forms of parkinsonism, 30% dystonia of various types, 13% tremor, 5% tics, 3% chorea, 3% tardive dyskinesia, 3% myoclonus, 2% hemifacial spasm, 2% psychogenic movement disorders, and the remainder consisting of paroxysmal dyskinesias, stiff person syndrome, stereotypies, restless legs, and ataxia.

Patients evaluated by Fellows and faculty are entered into a database; the patients are also usually videotaped, and their symptoms and signs are quantified with rating scales.

After a period of adjustment, one or more clinical research projects should be initiated by the Fellow. Current projects include pharmacologic drug trials in parkinsonism, dystonia, tardive dyskinesia, and myoclonus; natural history, and genetic studies, surgery for Parkinson's and other diseases neuroimaging including PET scanning and MR spectroscopy; and epidemiology. The clinical faculty consists of Drs. Stanley Fahn (Director), Robert E. Burke, William Dauer, Blair Ford, Steven Frucht, Paul Greene, Elan Louis, Pietro Mazzoni, Serge Przedborski, Seth Pullman and Cheryl Waters. We work closely with the Behavioral Disorders Group composed of Drs. Richard Mayeux, Lucien Cote, Karen Marder, and Yaakov Stern. As part of our program we have three research nurse coordinators, a genetics counselor, and a social worker. These personnel participate in helping us provide clinical care as well as clinical research.

THE LABORATORY PROGRAM

The Motor Control Physiology lab is on another floor of the Neurological Institute and investigates normal and abnormal motor function with clinically-oriented physiological testing and experimentation. Seven major areas of research are emphasized: movement analysis, brainstem and spinal reflexes, psychophysical reactions, botulinum toxin injections into limbs, intraoperative single unit recordings, mathematical modeling, and artificial intelligence approaches to complex clinical/physiological data. Current projects include sophisticated diagnosis-oriented tremor analysis, back averaging EEG to EMG and polymyography, handwriting and spiral analysis, transcranial magnetic motor evoked responses, reaction time and movement speed analysis in

patients undergoing surgery for Parkinson's disease, botulinum toxin injections in limb disorders including spasticity, intraoperative monitoring during stereotaxic surgery and diagnostic neural network paradigm development. The motor control lab is run by Dr. Seth Pullman.

The biochemistry and genetics labs are located in a building across the street from our clinical floor. For those Fellows who participate in one of the biochemistry and genetics labs, time is spent learning techniques currently being utilized in our labs, such as stereotaxic brain injections of toxins, monitoring animal behavior, receptor binding assays, receptor autoradiography, assays of neurotransmitter agents and metabolites in tissues and body fluids using high-performance liquid chromatography, tissue culture, immunohistochemistry, enzymatic assays, and molecular biology of DNA mapping. The Fellow participates in on-going research projects. Our thrust has been to conduct laboratory research on clinical problems that we encounter in our patients. Current projects include studies on dopamine, acetylcholine and other neurotransmitters and their receptors, evaluation of potential therapeutic agents, production of animal models of movement disorders, transgenic animal models, and molecular genetics. These labs are run by Drs. Robert Burke, Serge Przedborski, David Sulzer, Leonidas Stefanis, and William Dauer. We have close collaborations with other neuroscientists at Columbia.

Additional formal training that can be integrated into the Fellowship includes the program in epidemiology and biostatistics at the Sergievsky Center under the leadership of Dr. Richard Mayeux, neuropsychology with Dr. Yaakov Stern, motor control physiology with Dr. Claude Ghez, and in PET scanning with Dr. David Eidelberg.

Goals of the Clinical Fellowship

1. Expertise in the diagnosis and treatment of movement disorders.
2. Development of competence in the therapeutic use of botulinum toxin injections for dystonia, hemifacial spasm, and related disorders.
3. Development of skills in research design, data analysis, basic epidemiological principles.
4. Gain experience in the coordination and execution of clinical trials.
5. Development of a core of clinical and basic science knowledge relevant to the field of movement disorders.
6. Familiarity with rating scales.

Goals of the laboratory fellowship

1. Expertise in research design and laboratory techniques, including but not limited to molecular techniques, immunohistochemistry, biochemistry, pharmacology, and genetics.

