

DEPARTMENT OF
PATHOLOGY
&
LABORATORY
MEDICINE

ANNUAL REPORT

2019

Submitted by:

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Executive Summary

Department Structure and Organization

The Department of Pathology & Laboratory Medicine (DPLM) comprises the medical and scientific staff for Alberta Precision Laboratories (APL) (formerly Alberta Public Labs). It is composed of 6 Divisions with 115 primary clinical MD appointees and 14 clinical PhD scientists. 24 members have a GFT appointment with the Cumming School of Medicine, University of Calgary and 91 have Clinical Faculty appointments. The Medical/Scientific staff are located at all 5 acute-care hospital sites, at the APL central laboratory facility the Diagnostic & Scientific Centre, the Southern Alberta Provincial Laboratory, the University of Calgary Health Sciences Centre, Heritage Medical Research Building, and Health Research Innovation Centre.

The DPLM has historically encompassed the same medical and scientific staff as Alberta Public Laboratory (APL). With the advent of Alberta Public Laboratories, subsequently renamed Alberta Precision Laboratories, the clinical department is now provincial in scope, led by Dr. Carolyn O'Hara, as interim Chief Medical Laboratory Officer.

Accomplishments and Highlights

Accomplishments of individual sections are described in this report. 2019 was an excellent year for research and development with major new research investment in precision health initiatives. 2019 was also a record year for publications with 233 peer reviewed publications.

Challenges

There are significant ongoing challenges, both locally and provincially. APL has limited capital funding and space limitations at a number of tertiary care sites. This includes a severe infrastructure deficit in the North sector. Molecular pathology, which is a rapidly growing area in pathology has severe space constraints in both North and South sectors.

Test volumes continue to increase in all areas of laboratory medicine. This is especially marked in anatomic pathology where volumes at some sites are increasing at about 10% per year. The pandemic caused a temporary reduction in volume which has been followed by a significant rebound in volumes. This has created challenges in meeting turnaround time targets.



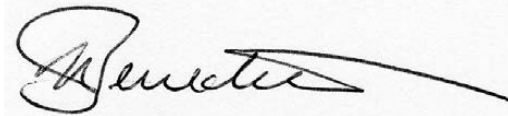
Workforce Planning

Quality Programs

Future Directions and Initiatives

Provincial integration of laboratory services continues apace. A provincial lead in molecular Pathology was recruited in 2019 and has been able to achieve significant enhancement of services through a tighter integration of these highly sophisticated tests between the two University Centres.

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University of Calgary, Cumming School of Medicine
Interim South Sector, Medical Director, Alberta Precision Laboratories



Departmental Committees

Alberta Precision Laboratories Ltd - South Sector Medical and Administrative Committee

Dr. Hallgrimur Benediktsson (Chair), Interim Medical Director
Dr. Leland Baskin, Associate Medical Director
Dr. Heidi Paul, Regional Site Chief, Red Deer Regional Hospital
Dr. Julio Silva, Regional Site Chief, Medicine Hat Regional Hospital
Dr. Michael Greeff, Regional Site Chief, Chinook Regional Hospital
Dr. Ranjit Waghray – Section Chief, Anatomic Pathology
Dr. Hossein Sadrzadeh – Section Chief, Clinical Biochemistry
Dr. Ethan Flynn – Section Chief, General Pathology
Dr. Meer-Taher Shabani-Rad – Section Chief, Hematopathology
Dr. Thomas Griener – Interim Section Chief, Microbiology
Dr. Susan Nahirniak – Interim Section Chief, Transfusion Medicine
Dr. Graham Tipples - Medical Scientific Director, Public Health
Dr. Dennis Bulman - Medical Scientific Director, Genetics and Genomics
Dr. Imran Mirza – Provincial Lead Molecular Pathology
Dr. Jillian Parboosingh - Medical Lead, Genetics & Genomics
Dr. Allison Venner - Sector POCT Lead
Maureen Cyfra - Director, Technical Operations
Keith Kirkland - Director, Urban Hospitals
Tamara Trotter - Director, Rural Hospitals
Paul Jacquier - Director, Public Health
Christine Yamniuk - Director, Integrated Programs
Monica Phillips - Director, Provincial Community Laboratory Services

Non-Voting Members:

Hilary Dynes - Sector Finance Representative
Gabriel Ayala - Sector Human Resources Representative
Kathy Ervin - Sector LIS Representative

Laboratory Services Calgary Zone Quality Assurance Subcommittee of the Laboratory Services Provincial Quality Assurance Committee

Dr. Leland Baskin, (Chair), Associate Medical Director, South Sector
Joan Carlson
Marcene Campbell
Denise LaPerle
Tamara Trotter
Kathy Johnson
Dr. Ranjit Waghray
Dr. Anna Sienko

Department of Pathology & Laboratory Medicine Business Meeting

This is a quarterly meeting of all laboratory medicine medical and scientific staff. Chaired by the Department Head and Medical Director, South Sector, APL

Anatomic Pathology Residency Training Committee

Dr. Carolin Teman, Program Director
Dr. Konstantin Koro, Associate Program Director
Dr. Amy Bromley, CBME Lead
Dr. Travis Ogilvie
Dr. Iwona Auer
Dr. Martin Hycza
Dr. Mara Caragea
Dr. Sandra Lee
Dr. Denise Ng
Dr. Kyle Kurek

Dr. Jenika Howell
Dr. Davinder Sidhu/Dr. Amy Thommasen
Dr. Hallgrimur Benediktsson (corresponding)
Dr. Marie Dvorakova/Dr. Nicole Bures
Dr. Charlene Hunter/Dr. Karen Naert
Dr. Eric Bol
Dr. Asli Yilmaz
Dr. Adrian Box
AP Junior Resident (rotates)
AP Chief Resident (rotates)
GP Chief Resident (rotates)

General Pathology Residency Training Committee

Dr. Davinder Sidhu – Program Director
Dr. Hallgrimur Benediktsson (Corresponding)
Dr. Amy Thommasen
Dr. Amid Abdullah
Dr. Carolin Teman
Dr. Iwona Auer
Dr. Alex Chin
Dr. Julie Carson
Dr. Heidi Paulin
Dr. Ryan Lenz (corresponding)
Chief Resident
Junior Resident Representative

Microbiology Residency Training Committee

Dr. Julie Carson – Program Director
Dr. Wilson Chan
Dr. Andrew Johnson
Dr. Dan Gregson
Dr. Davinder Sidhu
Dr. Joseph Kim
Dr. Raymond Tellier
Dr. Taj Jadavji
Dr. Helen Bibby – Resident PGY2

Neuropathology Residency Training Committee

Dr. Denise Ng – Program Director
Dr. Kristopher Langdon
Dr. Jeffrey Joseph
Dr. Jennifer Chan
Dr. Ana Nikolic
Dr. Erik Bol
Dr. Marie-Anne Brundler
Dr. Carolin Teman/Dr. Amy Bromley (ex-officio)
Dr. Davinder Sidhu (ex-officio)
Dr. Hallgrimur Benediktsson (corresponding)
Chief Resident (residents' representative)

Fellowship Committee

Dr. Hallgrimur Benediktsson (Interim Chair)
Dr. Carolin Teman
Dr. Davinder Sidhu
Dr. Jessica Boyd

Divisions, Sections and/or Programs

Alberta Health Services Sections/University of Calgary, Cumming School of Medicine Divisions:

Section/Division, Anatomic Pathology

Section Chief/Division Head, Dr. Ranjit Waghray

Section/Division, Clinical Biochemistry

Section Chief/Division Head, Dr. Hossein Sadrzadeh

Section/Division, General Pathology

Section Chief/Division Head, Dr. Ethan Flynn

Section/Division, Hematopathology

Clinical Section Chief/Division Head, Dr. Meer-Taher Shabani-Rad

Section/Division, Microbiology

Interim Section Chief/Division Head, Dr. Thomas Griener

Section, Transfusion Medicine

Interim Section Chief/Division Head, Dr. Susan Nahirniak

Membership (Appendix 1.1)

Accomplishments and Highlights

Clinical Service (by Section)

Anatomical Pathology Section(AP)

Projects

Connect Care project towards implementation of EPIC Lab Information System province wide continues with involvement of Subject matter experts.

Cytopathology section initiated implementation of One-Piece Flow towards elimination of redundant steps and efficiency gains.

HPV Test of Cure implementation plan province-wide developed and presented to AHS however final approval not received yet.

Thyrospec test molecular discussions completed and approval granted however, implementation in progress.

Equipment

Two pathologist's microscopes, three Cryostats for Frozen Section and one Spectra slide stainer were acquired for the acute care sites in Calgary

Staffing

One MLT FTE position was approved for the BioBank

The following pathologists were recruited to Calgary DPLM: Drs. Ana Cota Schwarz, Farshid Siadat and Tiffany Shao.

Clinical Biochemistry Section

- The section is doing very well and ready to adopt new developments in the field.
- Transfer of testing from Mitogen Diagnostics (formerly MADL) to APL Diagnostic and Scientific Centre.
- Several new methods have been transferred from Immunoassay to LC-MS/MS technology.
- The provincial RFP for wet chemistry analyzer that has been ongoing for the past year or more, has recently been concluded and Roche has been selected as the vendor to place instruments throughout the province. This is great news for us as our technologists have been using Roche systems for 20+ years.

- The blood gas analyzers throughout the province are being replaced and laboratory will receive 12 placed in the hospitals under chemistry supervision and 38 will be placed under respiratory supervision for the Calgary zone.

New Things

Dr. Dennis Orton, our second graduated fellow in the Clinical Biochemistry Training program who graduated in 2016 and has been working as a clinical biochemist at Surrey Memorial Hospital in Surrey, BC, returned to APL in July 2019. Dr. Orton is one of the experts in the field of mass spectrometry in Canada and will be directing all the activities related to Mass Spectrometry in the department. Dr. Orton is also the appointed chemist to oversee the chemistry lab in Lethbridge, AB.

Dr. Heather Paul, our current senior fellow, accepted the offer to work 0.5 FTE in chemistry and 0.5 FTE in POC starting July 2020.

Pharmacokinetic Laboratory, that has been functioning at the Tom Baker Cancer Centre for many years, and providing pharmacokinetic studies on cancer patients, recently became part of the clinical biochemistry department specifically in analytical toxicology. This is an important addition to the department because it brings a great amount of experience and knowledge in the field of pharmacokinetics and provides opportunities to attract clinical trials in that area in the future.

Challenges

The overall impact of the new changes in the institution has been very challenging to the staff as well as the clinical biochemists. The uncertainty of the future is one of the key factors in these challenges. Any information that can provide some insight will be of great importance to relieve some of the anxiety the staff are currently facing.

Our current financial situation poses a challenge to address test growth and new biomarker development via R & D. The current constraints, through the budget cuts, can impede the research and development process and make it very difficult to develop new markers to address patient and clinical needs as well as bring in new revenue.

General Pathology Section

Pre/post Analytics

Good News

- Commitment to Comfort continues to spread across the organization with interest and sharing with other groups. ACH site has been live for a year. Since then 19 PSC's, South Health Campus OP Lab and two rural sites (Lacombe and Sundre hospitals) have incorporated the practices and principles. Presentations, kudos and write ups including: ACH including the PEAK nursing conference (poster) and the 2019 Quality Forum, Patient and Family Centred Care newsletter article, Just 4 Kids (ACH Foundation Newsletter) article, Children's Healthcare Canada annual conference poster presentation in December 2019. Recent requests for consultation on APL roll out strategy and resources from Solutions for Kids in Pain (SKIP), submission to the Health Quality Council of Alberta Patient Experience Awards, and work being done on a peer review publication in collaboration with ACH and AHS Quality.
- In collaboration with provincial Hand Hygiene colleagues, work is being done to standardize APL naming nomenclature in the Hand Hygiene Clean Hands reporting system. This will allow for more consistent provincial reporting of hand hygiene compliance for laboratory personnel and sets the stage for trends with reasons for missed hand hygiene moments. Calgary Patient Service centers have also been added into the Clean Hands system.
- In collaboration with NMS program manager, NMS program data analyst, NMS testing Laboratory and Process Excellence, a statistical analysis review of the data outlining lab collection errors was done. In addition, a workflow review of the handoff, tracking and transport of NMS cards from DSC Calgary to UAH Edmonton was accomplished.
- Standardization of the collection of 4 (two sets of two) blood culture bottles is completed for the province. Work still needs to be done to standardize the pediatric blood volumes and how this relates to maximum blood collection standards.

