

POSTDOCTORAL FELLOWSHIP PROGRAM IN CLINICAL CHEMISTRY AND LABORATORY MEDICINE

(Diagnostic Pharmacogenetics and Proteomics)
University of Louisville School of Medicine
Department of Pathology and Laboratory Medicine

GENERAL INFORMATION

This recently-expanded, ComACC-accredited Postdoctoral Fellowship Program in Clinical Chemistry and Laboratory Medicine prepares exceptional individuals with advanced degrees (Ph.D. or M.D.) for careers in Laboratory Medicine. Our program emphasizes the application of advanced analytical techniques involving proteomics and genomics in clinical chemistry and related clinical laboratory disciplines. The Fellowship Program requires a minimum of two years for completion; however, further training in a third year—particularly in advanced research—is encouraged. Candidates are trained not only as specialists in disciplines like clinical Chemistry/Toxicology, Clinical Pharmacogenomics, Diagnostic Proteomics and other new and evolving specialties, but also as basic and clinical laboratory scientists. The major goal of this training is to prepare a candidate with sufficient practical and theoretical experience for a career in academic medicine, clinical practice, or industry. Additionally, our goal is to prepare candidates for board certification by national boards such as the American Board of Clinical Chemistry (ABCC), Molecular Diagnostics, or other such boards. Emphasis is placed on obtaining basic and applied research experience which then provides the

foundation needed for future career development with a focus on both basic and translational clinical research.

Laboratory tests and procedures, as well as new discoveries, are necessary to aid in optimal management, therapy, and diagnosis of disease. Clinical laboratories perform many of these crucial tests, most of which evolve as a result of better understanding of the disease process at the molecular level. Technology applied to diagnostic testing is evolving at such a rapid pace that very few clinical practitioners can keep up with advances in laboratory utilization. The clinical laboratory scientist/pathologist is an integral part of the health-care delivery system by helping the clinician in choosing tests, developing procedures for the laboratory, providing proper collection/distribution of specimens, overseeing laboratory performance; and using information, biotechnology and evidence-based medicine in the interpretation of results. Advanced analytical techniques in genomics and proteomics including automation, nanotechnology, and bioinformatics, establish the basis for translational research in medicine.

PROGRAM ORGANIZATION

The Clinical Chemistry and Laboratory Medicine Training Program in Proteo-Genomics is organized in the laboratories of several hospitals affiliated with the University of Louisville School of Medicine and in the research laboratories of participating faculty members. The two principal hospitals are University of Louisville Hospital (ULH) and the Veterans Administration Medical Center (VAMC). Other affiliated hospitals and institutions in the Health Sciences Center include the James Graham Brown Cancer Center, and the Jewish Hospital and Norton Hospital Healthcare Systems. As an example, the faculty in Clinical Chemistry consists of seven faculty

all of whom are either board-certified by the ABCC and/or are Fellows of the NACB. Faculty in other sub-specialties such as Clinical Microbiology, Hematopathology, Transfusion Medicine, Molecular Diagnostics, and other sub-specialties, are also board-certified in their respective disciplines and available for training in those areas as needed. A major goal of our Fellowship Program is the integration of various specialties within genomics and proteomics in order to provide a better fundamental understanding of laboratory medicine as a clinical and research discipline.

Clinical Chemistry Fellows conduct research projects in the laboratory of a faculty member as well as participate with other faculty in one or more clinically-oriented research projects. The principal research interest of the Department's faculty includes:

- biological markers in heart disease
- discovery of new hormones
- developing techniques in clinical pharmacogenetics and proteomics
- diagnostic applications of immunocytochemistry and nucleic acid-based molecular pathology techniques
- antibodies in inflammatory tissue damage
- role of lipoproteins in coronary artery disease
- novel approaches to diagnose infectious diseases
- clinical application of flow-cytometric techniques
- role of tumor markers in cancer diagnosis and treatment

- role of hormone receptors and oncogenes in oncology
- mineral metabolism in pathophysiology.

In addition, many projects ranging from evaluation of new laboratory products to development of new medical tests are actively pursued.

A very important aspect of the Postdoctoral Fellowship Program in Clinical Chemistry and Laboratory Medicine is its close association with the Residency Program in Pathology. For example, training in clinical chemistry for the residents in pathology parallels and is integrated with that of the clinical chemistry postdoctoral fellows. This integration allows for maximum cross-fertilization of individuals with varied initial backgrounds and supplies the critical-mass necessary for a successful training program including establishing viable translational-research projects.