Evaluations

To date, no additional fellowship certification exists for movement disorders. However, the fellowship program is designed to provide a very broad exposure to all aspects of the field. Periodic evaluations of Fellows will be a part of the Fellowship program.

Description of the database, the video library, and the computer network

The Movement Disorder Division has compiled detailed information on several thousand patients in a computerized database that is often the starting point of a research project. The database is complemented by one of the largest medical videotape collections in the world, housing thousands of hours of footage of patients with movement disorders. The videotape library is a precious source of clinical material that is valuable both for teaching purposes and in research projects. The Movement Disorder Division communicates readily with each member by a local area computer network, facilitating exchange of ideas.

Curent projects and ongoing trials

Clinical trials are an important activity of the movement disorders division. The division has coordinated many recent trials that shaped the treatment of Parkinson's disease and dystonia, including the DATATOP study [NEJM 1989;321:1364-1371; NEJM 1993;328:176-183], pergolide [Mov Disord 1994;9:40-47], trihexyphenidyl in dystonia [Neurology 1986;36:160-164], botulinum toxin A injections for torticollis [Neurology 1990;40:1213-1218], botulinum toxin F [Mov Disord 1993;8:479-483], lazabemide in PD [Ann Neurol 1993;33:350-356, Ann Neurol 1996;40:99-107], entacapone in PD [Ann Neurol 1997;42:747-755], pramipexole in PD [JAMA 1997;278:125-130], remacemide for PD [Neurology 2000;54:1583-1588], fetal tissue transplantation for PD [NEJM 2001;344:710-719].

Ongoing trials in PD include fetal tissue transplantation, deep brain stimulation, levodopa ethyl-ester, a new dopamine agonist with skin patch application, neuroimmunophyllin, a new monoamine oxidase inhibitor, and levodopa's effect on the natural history of PD. Clinical trials require considerable effort in planning and execution. In addition to other projects, clinical fellows should anticipate participation in one or more of the ongoing trials, under the supervision of the faculty investigator.

Other activities

1. We run a basic science journal club.
2. We have a weekly breakfast video conference, in which we review our patients as a group.
3. We hold a weekly movement disorder conference, discussing in-patient and out-patient cases with the residents and faculty members.
4. We have CPC's approximately once a month.
5. There are many other conferences run by the Department of Neurology, including Grand Rounds, special lectures, and conferences run by other divisions in the department. Fellows may attend any of these.
6. Additional academic resources include the Columbia University libraries, Internet, and Medline.

Location

Columbia-Presbyterian Medical Center, of which the Neurological Institute of New York is a part, is located in Northern Manhattan, just south of the George Washington Bridge, and about 50 blocks north of the main campus of Columbia University. It is a convenient location for faculty and

fellows to live in the suburbs of New Jersey and Westchester County, or to live in the heart of Manhattan. In addition to a superb view of the Hudson River and the Palisades cliff overlooking the river, this location affords the opportunity to experience the many attractions of New York. Brilliant dining, theater, museums, and parks are but a few of the offerings of this great cosmopolitan city. For those living in the suburbs transportation by car is convenient; for those living in Manhattan or other boroughs of New York, the subway is the quickest way to travel.

Application Processing

In addition to your letter of application, it is necessary to send:

1. your curriculum vitae and bibliography,
2. three letters of recommendation from your neurology or other training programs. One of these letters must be from your Chief of Service, and
3. a letter describing yourself as a person, stating what your ultimate goals are, what duration of Fellowship training you anticipate, and what research projects you have been thinking about.

Please mail or fax your application to:

Mail:

Stanley Fahn, MD
Neurological Institute of New York
710 W 168th ST
New York, NY 10032
USA

Fax:

Stanley Fahn, MD
Fax: 1-212-305-3530

If there are openings in our fellowship program, we will schedule interviews for the applicants following receipt of the appropriate documentation. Interviews are usually held on Tuesdays so that the applicant can experience a sampling of the activities of the movement disorders division, including video rounds, botulinum toxin clinic, the noon research conference, and movement disorder rounds. Applicants are welcome to bring a videotape of an interesting or complex patient to the videotape review. During the day, the applicant will have the opportunity to meet most of the faculty of the division individually.

If you have any questions regarding the program, please contact Dr. Fahn's Academic Assistant, Margaret Gallagher, at 212-305-5295 or email mgallagher@neuro.columbia.edu.