New Things

- A request was submitted to review the EPIC Connect Care capabilities to handle multiple requisitions (different providers) and duplicate tests orders, which adhering to foundational principles of appropriate result delivery, minimum blood collection and critical values reporting.
- The work and engagement surrounding the repatriation of certain tests currently tested at Mitogen Advanced Diagnostic Laboratories to be tested at APL DSC continues. This changes is now slated for implementation March 10, 2020.
- DSC Accession and Chemistry collaborating to provide Troponin T testing on horse serum for Calgary Stampede.

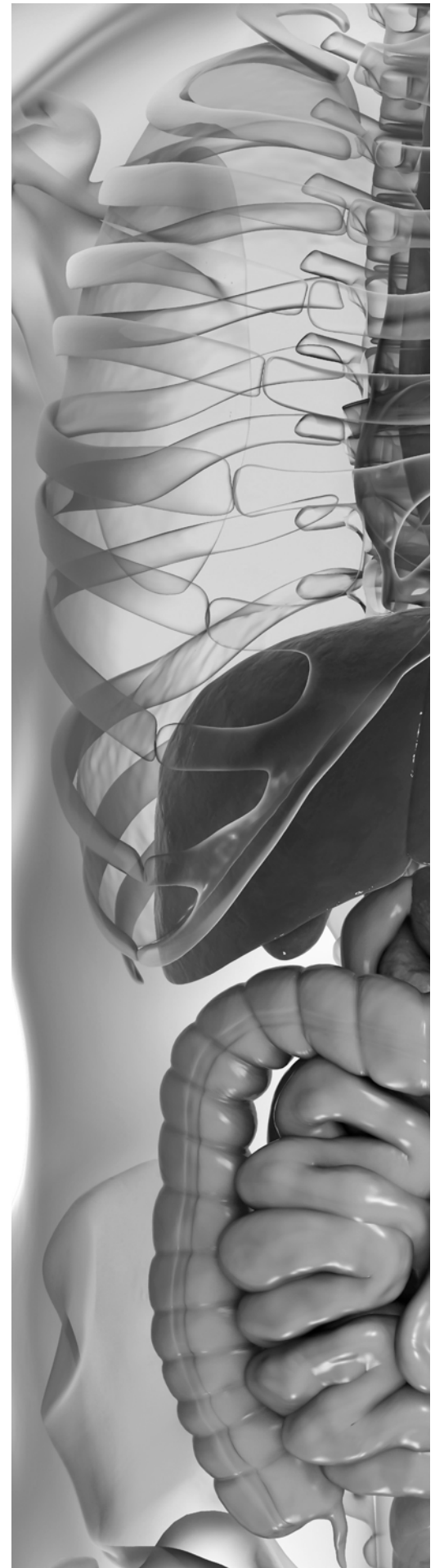
Challenges

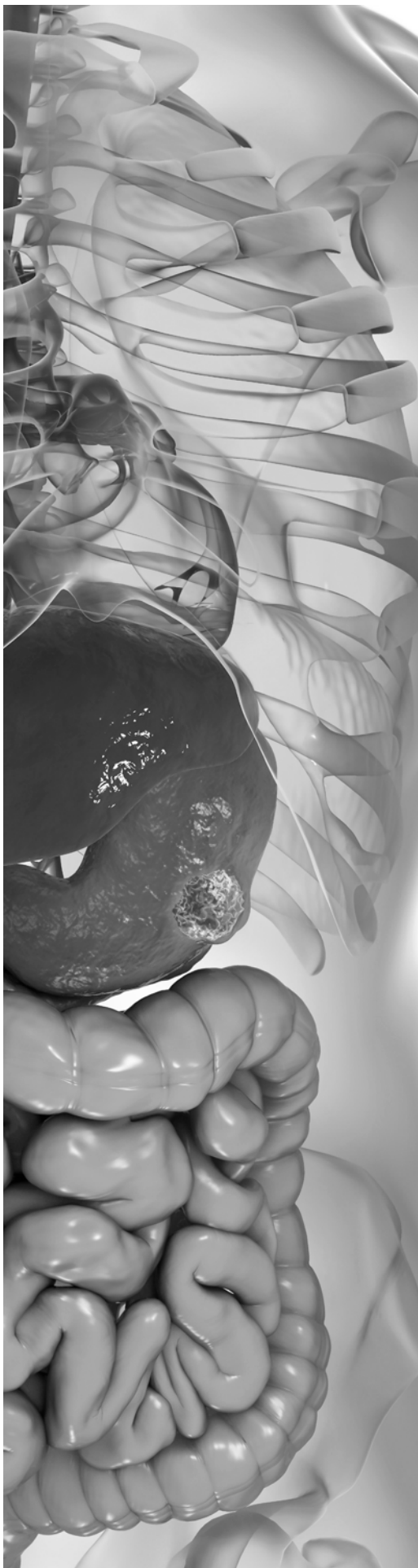
- Preparations for Wave 2 Connect Care is on-going in tandem with a continued push to resolve Wave 1 issues. Calgary Zone sites listed for implementation in Wave 2 sites will utilize Connect Care at the facility, however, the laboratories will continue to use Millennium.
- Planning, preparation and testing work on-going for Millennium Rev upgrade to v2018, scheduled for implementation April 2020.

Community Laboratory Services - Patient Service Centres - Calgary Zone

Good News and New Things

- Implementation of Schiller ECG devices and software – the ECG devices and software were changed at all 19 locations in 2019. Improvements in this software allowed us to virtually eliminate errors due to “no-read” physicians who require printed copies and missed escalations.
- Inserts for the patient urine specimen drop off in washrooms were manufactured and implemented eliminating privacy concerns from patients viewing other patient samples and patient concerns about other patients potentially tampering with their urine specimen.
- Data Entry clerks were introduced at sites that tended to see a bottleneck of patients occurring in the data entry step of their visit. This trial was successful in reducing patient wait times; the positions are being made permanent and additional sites have been added.
- Further reductions in patient wait times were achieved with the introduction of new staff productivity measures and monitoring. The patient service centres have consistently met all 3 key performance indicators (KPIs) for patient wait time since July 2019 with an 80P average wait time of 20 minutes for the period July to December 2019.
- Three additional patient service centre locations were approved for Quantiferon Gold TB testing collections to improve patient access. Quantiferon tubes are now stocked at these locations to eliminate the need for patients to pick up collection kits prior to coming to the PSC's for their collections.





- Harmony Non-invasive prenatal testing (NIPT) kits are now stocked at all 19 locations improving ease of access to this testing and eliminating wait times associated with kit delivery prior to collection.
- Patient and Family Experience training was held for all PSC staff in early 2019; we have a weekly Patient and Family Experience moment that is shared with all staff highlighting stories where staff have gone above and beyond to provide exceptional care to our patients and their families. A different site shares a story each week; this has been well received and helps keep the concepts and training in the forefront of staff minds.
- The Commitment to Comfort program was rolled out to all 19 PSC locations in the fall of 2019. Commitment to Comfort is a quality improvement initiative that provides training and tools for staff to use to reduce the anxiety and pain associated with blood collections in pediatric patients. All staff received 3 hours of training and practice exercises. All sites were given resources to decorate 1-2 child friendly rooms at their site and a distraction kit. We have seen remarkable results with this implementation, dramatically improved experiences for the children and parents we serve, reduced stress and anxiety for both patients and staff, and the successful application of the principles and tools to adults with needle phobias. The feedback from patients, parents, and staff has been overwhelmingly positive. Site champions have regular 15 minute touch base meetings to share positive experiences and brainstorm solutions to challenges they have encountered.

Challenges

Our main remaining challenge is capacity at some sites particularly in the North East and North Central areas of the city (Beddington, McKnight, Sunridge, and Marlborough) and a lack of any PSC's in the deep southeast area of the city.

Community Laboratory Services - Mobile Collection Services - Calgar Zone

Good News and New Things

- Worked with Calgary area Anticoagulation Management Services (AMS) to develop a standardized process for them to order testing for their patients and discontinued the use of a 'draft' Priority Requisition for AMS patients. This will help the MCS Clerks to be more efficient with data entry, as the documents received are standardized.
- Modified the Millennium profile for Mobile Collection Services (MCS) staff to allow them access to the Millennium Scheduling Module and Department Order Entry (DOE) without the need to toggle between two profiles. This will improve efficiency when doing data entry for community and nursing home patients by eliminating unnecessary steps during data entry.
- Provided Skype accounts to all MCS Clerks to improve departmental communication and reduce the number of times the clerks had to walk through Glenbrook PSC to speak to the Clerk II or MLA II.
- Changed the time the Patient Phone List audit is run, from 1600 to 2000, to decrease the number of entries which may be missed if there is a Millennium downtime.

- Celebrated Long Service awards for 11 staff with a total of 170 years of work amongst them.
- MCS-Calgary is now providing service to an additional 300 new Long Term Care and Supportive Living beds in the Calgary area at five new locations.
- Successfully rolled out the Schiller ECG machines for Mobile Collection Services, which replaced the Welch Allyn ECG machines.
- Introduced a 'How to Get Up from a Fall' poster to current and new MCS home patients to provide them with additional tools to help them help themselves if they fall in their own homes.
- Replaced fabric tote bags and hard sided containers used by MCS staff to carry supplies and specimens in Long Term Care facilities and patient homes with a single, ergonomically designed smaller fabric tote bag which meets current Infection and Prevention Control guidelines. The new bags are easier for staff to carry, and simplifies their supply management by consolidating two containers into one.

Challenges

- It continues to be a challenge to ensure that patients supported by Mobile Collection Services meet the existing eligibility criteria, and that we are providing a necessary medical service, rather than simply a convenient service to patients and healthcare providers.
- It continues to be a challenge to ensure our clients are familiar with the level of service provided by Mobile Collection Services regarding sample collection times and result testing turnaround times.

Rural Laboratories and Health Centre Testing Laboratories - Calgary Zone

Good News and New Things

- Several discontinued tests for cost savings:
 - * Digoxin and Urine Drug Screen (UDS) at Banff Mineral Springs Hospital laboratory
 - * UDS at Oilfields General Hospital laboratory
- Implemented support for Stoney First Nation by performing off site collections at Eden Valley Health Centre near Longview, with great positive impact/feedback
- Enhanced support for Opioid Dependency Clinic collections, utilizing kits and third party requisitions, implemented in Calgary Zone Rural Laboratories (CRL), as well as Cochrane and Airdrie Health Centre Testing Laboratories (HCTL); improved patient compliance noted.
- Laboratory Information Centre (LIC) is providing support for Medical Examiner (ME)/warrant requests. Such requests are less commonly seen in rural labs. This support from LIC has improved staff confidence in ME/warrant requests.
- LIC is providing support for ECG report requests from providers, replacing the practice of rural laboratory staff providing reports.
- High sensitivity cardiac Troponin I (hsTnI) on Mini Vidas instrument for STAT orders, replacing conventional TnI previously performed on Mini Vidas.
- Continuing to work on our partnership with rural Diagnostic Imaging senior leaders.

Challenges

- Implementing a new HSAA/ APL Technical Collective Agreement for HCTL staff.
- Pre-analytic challenges associated with hsTnI.
- Supporting Diagnostic Imaging with Combined Lab/XRay Technologist (CLXT) staff preparedness for Connect Care Wave 2 go-live (May 2020).
- Maintaining adequate laboratory coverage while adhering to fiscal restraint directives (smaller staff complements can create difficulties in scheduling).

