

# Clinical Biochemistry Fellowship Program

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## Program Description - Curriculum

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This is a full-time, 2 year Clinical Biochemistry Fellowship program consisting of Clinical and Analytical Biochemistry training objectives delivered through a combination of didactic, mentor-led, and self-directed learning, meeting curriculum requirements for both the Canadian Academy of Clinical Biochemistry and the American Board of Clinical Chemistry specialty certification in Clinical Biochemistry.

### Prospectus

Graduates of this fellowship program will have acquired the knowledge, skills, and professional competence to assume immediate responsibility for the clinical biochemistry laboratory in a medium sized hospital or to direct a laboratory subject to provincial accreditation requirements. The trainees will have specialized training in Clinical Biochemistry with basic training in hematology and microbiology. They will be consultants to clinicians regarding test selection and interpretation, instructors, and laboratory managers. Graduates will provide leadership in the clinical laboratory by implementing quality patient care and performing research and development.

### Objectives

Our program will train clinical biochemists who:

- Will provide service leadership in the field of clinical biochemistry and other areas of speciality in clinical laboratory science.
- Will be active in research, and who will advance knowledge in the field of clinical biochemistry to serve the needs of physicians and patients.
- Will educate peers, trainees, clinicians, and patients with regards to the appropriate, utilization and selection of laboratory tests.

In order to be successful in the professional environment the program will prepare the clinical biochemist for future professional opportunities in research, education, service, and administration.

### Specific Objectives

#### **Medical Expert**

- In all rotations fellows will be expected to gain new knowledge and skills specific to the specialty area in question.
- By the end of the two year program, fellows would demonstrate a high level of competency in the following areas:
  - a. Instrumentation and Principles of analysis for biochemistry, hematology, immunology and microbiology and molecular biology testing by rotations through several hospitals

and other laboratories, didactic and hands on laboratory teaching, supervised decision making responsibilities.

- b. Pathobiology of fluid and electrolyte homeostasis, acid-base homeostasis, renal disease, hypertension, diabetes mellitus, cardiovascular disease, lipid and lipoprotein disorders, hepatobiliary, gastrointestinal, and pancreatic diseases, immunology, endocrinology, bone metabolism, principles of inflammation, oncology, nutrition, pediatrics, geriatrics, pharmacology/toxicology, porphyria, genetic metabolic and molecular genetic diseases. These will be delivered through scheduled didactic sessions, self-study, attendance at medical rounds.
  - c. Clinical practise in biochemistry and laboratory medicine including supervised decision making in the laboratory setting, case-based problem solving, supervised oversight of a community hospital lab and attendance at clinical hospital rounds.
  - d. Laboratory operations topics in quality control, laboratory management, budgeting, quality improvement, assessment of technology and test utilization.
  - e. Research methods in clinical biochemistry including method evaluation, laboratory statistics and design of clinically oriented research projects and development of presentation skills at Continuing Medical Education rounds, and conferences.
- Each fellow will participate in on-call service during the last year of hospital/laboratory rotation both under the supervision of a Diagnostic and Clinical Pathologist and with the Chemistry Faculty of their current rotation for the biochemistry on-call service.

#### **Communicator**

- Fellows will effectively communicate in a variety of settings including interactions with clinical biochemists, pathologists, other physicians, technical staff, patients, managers, administrators, governing bodies, and the public at large.
- The fellow will participate in the call rota of the general pathology division in the second year of training and will effectively communicate information and opinion regarding the selection and interpretation of chemistry tests.
- Fellows may also participate in medical resident teaching at the University of Calgary.
- Fellows will present at CME rounds at the Department of Pathology and Laboratory Medicine. Presentations at other rounds (Department of Emergency Medicine, Nephrology, Endocrinology etc) are also encouraged.

#### **Collaborator**

- Fellows will recognize the role played by clinical biochemists within a health care team and work to promote inter-professional cooperation among team members.
- As clinical biochemistry fellows, learners will understand both the key contributions and limitations of a clinical biochemist in laboratory diagnosis prognosis and monitoring of human disease and learn to consult with other specialists in Pathology and other medical departments on challenging and high-risk cases.
- Fellows will demonstrate an understanding of medical practice in other disciplines such as Internal Medicine, Emergency Medicine, Nephrology, Endocrinology, Microbiology Hematology and Genetics by documented attendance at department specific rounds.