TRAINING PROGRAM

The Postdoctoral Training Program in Clinical Chemistry and Laboratory Medicine at the University of Louisville provides specialization in newly-evolving areas of laboratory medicine such as pharmacogenetics and diagnostic proteomics, including molecular diagnostics, and consists of the following structure: basic and advanced elective rotations, conferences, research, consultations, administration, and teaching.

Basic Rotation: A 12- to-16-week rotation with 12-weeks at ULH and one-to-two weeks at other selected program-affiliated hospitals. Fundamentals in all areas of clinical chemistry testing are taught—including analytical methods, proper collection and handling of specimens, and basics of diagnostic test selection and interpretation.

Advanced Elective Rotations: These more advanced rotations are designed to allow trainees to focus on selected sub-specialties involving proteomic and genomic applications in laboratory medicine and, in general, consist of four-to-six months each. Elective rotations are available in receptor techniques, molecular biology techniques, advanced toxicology, computer applications, and laboratory administration. A short rotation is also available in internal medicine. These rotations augment the knowledge gained through the other learning activities. During the advanced rotations, the trainee, where applicable, engages in a clinical research project and may function as Acting Director of a section of the clinical laboratory with the accompanying responsibilities.

Conferences: A series of conferences are designed to integrate knowledge in laboratory medicine and medical pathophysiology:

- Weekly clinical chemistry seminars and journal clubs (discussion series). These cover the physiology, pathophysiology, analytical and biochemical aspects of testing using an organ-system approach. These sessions are provided by faculty members, advanced fellows, or invited faculty from other departments as appropriate. The current literature is also discussed.
- Semi-Monthly case presentations (rounds). These alternate and complement the seminars above, centering around a case discussion of laboratory data pertinent to the care of the patient. Rounds are presented by the Clinical Chemistry Fellows and Residents in Laboratory Medicine.
- Semi-Monthly Pathology Research Conferences presented by Faculty, Invited-

Lecturers, and advanced Residents and Fellows.

- Weekly, hour-long, Beeper Report (on-call) sessions (presented by individual on-call) and also clinical chemistry method development sessions are held to discuss real-time problem-solving issues in both medical and analytical categories thus integrating the practice of laboratory medicine.
- Various other conferences held in the Medical School (medicine grand rounds, journal clubs, etc.) are available to the trainee.

Research: Research is an integral part of the program. Trainees are expected to actively participate in both basic research projects as well as in developmental and clinical types of research.

On-Call Duties and Consultations: Clinical consultation is another important part of the training program. The Clinical Chemistry Laboratory offers an active consult service to aid in selecting tests, interpreting test results, determining whether unusual values are correct, resolving administrative matters or technical problems, etc. Clinical Chemistry Fellows and Pathology Residents are on-call (beeper) on a rotating basis to cover these responsibilities. This on-call program is intended to provide clinical service to the hospital physicians, staff, and medical technologists, teaching as well as learning opportunity for the fellows, and chances for interaction between fellows and clinical residents and staff. Participation in medical rounds, presentation at the beeper reports, and possible publication and follow-up of a selected number of calls are some of the benefits of the on-call system. These individuals also represent the clinical laboratories during the Department of Medicine morning reports.

Administration: Administrative training is an important part of the Clinical Chemistry Fellowship Program. During advanced rotations, the Fellows are assigned as Acting Directors of specific areas in the clinical laboratory. They work closely with the supervisors in coordinating all aspects of those sections, including reporting of laboratory results, QC administration, proficiency testing, and budgeting matters related to cost analysis and personnel scheduling.

Teaching: The trainee is involved in presentation of conferences during rounds, teaching of pathology residents during rotations in clinical chemistry and teaching of technologists during in-service sessions.

TRAINEE SELECTION AND APPLICATION PROCEDURE

Applicants for appointments in our Postdoctoral Fellowship Program in Clinical Chemistry and Laboratory Medicine must have previously earned a doctoral degree (Ph.D. or M.D.) at an accredited institution of higher learning. Preferred doctoral degrees are those in Biochemistry, Medicine, Molecular Biology, Pharmacology, or another appropriate biological science. Sufficient courses in analytical, inorganic and organic chemistry, as well as in physical biochemistry and molecular biology, should have been completed to allow certification eligibility by the American Board of Clinical Chemistry or other related board exams depending on the emphasis of training. Candidate must demonstrate excellent communication and personal-interaction skills.

Formal applications are taken yearly and require a letter of intent, curriculum vitae, undergraduate and graduate transcripts, and three letters of recommendation. The package is reviewed by a

selection committee composed of the Faculty. Those selected for interviews are invited for a formal visit and are asked to provide a seminar.

STIPENDS

The annual stipends are based upon the postgraduate medical residency scale ranging from PG-1 to PG-4, depending on the previous applicable experience.

Address correspondence and application materials to:

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