Hematopathology Section

Summary

- 2019 was a very productive year for the clinical section of Hematopathology & Molecular Hematology. Hempath medical and scientific staff published 20 peer reviewed articles in international journals and HIL fellow won the best abstract award at the 2019 ASHI conference.
- Molecular Hematology received a prestigious research grant from Alberta Cancer Foundation (ACF; \$925,000).
- The immune deficiency section of Flow Cytometry lab has established its position as national referral lab for Canada wide immune deficiency testing.
- The accreditation renewal for HIL lab until 2021 has been completed successfully and HIL director was elected to the board of ASHI.

Molecular Hematology Lab

- Next Generation Sequencing (NGS) 54 Gene Myeloid Panel performed on over 750 patients from across the province since inception in late 2017.
- NGS reporting and workflow is built in Millennium. All approved NGS reports are now reported in Netcare.
- Validation and implementation of the use of Tape Station Electrophoresis System.
- MH Lab has implemented JAK2 testing algorithm in the spring of 2019. This has significantly decreased the numbers of JAK2 tests performed in the lab by at least 50%.
- Medical/Scientific Staff of Molecular Hematology Lab led by Dr. Faisal Khan were successful as in obtaining R. K. Dixon Award operational research grant (\$925,000) from Alberta Cancer Foundation (ACF). Hematology Translational Lab will be leading this study.
- Medical/Scientific staff of the Molecular Hematology Lab have published 13 research articles in reputed scientific journals including Blood Advances and JAMA in 2019.
- Flow Cytometry
- Flow Cytometry Lab is now receiving referrals for the Immune Deficiency Tests from all over Canada.
- Dr. Poonam Dharmani-Khan, Clinical Scientist, has joined flow cytometry lab as full-time scientific staff.
- Dr. Dharmani-Khan has been awarded 'Meritorious Abstract Award' in Federation of Clinical Societies (FOCIS) meeting for her presentation on "Modified Chimerism approach for predicting Acute Myeloid Leukemia (AML) relapse after allogeneic Hematopoietic Cell Transplantation".
- Flow Cytometry Lab provided laboratory services to support the first Canadian TCR $\alpha\beta$ CD19 depleted transplant trial. Clinical validation of laboratory protocol for this test has been completed.
- Dr. Dharmani-Khan has published six peer-reviewed articles in reputed scientific journals including Blood Advances and Biology of Blood and Marrow Transplantation (BBMT).

HIL (Human Immunogenetic Lab)

- In July 2019, HIL section validated an automation suite for HLA Next Generation Sequencing and obtained ASHI accreditation for this.
- Dr. Alison Gareau, our HIL fellow won a best abstract presentation at the 2019 ASHI Annual Meeting.
- HIL section received the renewal of accreditation by the American Society for Histocompatibility and Immunogenetics (ASHI.) The renewal is for two years, from September 1, 2019 August 31, 2021.
- HIL medical director, Dr. Nouredine Berka was elected to the board of ASHI.

Special Coagulation

- Special Coagulation Lab has established quarterly clinical/pathology rounds in conjunction with clinicians at Bleeding disorder program to ensure an optimal utilization of correlated test and patient care.

- Publication: Dr Tariq M. Roshan, Nancy Stein and Xiu Y. Jiang. Comparison of clot-based and chromogenic assay for the determination of protein c activity. Blood Coagulation and Fibrinolysis 2019, 30:156–160

General Hematology

- Bone marrow scheduling Process Excellence project to optimize BM collection service.
- Installation of state of art and fully automated XN10 Blood Cell Analyzers at DSC providing general hematology service to community based patients and primary care physicians.

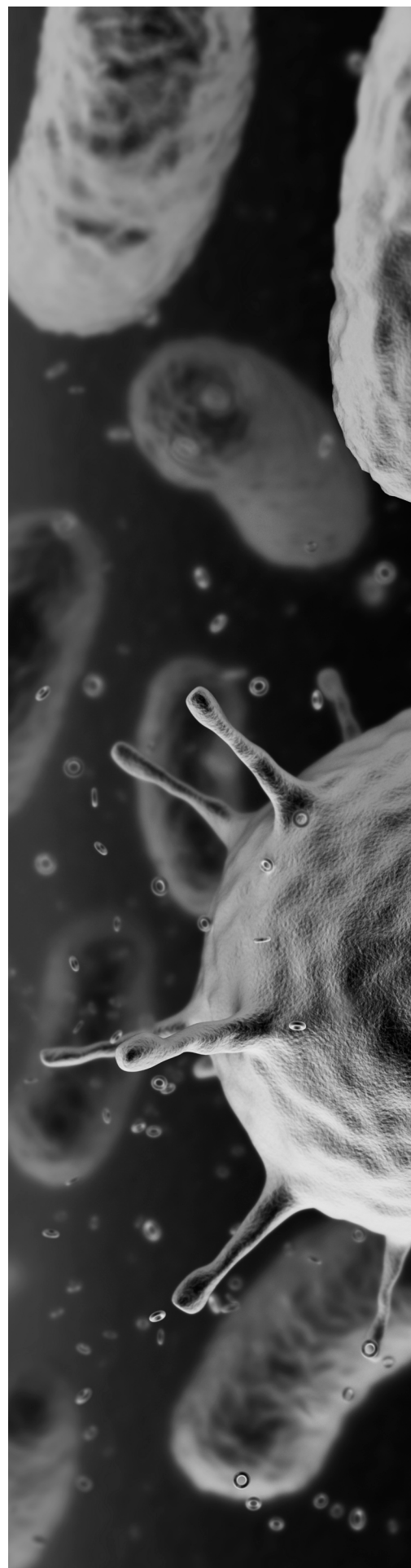
Microbiology Section

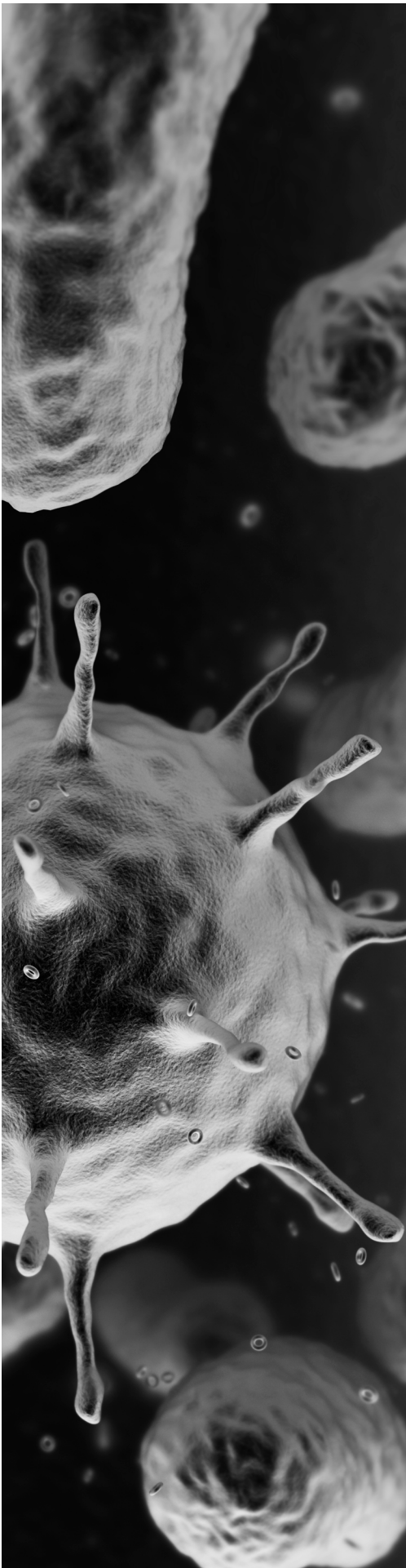
Medical Microbiology Microbiologists are recognized leaders in translational practice and research. Drs. Deirdre Church, Johann Pitout, Dan Gregson and Dylan Pillai are all internationally recognized medical/scientists with a high level of productivity.

- Drs. Wilson Chan and Michael Groeschel provide dedicated medical oversight and supervision to rural practice in South Sector laboratories outside of Calgary. Many practice changes have been made throughout these facilities to align with best practices throughout the large laboratory network in South Sector. The APL medical group provides a dedicated rural on call program:
- Dr. Julie Carson is the Program Director for the Medical Microbiology Residency Training Program.
- Dr. Thomas Griener provides medical supervision to development and implementation services. Last year numerous separate technology/procedural validations were completed with all moving on to implementation status.
- Dr. Kristen Brown provides medical liaison to the physician group in order to improve front-end processes including the appropriate collection of specimens.
- Dr. Oscar Larios provides medical liaison to the Regional Infection Control & Prevention Program, including assistance with practice and policy regarding diagnostic microbiology support for this critical program.
- Dr Luiz Lisboa joined APL Medical Microbiology in July 2019. He has a special interest in Molecular Diagnostics.

2019 Key Accomplishments:

- H.pylori stool antigen testing (HpSAT), in 2018 H.pylori stool antigen test replaced Urea Breath Test (UBT) with UBT available for patients referred to Gastroenterology. In 2019, this testing algorithm was expanded to APL sites in South zone. The HpSAT has equivalent performance to the Urea Breath Test, it is easier for patients to collect, quicker to access thus improving turnaround times. HpSAT has subsequently been implemented in the North.
- Enteric testing for stool bacterial pathogens on BD Max instruments was implemented on June 3rd, 2019. The PCR assay tests for Shiga toxin-producing Escherichia coli 9STEC, including O157 and non-O157), Camylobacter species, Salmonella species, Shigella species and Enterovasive E.coli (EIEC). The PCR assay replaces the





traditional stool culture as the primary screen. The PCR assay is more sensitive, the pathogens detected by this PCR assay collectively account for >95% of the bacterial pathogens.

- Moved throat for Group A streptococcus (GASD testing platform) into the student training room where environmental controls are better managed, and maximized workflow efficiencies. We continue to explore moving the testing platform to a real-time molecular platform that will result in improved level of service for better patient outcome and support antibiotic stewardship.
- The 3rd Vitek MS instrument was moved from south Health Campus to the DSC site allowing to manage the increased testing capacity and allowing the clinical lab to easily use the Saramis platform.
- Medical Microbiology team both collates and publishes annual Antibigrams for various locations in Calgary and South Sector. This data informs empiric antibiotic management for patients and assists the Antibiotic Stewardship Program with appropriate antibiotic treatment decisions including stepdown therapy.
- APL led the STI working group in submitting a briefing note for funding to implement NAT testing for Trichomonas throughout Alberta. This proposal is pending a funding decision.

Transfusion Medicine Section

In January 2019, the WellSky operational team and positions (3 testers, 1 SOP writer and a dedicated WellSky trainer) were identified for the Connect Care project. Transfusion Medicine managers along with the five new WellSky staff attended a 4 day vendor training in Edmonton. Weekly meetings of the WellSky Steering Committee, Leadership Team Committee and Subject Matter Experts Committee continue as the Connect Care waves roll out.

In February, 2019, the Transfusion Medicine Discipline Council (TMDC) was created with the Terms of Reference being approved in April, 2019. The council meets twice a month and consists of administrative and medical representation from Urban and Rural Alberta. Decisions for operations that require administrative and medical consultation are escalated to the TMDC.

On February 4, 2019, the first South Sector Transfusion Medicine Senior Staff meeting was held. Technical, management and medical representation from the previous Calgary, Central and South Zone sit on the committee. The sharing of best practices and standardization is the focus of this committee.

In February, Transfusion Medicine senior staff received notice that their Red Cell Screening Implementation abstract had been accepted for the Choosing Wisely Alberta Symposium under the theme of Increasing Appropriate Use of Blood Products.

Effective May 2, 2019, the pooling and reconstitution of cryoprecipitate was discontinued at all acute care sites in the Calgary Zone. Cryoprecipitate screening implemented previously by Transfusion Medicine coupled with the efficacy of using Tranexamic Acid and Fibrinogen Concentrate has drastically reduced the usage of cryoprecipitate.