#### **Manager**

- Fellows will gain the necessary skills and experience to function as medical directors for community or regional laboratories and will understand the roles of medical leadership and administrators in the operation of a community laboratory.
- Fellows will demonstrate the necessary analytical and communication skills to address issues related to appropriate utilization of laboratory testing within the context of a community hospital.

- Fellows will have the opportunity to function as the acting Assistant Director of one of the core lab departments at the Diagnostic and Scientific Centre (DSC) under the supervision of the fellowship co-directors.

### Health Advocate

- Fellows will apply a population health approach to the communities they serve, including a recognition of the relevant determinants of health and will advocate for equitable access to laboratory services including laboratory-based screening programs.
- Fellows will recognize the importance of appropriate resource allocation for laboratory testing and the role it plays in delivering high quality health care to a diverse population.

### Scholar

- Fellows will initiate R&D/Diagnostic Test Development Projects within the chemistry area with particular emphasis on cross-disciplinary research collaborations with clinical colleagues. Each student required to carry out at least 3 projects in the area of diagnostic test development.
- Fellows will lead basic research projects under the guidance of a Research Mentor who will provide the necessary facilities for the continued involvement of the fellow in a basic research laboratory.
- Fellows will achieve the necessary statistical, methodological and critical appraisal skills to conduct independent research projects.

### Professional

- Recognize their role as medical leaders within their laboratory and will act in the best long-term interests of the populations they serve, their medical colleagues and their profession.
- Conducts himself/herself/themselves in a professional manner, demonstrating respect for the confidentiality and dignity of patients and their families.
- Demonstrates knowledge of his/her/their limitations.
- Accepts guidance and supervision from members of the multidisciplinary team.
- Recognizes the ethical and legal issues related to clinical laboratory services.

For more information about training in Clinical Biochemistry and the Profession of Clinical Biochemistry please visit the Canadian Society of Clinical Chemists website:

Training | [CSCC \(cscsccc.ca\)](http://cscsccc.ca)

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## PGY1

**The first year will consist of: 13 block rotations (1 block = 4 weeks)**

Rotation	Duration	Location / Notes
Orientation, Safety and Preanalytical	1 block	DSC
General Clinical Biochemistry	2 blocks	DSC
Immunochemistry, Immunology, Electrophoresis	2 blocks	DSC
Analytical Toxicology/ LC and GC MS	3 blocks	DSC
Urinalysis	1 block	FMC/ACH/DSC
Therapeutic Drug Monitoring and Volatiles	1 block	FMC
Renal, and Endocrine Pathophysiology	3 blocks	FMC/HSC

## PGY2

While all these rotations below are available to the fellow in our program and typically 1 block (4 weeks) in duration, the second year of the program will have a more flexible schedule dependent on the fellow's background and interests. Fellows may choose to specialize in one area of the lab and do more in-depth research electives in that area (e.g. toxicology, immunology, pediatrics or tertiary care). Fellows may also choose to design their own elective rotation, write the objectives and have them approved by the program training committee.

Rotation	Location / Notes
Therapeutic Drug Monitoring and Volatiles	FMC PADIS – Poison And Drug Information Service
Point of Care Testing/Blood Gases	DSC + Regional
Hematology	DSC
Microbiology	DSC
Pediatrics	ACH
Laboratory Statistics	ACH
Newborn Screening and Metals testing	FMC ACFT – Alberta Centre For Toxicology
Molecular Genetics	ACH
Biochemical Genetics	ACH
Elective rotations	Variable

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### Research Mentorship:

- Each fellow is encouraged to choose (or is assigned) a research mentor who will provide the necessary facilities for the continued involvement of the fellow in research. Through this involvement, each fellow will be given the opportunity to carry out a research project during the training program.
- Alberta Precision Laboratories (APL) recognizes that research is an integral part of quality patient care, and that academic laboratory medicine plays a crucial role in developing new knowledge and in applying it to improved patient care. Fellows will be encouraged to present their research at Departmental Rounds as well as National and International conferences.
- Fellows will be encouraged to publish research articles during their training program and can choose to spend some of their elective time with a focus on research.
- Our training environment offers tremendous opportunities for research electives in areas of epidemiology, laboratory test utilization management, laboratory automation and process improvement. Our state of the art mass spectrometry facility has many ongoing research opportunities for fellows in chemistry method development.
- A unique strength of our program is our access to laboratory informatics. With a catchment population of close to 1.6 million people on a common Lab Information System (LIS) and 23 million reported tests per year.