Calgary hosted a successful 2019 Canadian Society of Transfusion Medicine conference. The conference ran from May 30 – June 2, 2019.

On June 26, Transfusion Medicine participated in a Mass Casualty Incident simulation. The staff worked with the Trauma coordinator and the Emergency department to test a new protocol that had been created. Lessons learned were identified to improve the current protocol and responses when multiple traumas are received.

In June, titring of isohemagglutinins in platelets was implemented to identify low titre ABO antibodies (less than 1/50). Platelets that meet the criteria can be transfused to any patient and will not require concentration. This improves inventory management of platelets and decreases the discard of in date platelets. Concentration will continue to be required for high titre platelets that are ABO incompatible, patients on volume restrictions or for neonates.

In August 2019, IVG Screening was implemented throughout Calgary Zone. This was a provincial initiative to monitor and control IVIg utilization. All new referrals would require a TM physician approval for indication and dosage.

South Zone CPSA accreditation was held in September 2019. Staff are currently working on Evidence of Compliance for submission to the CPSA.

In September, Transfusion Medicine introduced new CBS products, panhematin and hemelibra into their inventory. These products are available through the exceptional access product process.

The October edition of Vital Signs (October) published Dr. Sidhu's article, Empowering Patients to Manage Long Term Conditions, An Update on Home Infusions

Hepatitis B vaccine will no longer be stocked in Transfusion Medicine departments. The transfer of the product to acute care site pharmacies occurred in November 2019.

As of December 2019, there are currently 122 patients enrolled in the Sub-cutaneous Immune Globulin (SCIG) clinic with ongoing referrals intake. Of the 122 patients, 25% receive Hizentra brand immune globulin while 75% receive Cuvitru brand immune globulin. In February 2019, a request for funding from Alberta Health was submitted. This request was to provide monies for dedicated clinic staff salaries and benefits. Currently the clinic has a dedicated 0.5FTE staff and this supplemented with staff support from Transfusion Medicine laboratory technologists.

In December, a Purchase Order was completed for an x-ray irradiator that will be installed in Transfusion Medicine at Foothills Medical Centre. This supports better blood management and utilization. Calgary Zone neonatologist, hematologists, oncologists and the transplant surgeons all feel an onsite blood irradiator should be standard of care. The irradiator is due to be installed in March 2020.

New Initiatives

The reduction of non-lab blood storage satellite refrigerators throughout Calgary Zone is a work in progress to meet the Health Canada regulations (tracking of blood to determine if a blood component has been out of a controlled environment, such as a monitored refrigerator, more than 60 minutes). A recent pilot was held to use the delivery of blood components to the McCaig Tower operating rooms via pneumatic tube system. Due to the success of the pilot, the satellite fridges will be removed. Further collaboration with nursing units has identified the potential to remove additional fridges. Transfusion Medicine has been working with site administrators to look at the purchase of fridges with the track ability component.

Transfusion Medicine will see the introduction of a new testing platform, the Bio-Rad Tango Infinity. The first Infinity will be installed at the Peter Lougheed Centre in late January 2020.

Future Plans

- Plasma screening
- Connect Care Wave 2 will roll out not the Calgary Rural hospitals (EPIC only). This will create an interim state in Calgary Zone.
- Health Canada Inspection, late summer 2020.
- Fibrinogen screening
- Massive Transfusion Protocol reconfiguration
- Porter training for transport of blood components/products

Cellular Therapy Laboratory

- CTL is participating in several corporate sponsored clinical trials:
 - * Utilization of autologous CAR-T cellular therapy products for the treatment of hematological malignancies. These cellular therapies utilize a patient's own T cells that are modified to search out and destroy tumour cells. The clinical trials include treatment of Multiple Myeloma, Lymphoma, and Leukemia.
 - * Utilization of virus specific T cells for the treatment of post-transplant viral complications. The first clinical trial will examine EBV-specific T cells in treat of EBV disease post-transplant.
 - * Utilization of gene modified autologous endothelial progenitor cells for treatment of pulmonary arterial hypertension.
 - * Utilization of gene modified autologous blood stem cells for treatment of Fabry's Disease. Three Fabry's patients have been treated thus far in Calgary. Calgary has been accepted as the only Canadian site for an international clinical trial examining the efficacy of stem cell gene therapy treatment of Treatment-Naïve Subjects with Classic Fabry Disease. This is an expansion of the already success gene therapy trial conducted here in Calgary.
 - * Treatment of Gaucher Disease using blood stem cell gene therapy.
 - * Treatment of Rheumatoid Arthritis with Allogeneic Transplant.
- CTL is providing $\alpha\beta$ + T cell/CD19+ B cell depletion of a haplo-identical product for patients across Canada. These engineered grafts provide precise products that are ideal for patients that do not have matched donors available with reduced risk of post-transplant complications. CTL was the first to produce these products in Canada and is now providing processing services for external sites throughout Canada.
 - * CTL is key in quality initiative with the Apheresis department for improvement of collection efficiency and quality of cellular therapy products collected. CTL has generated automated reports that allow for assessment of product collection quality based on a number of donor and collection parameters.
 - * CTL continues to lead cellular therapy initiatives in Alberta. CTL is validating manufacturing for the first clinical trial that will use in-Alberta manufactured CD19 CAR-T cells for treatment of patients. Patient enrollment will begin in 2020.
 - * CTL continued to see an increased number of requests for processing of unrelated blood and marrow transplant products for send-out to other transplant centres (national and international). Calgary is the only unrelated collection facility in Alberta and Saskatchewan currently. This work is in addition to all the processing performed for the adult and pediatric patients in Alberta.
 - * Dr. Nicole Prokopishyn was appointed Director of Regulatory/Quality for Cellular Therapy and Transplant Canada (CTTC) (formerly CBMTG). This board of director position is a 3 year term which will focus on improving regulatory and quality aspects of cellular therapy and transplant in Canada.
- Dr. Prokopishyn was an organizing member for the 2019 CTTC annual meeting in Calgary
 - * Dr. Prokopishyn organized the laboratory component of the meeting
 - * April Hillman, CTL MLTII was an invited speaker
 - * 3 CTL MLTs attended the meeting
- CTL Director, Dr. Prokopishyn, was an invited speaker at:
 - * Canadian Society of Transfusion Medicine (CSTM) meeting in Calgary, AB 2019
 - * The Cellular Therapy and Transplant Canada (CTTC) meeting in Calgary, AB 2019
 - * Dr. Prokopishyn attended
- CAR-T ExCELLirate meeting as an invited guest in Feb 2019
- CellCAN Forum 2019 in Toronto
- Cellular Therapy and Gene Therapy Manufacturing Conference in Amsterdam

- Dr. Prokopishyn was an invited guest at the Cellular Therapy Workshop for the CTTC in December 2019
- Dr. Prokopishyn is an active participant and lead investigator on a submitted CFI grant for development of Canadian infrastructure for cellular therapy manufacturing. This national consortium (ExCELLirate) aims to expand manufacturing in Canada, with CTL as one of the lead manufacturing sites.
- CTL is working with corporate partners and ABMTP to on-board commercial, standard-of-care CAR-T cellular therapy products.
- CTL continues to finalize laboratory design at the New Calgary Cancer Centre.
- CTL is upgrading its lab information system, StemSoft to the newest version StemSoft LAB which will allow for integration with Connect Care.

Education

Educational Programs Provided by the Department of Pathology & Laboratory Medicine

The medical and scientific staff of APL are responsible for a wide array of educational activities that include: (1) residency training programs in Anatomic Pathology, General Pathology, Neuropathology, and Microbiology (2) mandatory rotations (e.g. hematopathology) for a number of other residency programs, (3) lectures and small group sessions in a number of undergraduate courses, (4) the Medical Sciences 515/Biology 515 Course, (5) parts of the Bachelor of Health Sciences program, (6) supervision of elective rotating residents from other programs and rotating clinical clerks, (7) training of fellows, (8) graduate student supervision, (9) summer student supervision, (10) Continuing Medical Education events, and (11) the Pathologists' Assistant M.Sc. program.

Anatomic Pathology Residency Training Program (Program Director: Dr. Carolin Teman)

Program Structure

This is a five-year program leading to certification in Anatomical Pathology by the Royal College of Physicians and Surgeons of Canada. Our program transitioned to Competency By Design (CBD) in July 2019, and we currently have a mix of CBD residents and traditional stream residents. The curriculum includes orientation, clinical rotations, core adult surgical and autopsy pathology rotations, subspecialty rotations, elective rotations, research, and 3-4 months of chief resident service. The program is designed to give graded responsibility to residents. In the final year of training, residents are expected to perform at the level of a fellow or junior faculty member, rec-



ognizing that faculty-resident supervision is always occurring. We accept four new residents per year, consisting of three Canadian medical graduates and one international medical graduate. We currently have 19 residents in our program. Administrative support and training facilities are provided by the University of Calgary's Department of Pathology and Laboratory Medicine.

Teaching

A philosophy of independent self-directed learning underlies the program. Teaching takes place via a combination of dedicated educational events, group learning and one-on-one teaching. Structured educational events include weekly clinical-pathological correlation rounds with Internal Medicine, Departmental Continuing Medical Education rounds, resident-led Gross Pathology rounds, optional evening weekend slide sessions, and a dedicated weekly academic half day consisting of unknown slide rounds, autopsy rounds, and didactic teaching. Residents are also expected to read and study independently.

Evaluation

Traditional stream residents are assessed via in-training evaluation reports (ITERS) completed for each rotation. CBD residents are assessed longitudinally based on their completion of Entrustable Professional Activities (EPAs). Several rotations incorporate end-of-rotation slide exams or presentations into their assessments. PGY2 autopsy and surgical pathology rotations also utilize encounter assessment forms to provide daily or weekly feedback to trainees. PGY2-PGY5 residents are also assessed via biannual exams, including a full RCPSC-style examination each winter and spring, and the American Society of Clinical Pathology Resident In-Service Exam (RISE) each spring. Additional examinations are offered for residents in difficulty and for senior residents preparing for the Royal College examination. The program director meets with each resident at least twice yearly to discuss the resident's academic progress, research projects, subspecialty interests, and fellowship/career plans.

Research

Involvement in research activities is an integral part of the program. Beginning in the PGY2 year, residents undertake one or more research projects with the advice and mentorship of the Resident Research Committee. In 2019 the Anatomical Pathology residency program allocated \$10,000 of its budget toward resident research grants, which are distributed on a competitive basis. Residents present their research findings at the annual departmental research day, as well as at national and international meetings. During 2019, University of Calgary Anatomical Pathology residents were involved in 41 research projects, presented 8 abstracts at national and international meetings, and co-authored 5 peer-reviewed scientific publications.



Resident progress and news

Our program graduated four residents in 2019. All are currently pursuing subspecialty fellowships, including Head and Neck / Endocrine pathology at Yale, GYN pathology at Yale, GI/Liver pathology at Memorial - Sloan Kettering Cancer Center, and GYN pathology at Alberta Precision Laboratories / University of Calgary. Our current PGY4-5 residents have obtained fellowship positions in Hematopathology at the University of Pennsylvania, Cytopathology at Columbia University, Breast Pathology at Alberta Precision Laboratories / University of Calgary, GI/liver pathology at Emory University, GYN pathology at the University of California-San Francisco, Breast Pathology at Memorial Sloan Kettering Cancer Center, Pediatric Pathology at Harvard University / Boston Children's Hospital, and Renal Pathology at Cedars-Sinai Medical Center. The University of Calgary's Anatomical Pathology residency program is well-regarded nationally, and receives a large number of applicants for the annual CaRMS match. In 2019 we filled all four CaRMS positions with outstanding applicants. We received numerous applications for the current match cycle also, and anticipate another excellent match result in March 2020.

Program accreditation and upcoming changes

The Anatomical Pathology residency program received full accreditation by the Royal College of Physicians and Surgeons of Canada following an External Review in 2015. An internal review is scheduled in April 2020, and our next external review is scheduled for 2022. The program's greatest challenges include managing our ongoing transition to Competency By Design (CBD), and ensuring a stable and supportive training environment for our residents despite ongoing changes and uncertainties in healthcare provision at the provincial level.

General Pathology Residency Training Program (Program Director: Dr. Davinder Sidhu)

Our program is a five-year program leading to certification in General Pathology by the Royal College of Physicians and Surgeons of Canada. The University of Calgary through co-sponsorship with Calgary Laboratory Services offer General Pathology Residency Training highlighting on laboratory management and pathology informatics. The General Pathology Residency Program is 5 years in duration (4 years of laboratory Medicine and one basic clinical year). The basic clinical year is designed to provide exposure to most of the medical and surgical services that rely heavily on the clinical and anatomical pathology laboratory and to prepare the resident for the Medical Council of Canada Qualifying Examination Part II. Upon successful completion of the education program, the residents will be competent to function as consultants in General Pathology and medical laboratory directors.

For the 8th consecutive year the General Pathology program has filled all resident positions at the CaRMS match. 2019 was the first year General Pathology launched the Royal College Competency By Design Residency Program and enrolled our first two CBD residents. Part of the success of our program lays in our close association with the highly successful University of Calgary Anatomic Pathology and Neuropathology Residency Training Program and our large group of over 90 pathologists and laboratory scientists. We hope to leverage these resources to best support our new CBD residency program.

Three key features unique to the program that have drawn medical students and residents from across the country include General Pathology Mentorship program, Community and Rural Laboratory Management training program and the Pathology Informatics/Laboratory Utilization office.

Research

The general pathology faculty has great interest in basic science, pathology informatics and laboratory utilization and so research in these areas is promoted. General pathology residents are expected to complete at least one research project during their residency. In 2019 our residents have undertaken 10 approved research projects and have presented or will present findings at USCAP, CAP, ACLPS and various other conferences. The Research Committee coordinates resident research and the Resident Training Committee monitors the manpower required for the project and our department has special funds available for resident research.

Didactic schedule

Pathology and clinico-pathologic seminars are held weekly on Fridays during academic half-day. Clinical chemistry half-days occur weekly Wednesdays with a "case of the week" format and Medical Microbiology academic half days occur Thursdays in conjunction with Infectious Disease residency academic days. Residents are exempted from work commitments during these periods. Residents are also expected to present at clinico-pathologic rounds, held weekly in conjunction with the Department of Internal Medicine. Residents also participate in medi-

cal student teaching at the University of Calgary. Presentations at other rounds (Department of Surgery/Nephrology/TBCC) are also encouraged.

Evaluation

An in-training evaluation report (ITER) is completed after each rotation. The ITER is reviewed with the resident and emphasis is on continuous constructive feedback for the resident. Beginning in 2019 the new Royal College mandated Competency By Design (CBD) initiative will be implemented nationally for general pathology evaluation and feedback and document preparation is currently underway jointly with Anatomical Pathology. Starting in the PGY2 year, all residents take two exams (RISE Examination and Annual Xmas exam) each year mimicking the fellowship exam by the RCPSC and the American Board Examination respectively.

Training Sites

Diagnostic and Scientific Centre, Foothills Medical Centre (FMC), Alberta Children's Hospital (ACH), Peter Lougheed Centre (PLC), Rockyview General Hospital (RGH), Medical Examiner's Office, Community/rural laboratories (provide extensive opportunity for management training), Community hospital rotations are taken at Red Deer General Hospital in Red Deer, AB and a collaborative rural training rotation at White Horse Hospital, Yukon.

A number of transfer residents from Anatomical Pathology, Anesthesia and Family Medicine have joined the General Pathology bringing the total number of residents to 12 in 2019.

Our program has successfully graduated every general pathology resident that has applied to the Royal College Examination, all of whom have successfully passed the General Pathology certification exams by the Royal College of Physicians and Surgeons of Canada. Our next graduates will be writing their certification exams in the Spring of April/May 2020 and one has successfully secured a fellowship position in Forensic Pathology and the other will start as a staff pathologist at the Red Deer General Hospital.

Successful onsite Royal College accreditation survey/review of the University of Calgary's General Pathology Residency Training Program took place on February 24, 2015 with no deficiencies noted and our internal review accreditation that took place in May 2019 was successful with no significant deficiencies noted.

Microbiology Residency Training Program (Program Director: Dr. Julie Carson)

The Medical Microbiology residency training program at the University of Calgary is a five-year program that aims to train medical microbiologists that are competent and confident practitioners. The program's rotations are focused at developing expertise and skills in the four major spheres of medical microbiology: the medical, scientific, and administrative direction and management of a clinical diagnostic laboratory; the provision of clinical consultation in infectious diseases; infection control and antimicrobial stewardship; and public health.

The PGY-1 year provides an experience akin to the rotating internship, with rotations in a variety of related clinical disciplines to supplement the clinical knowledge and skillset of the trainee. PGY years 2 through 5 involve a mix of rotations in the diagnostic laboratory, with particular foci in bacteriology, virology, mycology, and parasitology; clinical infectious diseases, including both adult and pediatric, inpatient and outpatient services; infection control, antimicrobial stewardship, and public health. There is a significant amount of elective time included in order to allow trainees to further develop in subspecialties of their choosing.

2019 marked our fourth full academic year. Our program continues to expand with two residents in the program. This year marked a record number of medical student electives and interest in CARMS applications as well.

Our program also supports the training of Infectious Disease Residents (12 weeks) and General Pathology Residents (24 weeks). We collaborate closely with our Infectious Disease programs with respect to shared curricula in Infection Control and Stewardship as well as our academic half day content. We continue to have healthy interest in the program from residents within the University of Calgary Infectious Disease subspecialty residency program. With deliberate planning of their infectious disease training and electives in Medical Microbiology, ID residents can meet the Medical Microbiology training requirements with an extra year of Medical Microbiology training. We have secured PGME funding for one ID resident to enter and complete this final year in Medical Microbiology in the 2020-2021 academic year.

Medical Microbiology begins its journey towards Competency By Design, the Royal College competency-based medical education program, in June 2020 with a tentative implementation date of July 2022.

Neuropathology Residency Training Program (Program Director: Dr. Denise Ng & Dr. Lothar Resch, Assistant Program Director)

This is a five-year program leading to certification in Neuropathology by the Royal College of Physicians and Surgeons of Canada. The University of Calgary program is in its last year of traditional stream residents and looking forward to transitioning to Competency by Design in 2021 due to Covid-19 related delays. This traditional stream includes one year of clinical medicine, one year of anatomic pathology and three years of neuropathology training, including two core years with graded responsibility in the reporting of adult and pediatric surgical and autopsy cases materials, including intraoperative consultations, and nerve and muscle biopsies. The fifth year is an elective year and may be used for further training in neuropathology and/or other pathology subspecialties; clinical rotations; or research. Ongoing participation in research activities is encouraged throughout residency training, and there are ample local research opportunities into neuro-degenerative disorders, neuro-oncology, neuro-regeneration, cerebral ischemia, and developmental disorders. Residents have also taken advantage of research opportunities in other areas of Canada and abroad. Trainees gain experience in the application of new technologies in the study of the pathogenesis of disease including immunodiagnostics, molecular pathology, cytogenetics, and electron microscopy. Medicolegal and diagnostic consultations are an integral component of this program, as is participation in undergraduate and postgraduate teaching programs. More reflection and work will also be underway in preparation for the University of Calgary Site Review by the Royal College after having completed the Mid-Cycle Internal Review this past March 2020. However, as the program was recently given full accreditation in the internal review in 2018, this review is expected to be smooth as we continue to make improvements in our training program.

The program is also heavily involved in teaching medical students and residents from other specialties who complete rotations with us, including Neurosurgery, Adult and Pediatric Neurology, Anatomic Pathology, General Pathology, Neuroradiology and Radiation Oncology. As needs are changing in the CBD paradigm, our staff are also adjusting to the different objectives and training needs.

Within the last few years, the University of Calgary Neuropathology Residency Program has been one of the more active neuropathology training programs across Canada. In the 2019-2020 academic year, we have four residents in the program and are welcoming a new PGY1 resident Dr. Christopher Newell from the University of Calgary.

With heavy hearts, we are also bidding farewell to Dr. Lothar Resch who will be retiring at the end of the academic year. Having previously held program directorship and later assistant program directorship for several years, Dr. Resch's experience, insight and teaching has been invaluable in the training of many neuropathologists and pathologists in Alberta and even across the country. There are few departments that Dr. Resch has not worked in and he has developed many colleagues and friends nationally who are sad to see him retire from active practice. We will miss him and his contributions to rounds dearly.

Figure 1 - Resident History/Growth

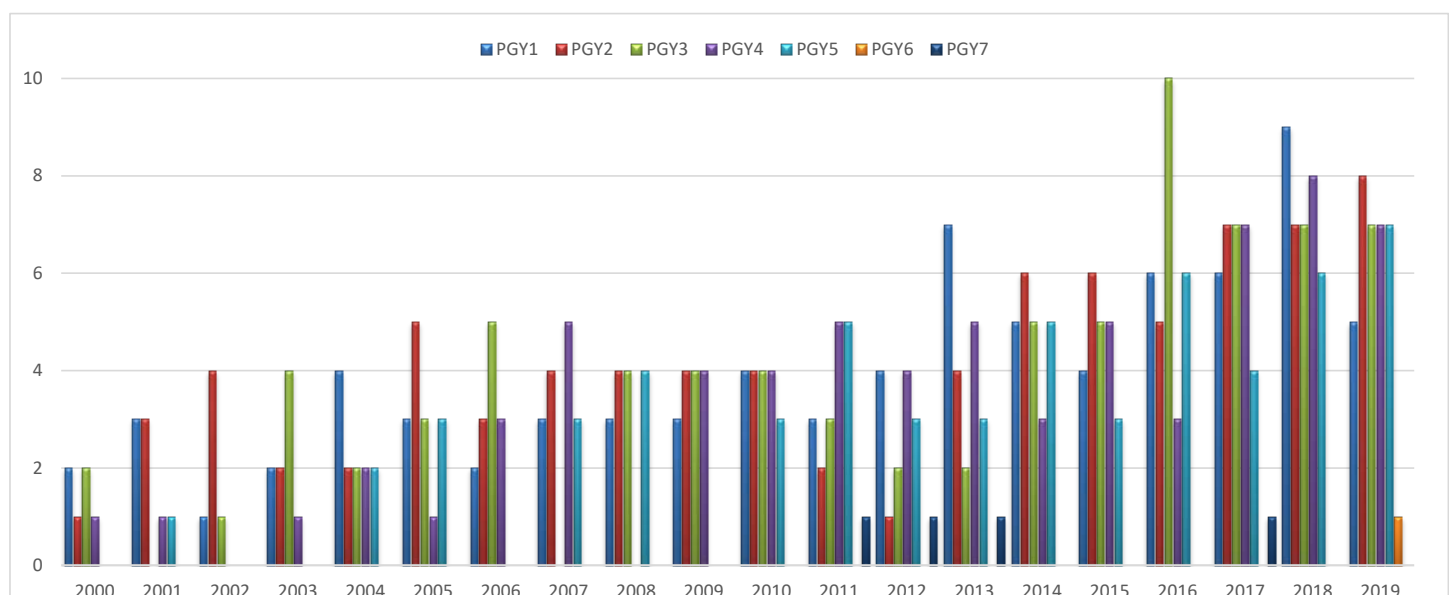
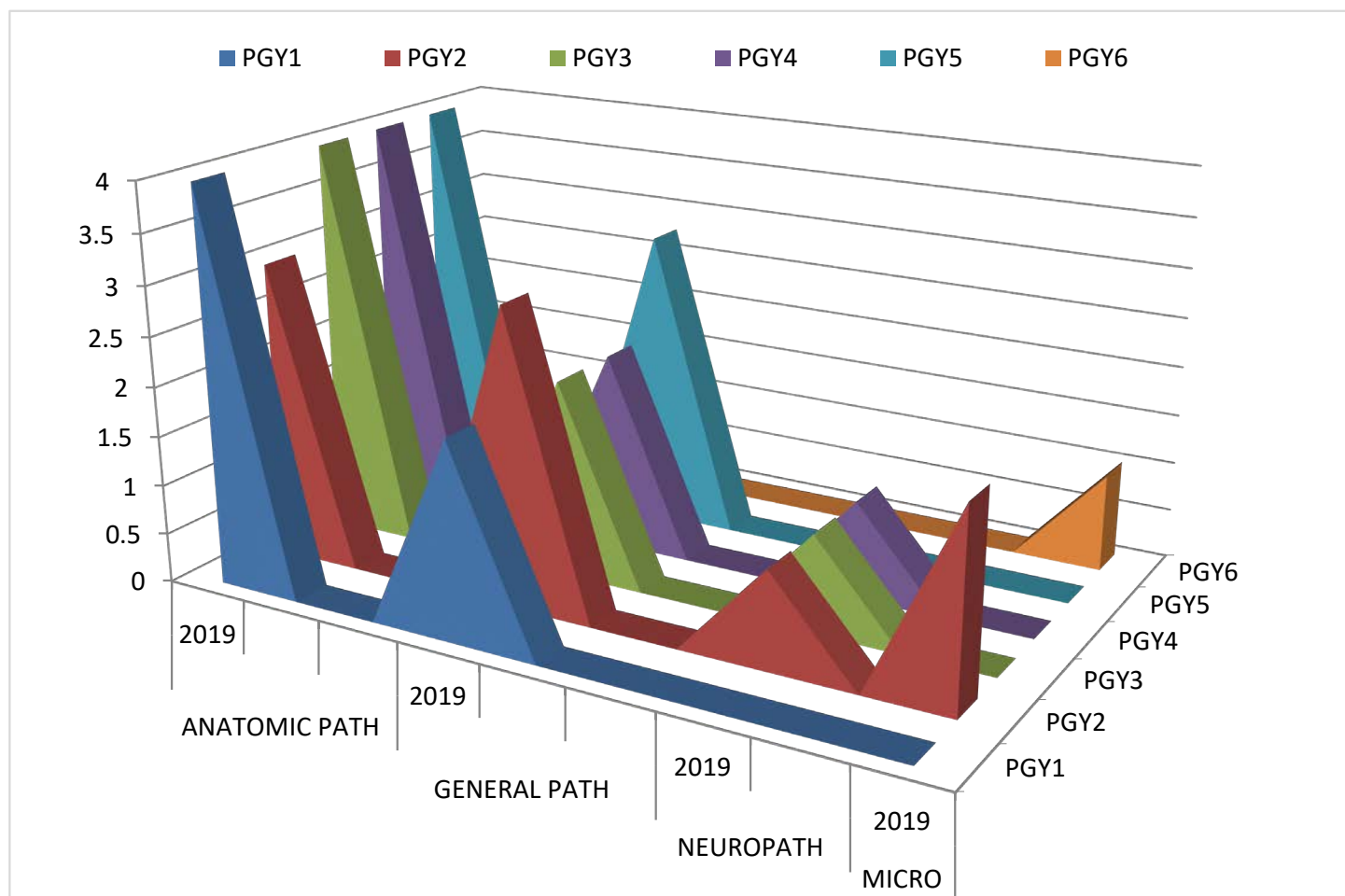