### R&D/Diagnostic Test Development Projects:

- It is recommended that each fellow carry out at least 3 projects in the area of diagnostic test development.
- A written report on these projects should be submitted to the Postdoctoral Training Committee at the end of the 20th month of training.

**Program Training Committee:**

- The committee meets quarterly for program review and discussion, which the fellow is invited to attend to provide feedback and insight. (8 times during their fellowship).
- During the last portion of each meeting, the fellows are excused, and the committee will review written evaluations of the fellow's progress through the rotations to date.
- The committee will oversee the student's progress and advise the director throughout the training program.

**Evaluations:**

- Fellows will participate in alternating oral and written exams every 6 months during their rotations.
- Fellows will participate in an oral and/or written exam (as best determined by the program co-directors) upon completion of the training rotations.
- These will be used as a check for understanding throughout the program and used to direct and customize learning needs for the fellows throughout the program.

**Clinical/On Call Experience:**

- Each fellow will participate in on-call service during their PGY2 senior year of the Fellowship program under the supervision of a Diagnostic and Clinical Pathologist.
- Each fellow will participate in on-call clinical biochemistry service during their PGY2 year of the Fellowship Program under the supervision of the program co-directors and faculty of the current rotation.

**Review of Training Rotations:**

- A written evaluation will be requested from faculty supervisor(s) following the completion of each laboratory rotation.
- A written evaluation of the rotation will be requested from the Fellow following the completion of each laboratory rotation.
- A written anonymous evaluation of the faculty advisor for each rotation will be requested from the Fellows following the completion of each laboratory rotation.
- Reports will be presented and discussed at the Program training committee and Fellowship committee meetings.

**Clinical Rounds:**

- Fellows will be expected to document their attendance at clinical rounds throughout the program.
- Attendance records will be reviewed during advisory committee meetings.

**Managerial experience:**

- Fellows will be scheduled for rotations through one of the eight rural hospital laboratories and/or within the four health center labs managed by Alberta Precision Laboratories during their first year of training. Under the mentorship of the Clinical Biochemistry co-directors, the Assistant Director role of one of the core lab departments at the Diagnostic and Scientific Centre (DSC) will become the responsibility of the fellow for their PGY2 senior fellowship year. The fellow is expected to familiarize themselves with the test menus of that laboratory and to work with the Medical Director of the lab to handle technical and management problems as they arise, and to oversee quality assurance activities.

**Teaching and Presentation Skills:**

- Fellows will present and attend Clinical Biochemistry Monthly Rounds.
- Fellows will present at Department of Pathology and Laboratory Medicine CME rounds.
- Fellows may also participate in medical student teaching at the University of Calgary.
- Presentations at other rounds are also encouraged.

## Training Sites

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Training will primarily take place in the core lab facility at the Alberta Precision Laboratories Diagnostic and Scientific Center located on campus at the University of Calgary.

Training rotation sites will include, but are not limited to, the following locations:

- Diagnostic and Scientific Centre (DSC - main laboratory for out-patient specimens)
- Foothills Medical Centre (FMC)
- Alberta Children's Hospital (ACH)
- Many additional community/rural laboratories in the Calgary region provide extensive opportunity for management training

## Additional Information

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The University of Calgary Department of Pathology and Laboratory Medicine Clinical Biochemistry Fellowship Training Program offers training opportunities unique to the regionalized healthcare delivery model in the Calgary Zone. Through our co-sponsorship with Alberta Precision Laboratories, we can offer an innovative and dynamic training environment including opportunities to train in both hospital and community settings. Fellows will benefit from our close association with the University of Calgary General Pathology Residency Training Program and our large Medical Scientific group of Clinical Biochemists, Diagnostic and Clinical Pathologists as well as many additional pathologists and laboratory scientists.