Figure 2 – Enrolment in DPLM Residency Training Programs



Medical Sciences 515/Biology 515 Course (Course Director: Dr. Davinder Sidhu)

The BIOL/MDSC 515 course ran from January 7th to April 12th 2019. The basis of the course is the cellular and molecular mechanisms underlying basic human disease processes and how these can be influenced by lifestyle and environmental factors and the ways in which this knowledge can be used in the laboratory diagnosis of diseases and in the biomedical research. The Department of Pathology and Laboratory Medicine is responsible for the development and teaching of this course and it continues to be very well received by students. The 2019 year's enrolment was 33 students an increase from 24 students in 2018. Our faculty provided 38.5 hours of lectures over the course of the semester in this course. This year the course average was 81.5%.

Undergraduate Medical Education (Department Representative: Dr. Lothar Resch)

The University of Calgary undergraduate teaching program for medical students follows an integrated approach in accordance with requirements of the Medical Council of Canada. As such, pathology is integrated into the systems based courses in the curriculum, which include hematology, gastroenterology, cardiology, respiratory, nephrology, endocrinology, neurology, gynecology, and pediatrics, among others. Pathology is taught through multiple modalities, including lectures, small groups, and clinicopathological correlation sessions, where pathologists partner with clinicians and other diagnosticians to present cases as they would actually play out in real clinical life. Department members are also preceptors for Applied Evidence Based Medicine courses, as well as pre-clerkship and clerkship electives. Recently, in an effort to expose medical students to pathology earlier in their career, members of the Department have participated in the Immersive Career Exploration program at the University of Calgary, which pairs first year medical students with physicians to allow for a direct observation of their practice.

Postgraduate Clinical Trainees

Geographic Full Time (GFT) faculty members provide greater than 2,000 hours of teaching per year to support postgraduate clinical trainees, including department residency training programs, rotating residents and fellows.

Clinical faculty members also make very extensive contributions to teaching residents and fellows; although this time has not been quantified, it is likely similar or greater in magnitude.

Fellowship Programs (Interim Chair: Dr. Christopher Naugler)

Up to 6 internally (APL) funded positions are available each year. Four of these positions are meant to fund board-certified (or board-eligible) Anatomic Pathology Fellows wanting to develop subspecialty skills in an area of Anatomic Pathology. In some years, we also train externally funded fellows.

The DPLM/APL Fellowship Committee selects qualified applicants for internally and externally funded Fellowship positions. Positions are open to either MD or PhD applicants, depending upon the field of study. We currently offer fellowships in Breast Pathology, Cytogenetics, Dermatopathology, Gastrointestinal Pathology, Gynecological Pathology, Hematopathology, Histocompatibility, Pediatric Pathology, Pulmonary Pathology, Renal/Transplant Pathology, Urology and offer an Area of Focused Competency (AFC) in Cytopathology.

Clinical Biochemistry Fellowship Program (Co-Program Directors: Drs. Hossein Sadrzadeh & Alex Chin)

The University of Calgary and DPLM postdoctoral fellowship training program in Clinical Biochemistry is accredited by both the Canadian Academy of Clinical Biochemistry (CACB) and the Commission on Accreditation in Clinical Chemistry (ComACC) in the United States. The Fellowship program continues to work closely with the University of Calgary Cumming School of Medicine General Pathology Residency Training program to enhance training opportunities for both residents and fellows. Fellows undergo clinical laboratory rotations at the Diagnostic & Scientific Centre (community general chemistry, immunology, endocrinology, analytical therapeutic and drug monitoring, toxicology and special chemistry), acute care hospitals and urgent care centers (chemistry and core laboratories), pediatric clinical chemistry, and point-of-care testing as well as participate in the general pathology call schedule. Clinical chemistry fellows also have the opportunity to engage in other rotations such as newborn screening, biochemical genetics, molecular diagnostics, and rural laboratory management. The Fellowship program also has a reciprocal arrangement with the Cumming School of Medicine Division of Endocrinology and Metabolism to train endocrinology fellows in the basics of clinical chemistry while sending clinical chemistry fellows to shadow endocrinologists at their clinics. Graduates of our program are eligible to work in North America and can take the Canadian Academy of Clinical Biochemistry specialist certification examination in Canada and the American Board of Clinical Chemistry examination in the United States. Our graduate last year, Dr. Jason Robinson has taken the clinical chemist/division head position at Health PEI in Charlottetown. Our current chief fellow, Dr. Heather Paul continues to progress in her studies and is set to graduate in June 2020. Our junior fellow, Dr. Dustin Proctor commenced his studies in July 2019 and was recruited from the Hotchkiss Brain Institute, University of Calgary.

The following Clinical Fellows, trained at APL:

Fellows (2017-2020)	Specialty Area	Supervisor	Year
Robinson, Jason	Clinical Biochemistry	Drs. Hossein Sadrzadeh & Alex Chin	2017-2019
Thommasen, Amy	Dermatopathology	Dr. Thomas Brenn	2018-2019
Brett, Mary-Anne	Gynecological Pathology	Dr. Martin Koebel	2018-2019
Tompkins, Jeffrey	Hematopathology	Dr. Iwona Auer	2018-2019
Gao, Yuan	Genitourinary Pathology	Dr. Asli Yilmaz	2018-2019
Gareau, Alison	Histocompatibility	Dr. Nouredine Berka	2018-2020
Paul, Heather	Clinical Biochemistry	Drs. Hossein Sadrzadeh & Alex Chin	2018-2020

Graduate Students

There is currently no experimental pathology graduate program in the Faculty of Graduate Studies; however, a number of graduate students are supervised by members of the Department.

Pathologists' Assistant M.Sc. (Program Director, Bill Gorday - Medical Director, Dr. Jim Wright)

- Pathologists' Assistants (PAs) are "physician extenders" for anatomic pathologists. PAs perform delegated medical tasks under the supervision of a medically qualified pathologist. They perform initial examination, dissection, and gross description of surgically removed tissues, assist in dissection of bodies during autopsies.

sies, and perform intraoperative frozen sections. They possess a highly standardized skill set related to each of these procedures, allowing pathologists to spend more of their time looking at slides and performing diagnostic work.

- The thesis-based Pathologists' Assistants (PA) Masters program at the University of Calgary began in 2012 as a specialization within Medical Sciences Graduate studies and in 2016 transitioned to a course based Masters Program under Graduate Science Education at the Cumming School of Medicine.
- The PA program is accredited by The National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), an American agency that accredits training programs of allied health professionals who work in anatomic pathology or clinical pathology laboratories. The PA program's 5 year NAACLS accreditation was up for renewal in April, 2019. On April 29th and 30th, 2019, we had the NAACLS site visit and were formally awarded accreditation on October 31st, 2019, for another 5 year cycle. Accreditation of the program is a huge benefit to our students, as it makes them eligible to write the American Society of Clinical Pathology board certification exam and Canadian Certification Council of Pathologists' Assistants exam, which allows them to work anywhere in North America.
- Currently the program is only one of two NAACLS accredited Pathologists' Assistant programs in Canada.
- Program Statistics- Graduation rate 100%, Attrition rate 0%, Employment rate 100%, ASCP Exam pass rate 100%, CCCPA-CCCAP exam pass rate 100%. Exam pass rates are based on eligible graduates who wrote the exam within one year of graduation. Students have found employment within the provinces of Alberta, Saskatchewan, Nova Scotia and Ontario.
- The program currently admits six students a year.
- The program has practical affiliations with APL (Calgary), Chinook Regional Hospital (Lethbridge), Medical Examiner's Office (Calgary), Vancouver General Hospital, BC Children's Hospital and the University of Saskatchewan College of Medicine.
- Affiliation agreements with BC Children's Hospital and the University of Saskatchewan College of Medicine were recently signed in 2019. We hope to send the first students to both sites in 2020 and 2021.

Continuing Medical Education

APL provides teaching for Medical Laboratory Technologists (MLT)/Medical Laboratory Assistants (MLA), Cyto-technology, Combined Laboratory and X-Ray Technologists (CLXT) Education Program. Additionally, department members provide weekly CME Rounds and participate in numerous Department of Medicine Rounds as well as presentations at National and International conferences.

Research (APL and Externally Funded)

APL Research

With the transition of lab services to Alberta Precision Laboratories, the general direction of APL Research changed from Corporate Services to APL Operations, under Christine Yamniuk, the director of Provincial Integrated Programs.

Research workload and demand for APL Research Lab Services continues to grow. APL Research is currently supporting >1800 active Clinical Trials and Research studies across the Province.

Focus on Provincial research lab standardization with an emphasis on research lab service delivery and patient care. Transitioned the Edmonton Zone Clinical Trial and Research billing to the APL Calgary research invoicing process.

Implementation of APL research services onto Connect Care involving regular meetings with Epic/ Beaker was a top priority for 2019. Implementation of Connect Care for Wave 1 in Edmonton Zone went live for APL Clinical Trials and Research on November 3, 2019.

Close collaboration with AHS Health Systems Access Director and Provincial Lead, Health Evidence & Innovations, System Innovations & Programs has been a major focus as we move forward with Connect Care to ensure consistency in lab ordering practices for Clinical Trials and Research studies across the Province.

Regular meetings with Beaker analysts, APL Finance and Hospital Billing to ensure adequate cost recovery and invoicing for research lab activity with the implementation of Connect Care has been and continues to be a challenge and work in progress.

APL Research functional planning with the New Cancer Care Centre is still underway, however high level planning is complete.

APL Calgary Research was invited to participate in Clinical Trials Market Day held at the HRIC atrium on May 16, 2019 where we had an opportunity to display our APL research services.

Alberta Clinical Health Research Conference was held on September 20, 2019, hosted by Alberta Innovates.

Choosing Wisely Alberta Symposium was held on March 18, 2019: Beyond Awareness to Implementing Change.

Glans-Look Lung Cancer Research Day was held on May 27, 2019 and was well attended. APL Research supports several active lung studies such as POET: Precision Oncology Experimental Therapeutics.

The 2019 APL Calgary Research Undergraduate Summer Studentship Competition was a success again this year:

Supervisor	Student	Project
Dr. Tarek Bismar	Robert Kelsey Young	Characterization of driver genes on 7p14 and 7q22 amplicons to identify novel therapeutic targets for PCa
Dr. Deirdre Church	Spencer Wildman	Development of an LC-MS/MS based metabolomics method to rapidly diagnose Urinary Tract Infections
Dr. Poonam Dharmani-Khan	Meriam Berka	Chimerism assessment in Acute Myeloid Leukemia (AML) specific target cells to predict AML relapse after allogeneic HCT
Dr. Faisal Khan	Rebecca Chen	Assessment of Somatic Gene Mutational Landscape of Acute Myeloid Leukemia in Alberta

APL funded the following annual 2019 Research Competition projects for Calgary Zone:

Competition Year	Principal Investigator/ Co- Investigators	Topic	Budget
2019	Dr. Johann Pitout Dr. Gisele Peirano, Dr. William Stokes (Resident)	Genomic epidemiology of Enterobacter cloacae complex causing bloodstream infections in the Calgary Region (2015-17)	\$14,998.00
2019	Dr. Martin Koebel	Clinically relevant molecular risk stratification of ovarian endometrioid carcinoma	\$15,000.00
2019	Dr. Michael Parkins Dr. Dan Gregson, Dr. Ranjani Somayaji, Dr. John C. Lam (Resident)	Prevalence and outcomes of high inoculum cefazolin-resistant Staphylococcus aureus blood stream infections in the Calgary Health Zone	\$9,000.00
2019	Dr. Nouredine Berka Dr. Alison Gareau (Fellow), Dr. Ahmed Mostafa	The Significance of Non-HLA Antibodies in Kidney Transplant Rejection	\$15,000.00
2019	Dr. Parham Minoo Dr. Ksenia Chezars (Resident)	Molecular Alterations in Appendiceal Serrated Polyps and their Relationship to Serrated Colorectal Polyps and to the Carcinogenic Pathway of Low-Grade Appendiceal Mucinous Neoplasms	\$14,943.00
2019	Dr. Thomas Brenn Dr. Martin Hycza	Genetic landscape of salivary gland basal cell adenoma and adenocarcinoma	\$15,000.00
2019	Dr. Thomas Griener Dr. Deirdre Church, Dr. Michael Groeschel, Dr. Tarah Lynch	Broad-range 16S rRNA PCR using Nanopore Next-Generation Sequencing Technology	\$14,900.00
Competition Total			\$98,841.00

Anatomic Pathology Research Lab (APRL)

The lab specialists working at the APRL had another busy and productive year in support of research.

- Requests for stained slides doubled this past year.
- Collaboration with AP leadership and the clinical IHC lab was very successful. When AP IHC lab requires new IHC tests to be added to their current test list, APRL lab specialists will work up the new antibody and then transfer the optimal conditions to AP IHC for finalization. The APRL Lab specialists also build TMA's for the clinical lab to use as IHC controls.
- APRL lab specialists drafted an APRL top 150 New Antibody list. Some of the antibodies have the potential to be used as diagnostic and prognostic markers. The APRL lab specialists reviewed the accumulated >400 IHC antibodies developed at the APRL, and selected the best 150 IHC markers. It is anticipated that at some time in the future the list could be made available to researchers to promote research and the potential clinical use of these antibodies.
- In addition to performing conventional IHC assays and TMA construction, the APRL lab specialists have spent considerable time and effort developing new research methods. They have made DNA CISH a routine practice and have developed a new RNA CISH assay. The CISH CCNE tests have generated promising data which will lead to good outcomes including grant applications and publications.
- The lab specialists started some PCR based molecular assays in 2019 which can be used for gene mutation studies. They developed an assay to successfully extract and amplify DNA from a very limited amount of tissue and from aged FFPE sections. This procedure yielded a sufficient amount of DNA for downstream DNA sequencing.

There were 16 publications related to APRL services and contributions:

- Mahra Nourbakhsh, and Parham Minoo. Annexin A10 and HES-1 Immunohistochemistry in Right-sided Traditional Serrated Adenomas Suggests an Origin from Sessile Serrated Adenoma. *Applied immunohistochemistry & Molecular Morphology*: January 16, 2019.
- Xianying Gui, Martin Köbel, Jose GP Ferraz, Marietta Iacucci, Subrata Ghosh, Shuhong Liu, Young Ou, Marco Perrizzolo, Robert J Winkfein, Peter Rambau, Douglas J Demetrick. Histological and molecular diversity and heterogeneity of precancerous lesions. Associated with inflammatory bowel disease. *J Clin Pathol* 2019; 0:1-12.
- Harvey B. Sarnat. Proteoglycan (Keratan Sulfate) Barrier in Developing Human Forebrain Isolates Cortical Epileptic Networks From Deep Heterotopia, Insulates Axonal Fascicles, and Explains Why Axosomatic Synapses Are Inhibitory. *J Neuropathol Exp Neurol* • Vol. 78, No. 12, December 2019, pp. 1147–1159.
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- Woodbeck R, Kelemen LE, Köbel M. Ovarian Endometrioid Carcinoma Misdiagnosed as Mucinous Carcinoma: An Underrecognized Problem. *Int J Gynecol Pathol.* 2019 Nov; 38(6):568-575.
- Lac V, Verhoef L, Aguirre-Hernandez R, Nazeran TM, Tessier-Cloutier B, Praetorius T, Orr NL, Noga H, Lum A, Khattra J, Prentice LM, Co D, Köbel M, Mijatovic V, Lee AF, Pasternak J, Bleeker MC, Krämer B, Brucker SY, Kommos F, Kommos S, Horlings HM, Yong PJ, Huntsman DG, Anglesio MS. Iatrogenic endometriosis harbors somatic cancer-driver mutations. *Hum Reprod.* 2019 Jan 1; 34(1):69-78.
- Wang L, Rambau PF, Kelemen LE, Anglesio MS, Leung S, Talhouk A, Köbel M. Nuclear β -catenin and CDX2 expression in ovarian endometrioid carcinoma identify patients with favourable outcome. *Histopathology.* 2019 Feb; 74(3):452-462.
- Köbel M, Luo L, Grevers X, Lee S, Brooks-Wilson A, Gilks CB, Le ND, Cook LS. Ovarian Carcinoma Histotype: Strengths and Limitations of Integrating Morphology With Immunohistochemical Predictions. *Int J Gynecol Pathol.* 2019. Jul; 38(4):353-362.
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Publications

Department members with a primary appointment in the DPLM and whose primary remuneration is derived from either APL or UofC DPLM (i.e., list excludes cross-appointments) published 233 peer-reviewed papers and book chapters in 2019.

Presentations

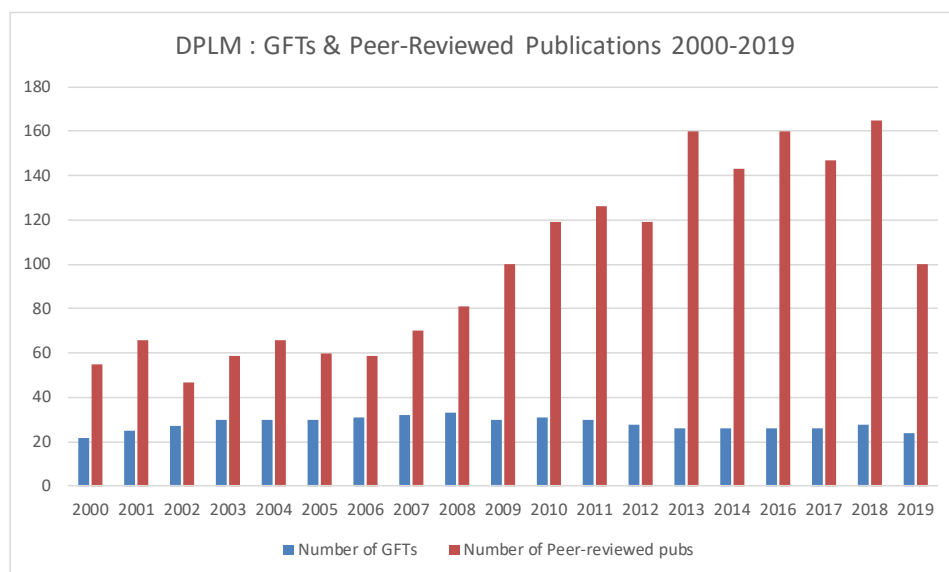
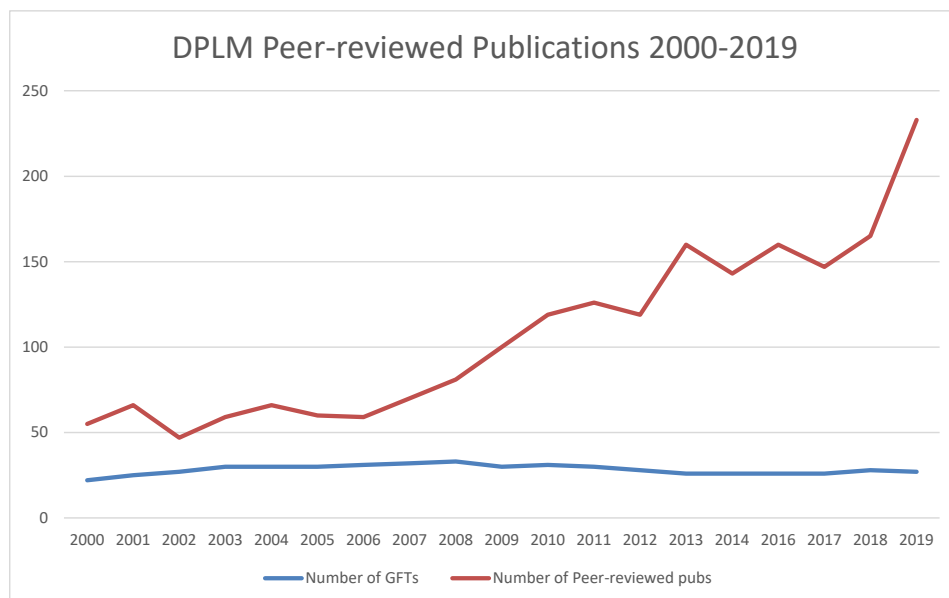
Members of the DPLM also presented many scientific papers at prestigious national or international meetings in 2019. While such presentations generally represent the generation of new knowledge, these are not listed here as the assumption is that the important presentations will be turned into peer-reviewed publications and will appear in a subsequent DPLM Annual Report.

Research Grants

Another measure of research productivity is peer-reviewed grant funding. For a complete list of Departmental research grant holdings, both as principle investigator, co-investigator and collaborator, please refer to Appendix 1.4.