## Salary and Benefits

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Fellows will have a salary of \$58,934 per annum, plus a practice stipend of \$1,500, less premiums for compulsory benefits (Alberta Health Care, Basic Life Insurance and Accidental Death and Dismemberment, Extended Health including vision care, Dental and Long Term Disability). Benefits coverage is provided to the Clinical Fellows through the APL Clinical Fellows Benefits plan. The premiums for this plan are 75% employer paid and 24% employee paid. All amounts are in Canadian dollars.

Trainees are provided an annual professional allowance reimbursement for use towards coverage of presentations and/or attendance to scientific meetings during the term of their fellowship.

## Application Requirements

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- 1) Applicants must have educational qualifications in chemistry or the biological sciences (e.g. Biology, Biochemistry, Immunology, Nutrition, Pharmacology, Physiology, Medical Sciences) equivalent to the requirements for the PhD degree from a university belonging to the Association of Universities and Colleges of Canada, or from an equivalent institution in the USA. \*
- 2) In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. The University of Calgary respects, appreciates, and encourages diversity.
- 3) Strong background in leadership and scholarship (research, education).
- 4) Satisfactorily completed a minimum of 30 semester hours (or equivalent) in undergraduate and/or graduate level chemistry or biochemistry courses.

\* If you have a university degree, or secondary education transcripts, from a university outside Canada or the USA, it is requested that your credentials be assessed and recognized for this program through a credential evaluation agency such as, but not limited to, *World Education Services (WES)*. For more information on credential evaluations, please consult the Government of Canada Foreign Credentials Referred Office (1-888-854-1805).

## Supporting Documentation

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- Completed Application Form  
A cover letter of 500 words maximum is required within the application form. Include your reasons for choosing Clinical Biochemistry as a career and for choosing the University of Calgary/APL as the location of your choice.
- Curriculum Vitae
- Full copies of precisely 3 peer-reviewed publications, where authorship has been indicated.
- Official university transcripts, or academic records, must be drawn up and sent from the registrar office of each institution *directly* to the Program. When education was obtained at an institution outside Canada or the USA, a course-by-course evaluation of those credentials must be submitted from the evaluation agency *directly* to the Program. Copies of any completed degrees or awards received may also be included.
- Three (3) letters of reference, as well as the reference form as provided in the application form, must be submitted to the Office *directly from the referee*. These letters must be current at the time the application is submitted and should attest to familiarity with the applicant's professional expertise, the length of acquaintance, and the good character of the applicant. Training Committee selection members may not serve as references.

## Application Deadlines

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Applications must be received by end of day **November 1<sup>st</sup>** annually

## Selection Criteria

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The following points will be considered, or may be required, when selecting Candidates to train in this program:

- 1) Grades in relevant courses and overall average during graduate studies, with a minimum of B+.
- 2) Strong background in chemistry or biochemistry with adequate background in an alternate discipline.
- 3) Third year level course in biochemistry or equivalent (requirement).
- 4) Third year level course in human physiology or equivalent (e.g. medical course in physiology); if not, candidate must make this up.
- 5) Research record, productivity, and relevance of publications to clinical biochemistry.
- 6) Relevant experience in clinical biochemistry (may include working as a technologist in a routine clinical biochemistry lab, research in clinical biochemistry).
- 7) Commitment of candidate to the field of clinical biochemistry, as assessed by education, research, experience and interview.
- 8) Teaching experience.
- 9) Knowledge of the career, evidence of visits to laboratories.
- 10) Leadership qualities, time management and interpersonal communication skills.

## Program Contact / Application Submission

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Application packages and reference letters can be submitted via email OR mail to:

**APL Clinical Biochemistry Fellowship Program**  
Attention: Shawna Pitman, Program Administrator  
Alberta Precision Laboratories  
9, 3535 Research Road NW, 4<sup>th</sup> floor Admin  
Calgary, AB, Canada T2L 2K8  
[ChemistryFellowship@albertaprecisionlabs.ca](mailto:ChemistryFellowship@albertaprecisionlabs.ca)