Medical Leadership and Administration

- Dr. Martin Hyrcza, Head & Neck/Endo Specialty Group Leader
- Dr. Martin Koebel, Gynecological Pathology, Specialty Group Leader
- Dr. Steve Gorombey, Cytopathology, Specialty Group Leader
- Dr. Thomas Brenn, Dermatopathology, Specialty Group Leader



Workforce Planning

Summary of Recruitment/Departures - 2019

Medical Staff - Recruitment			
Medical Staff	Start Date	GFT/Clinical	Primary Division
Shao, Xiao Xia (Tiffany)	2019 July	Clinical Assistant Professor	Anatomic Pathology
Siadat, Farshid	2019 July	Clinical Assistant Professor	Anatomic Pathology
Orton, Dennis	2019 July	Clinical Assistant Professor	Clinical Biochemistry
Cota Schwarz, Ana	2019 July	Clinical Assistant Professor	Anatomic Pathology
Santiago Lisboa, Luiz	2019 July	Clinical Assistant Professor	Microbiology
Thommasen, Amy	2019 July	Clinical Assistant Professor	General Pathology
Mirza, Imran	2019 August	Clinical Professor	Hematopathology
Medical Staff - Departures			
Oryschak, Allan	2019 March	Clinical Associate Professor	Anatomic Pathology
Sinclair, Gary	2019 March	Adjunct Associate Professor	Hematopathology
Abi Daoud, Marie	2019 October	Clinical Assistant Professor	Anatomic Pathology
Demetrick, Douglas	2019 December	Professor	Anatomic Pathology

Appendices

1.1 Membership Lists

Clinical Section of Anatomical Pathology				
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Abi Daoud, Marie	Clinical	Assistant Professor	DSC	Dermatopathology
Anders, Karl	Clinical	Associate Professor	SHC	Surgical Pathology
Benediktsson, Hallgrimur	GFT	Professor	FMC	Renal Pathology, Transplantation
Bismar, Tarek	GFT	Professor	RGH	Genitourinary Pathology Anatomic Pathology
Box, Adrian	Clinical	Assistant Professor	FMC	Molecular Genetic Pathology
Brenn, Thomas	GFT	Professor	DSC	Dermatopathology
Bromley, Amy	Clinical	Associate Professor	FMC	Autopsy Pathology
Brown, Holly	Clinical	Assistant Professor	RGH	Dermatopathology
Brundler, Marie-Anne	GFT	Professor	ACH	Pediatric Pathology
Bures, Nicole	Clinical	Assistant Professor	DSC	Cytopathology, Breast Pathology
Caragea, Mara	Clinical	Assistant Professor	FMC	Bone & Soft Tissue Pathology
Chan, Elaine	Clinical	Assistant Professor	ACH	Pediatric Pathology
Chan, Jennifer	GFT	Associate Professor	FMC	Neuropathology
Cota Schwarz, Ana	Clinical	Assistant Professor	FMC	Surgical Pathology, General Pathology, Hematopathology
Demetrick, Douglas	GFT	Associate Professor	HSC	Molecular Pathology
Duggan, Maire	GFT	Professor	FMC	Cytopathology, Gynecological Pathology
Dvorakova, Marie	Clinical	Assistant Professor	DSC	Cytopathology
Eidus, Leslie	Clinical	Associate Professor	RGH	Gastrointestinal Pathology
Falck, Vincent	Clinical	Associate Professor	FMC	Gastrointestinal Pathology, Surgical Pathology
Franko, Angela	Clinical	Assistant Professor	FMC	Pulmonary Pathology
Galman, Lanie	Clinical	Assistant Professor	SHC	Breast Pathology, Oncologic Surgical Pathology
Gao, Chen	Clinical	Assistant Professor	DSC	Cytopathology
George, David	Clinical	Associate Professor	FMC	Renal Pathology

Clinical Section of Anatomical Pathology				
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Gorecki, Margaret	Clinical	Assistant Professor	DSC	Surgical Pathology, Cytopathology
Gorombey, Steve	Clinical	Assistant Professor	PLC	Cytopathology, General Pathology
Gough, James	Clinical	Professor	FMC	Renal Pathology, Cytopathology
Guggisberg, Kelly	Clinical	Assistant Professor	RGH	ENT Pathology, Dermatopathology
Howell, Jenika	Clinical	Assistant Professor	PLC	Surgical Pathology
Hunter, Charlene	Clinical	Associate Professor	DSC	Surgical Pathology Dermatopathology
Hyrcza, Martin	Clinical	Assistant Professor	FMC	Head/Neck, Endocrine & Ophthalmic Pathology
Itani, Doha	Clinical	Associate Professor	FMC	Molecular Genetic Pathology Hematopathology
Joseph, Jeffrey	GFT	Professor	FMC	Neuropathology
Kelly, Margaret	GFT	Associate Professor	FMC	Surgical Pathology, Pulmonary Pathology
Khalil, Moosa	Clinical	Associate Professor	FMC	Cytopathology, Surgical Pathology, Endocrine Pathology
Klonowski, Paul	Clinical	Assistant Professor	DSC	Surgical Pathology, Lab Informatics
Koebel, Martin	GFT	Associate Professor	FMC	Gynecological Pathology, Autopsy
Koro, Konstantin	Clinical	Assistant Professor	FMC	Gastrointestinal & Liver Pathology
Kulaga, Andrew	Clinical	Associate Professor	RGH	Genitourinary Pathology, Surgical Pathology
Kurek, Kyle	GFT	Assistant Professor	ACH	Pediatric Pathology
Lee, Sandra	Clinical	Assistant Professor	SHC	Gynecological Pathology
Luedtke, Chad	Clinical	Assistant Professor	SHC	Breast Pathology
Medlicott, Shaun	Clinical	Associate Professor	RGH	Gastrointestinal Pathology
Minoo, Parham	Clinical	Associate Professor	FMC	Surgical Pathology, Hematopathology
Morava-Protzner, Izabella	Clinical	Associate Professor	PLC	Surgical Pathology
Naert, Karen	Clinical	Assistant Professor	DSC	Dermatopathology
Ng, Denise	Clinical	Assistant Professor	FMC	Surgical Pathology Neuropathology
Nikolic, Ana			FMC	Neuropathology
O'Connor, Kate	Clinical	Assistant Professor	FMC	Surgical Pathology Gastrointestinal & Breast Pathology
Ogilvie, Travis	GFT	Associate Professor	FMC	Breast Pathology, Gynecological Pathology, Molecular Pathology
Paslowski, Doreen	Clinical	Assistant Professor	RGH	Breast Pathology, Surgical Pathology
Pinto-Rojas, Alfredo	Clinical	Associate Professor	ACH	Pediatric Pathology
Rashid-Kolvear, Fariborz	Clinical	Associate Professor	DSC	Cytogenetics
Resch, Lothar	GFT	Associate Professor	FMC	Neuropathology
Schell, Andrew	Clinical	Assistant Professor	RGH	Gastrointestinal Pathology
Schneider, Michelle	Clinical	Assistant Professor	DSC	Dermatopathology
Shao, Xiao Xia	Clinical	Assistant Professor	FMC	Renal Pathology
Siadat, Farshid	Clinical	Assistant Professor	RGH	Genitourinary Pathology
Sienko, Anna	Clinical	Clinical	PLC	Surgical Pathology, Cytopathology
Simpson, Roderick	GFT	Professor	FMC	Head & Neck Pathology
Swanson, Paul	Clinical	Full Professor	DSC	Bone & Soft Tissue Gastrointestinal Path, Breast Path Lung & Thoracic, ENT
Teman, Carolin	Clinical	Associate Professor	FMC	Surgical Pathology Hematopathology
Terzic, Tatjana	Clinical	Assistant Professor	DSC	Cytopathology, Gynecologic Pathology

Clinical Section of Anatomical Pathology				
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Trpkov, Kiril	GFT	Professor	RGH	Genitourinary Pathology, Renal Pathology
Urbanski, Stefan	Clinical	Professor	FMC	Gastrointestinal Pathology, Liver Pathology, Pulmonary Neoplasia
Waghray, Ranjit	Clinical	Professor	DSC	Surgical Pathology, Cytopathology
Wang, Yinong	Clinical	Associate Professor	DSC	Surgical Pathology, Cardiac Pathology
Whitcomb, Emma	Clinical	Assistant Professor	SHC	GI/Liver Pathology
Wright, James	GFT	Professor	ACH	Pediatric and Perinatal Pathology Experimental Pathology
Yang, Hua	Clinical	Associate Professor	FMC	Breast Pathology
Yilmaz, Asli	GFT	Associate Professor	RGH	Genitourinary Pathology, Surgical Pathology
Yu, Weiming	Clinical	Associate Professor	ACH	Pediatric Pathology, Cardiac Pathology
Clinical Section of Clinical Biochemistry				
Medical/Scientific Staff	GFT/ Clinical	Rank	Site	Special Expertise
Boyd, Jessica	Clinical	Associate Professor	DSC	Analytical and Environmental Toxicology
Chin, Alex	Clinical	Associate Professor	DSC	Immunochemist, Clinical Chemistry
de Koning, Lawrence	Clinical	Associate Professor	ACH	General Pathology, Pediatric Clinical Chemistry
Gifford, Jessica	Clinical	Assistant Professor	DSC	Clinical Biochemistry
Lynch, Tarah	Clinical	Assistant Professor	DSC	Bioinformatics, Microbial Genomics
Orton, Dennis	Clinical	Assistant Professor	DSC	Clinical Biochemistry
Sadrzadeh, Hossein	Clinical	Professor	DSC	Endocrinology, Nutrition Pharmacogenomics, Clinical Biochemistry
Seiden Long, Isolde	Clinical	Associate Professor	FMC	Clinical Biochemistry
Venner, Allison	Clinical	Associate Professor	DSC	Clinical Chemistry
Clinical Section of General Pathology				
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Abdullah, Amid	Clinical	Assistant Professor	DSC	General Pathology
Flynn, Ethan	Clinical	Associate Professor	DSC	General Pathology
Larsen, Erik	Clinical	Assistant Professor	RGH	Surgical Pathology, Clinical Chemistry
Mourad, Walid	Clinical	Professor	DSC	General Pathology Hematopathology, Cytopathology
Naugler, Christopher	GFT	Professor	DSC	Lab Informatics, General Pathology
Thommasen, Amy	Clinical	Assistant Professor	DSC	General Pathology, Dermatopathology
Clinical Section of Hematopathology				
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Auer, Iwona	Clinical	Associate Professor	FMC	Flow Cytometry, Lymphoma
Berka, Nouredine	Clinical	Professor	DSC	Tissue Typing
Dharmani-Khan, Poonam	Clinical	Assistant Professor	FMC	Transplantation Immunology, Flow Cytometry and Transcriptome Analysis
Fourie, Thomas	Clinical	Assistant Professor	FMC	Hematological Pathology, Flow Cytometry
Jiang, Xiu Yan (Sue)	Clinical	Associate Professor	DSC	Hematopathology
Khan, Faisal	GFT	Associate Professor	HMRB	Tissue Typing

Clinical Section of Hematopathology				
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Mahe, Etienne	Clinical	Assistant Professor	FMC	Hematopathology & Transfusion Medicine
Mansoor, Adnan	GFT	Professor	FMC	Hematopathology
Mirza, Imran	Clinical	Professor	FMC	Medical Genetics in Molecular Genetic Pathology
Prokopishyn, Nicole	Clinical	Assistant Professor	FMC	Stem Cell Lab
Roshan, Tariq	Clinical	Assistant Professor	FMC	Hematopathology
Shabani-Rad, Meer-Taher	Clinical	Associate Professor	FMC	Hematopathology
Shameli, Afshin	Clinical	Assistant Professor	FMC	Hematopathology
Clinical Section of Microbiology				
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Berenger, Byron	Clinical	Assistant Professor	DSC	Medical Microbiology
Brown, Kristen	Clinical	Assistant Professor	DSC	Medical Microbiology
Carson, Julie	Clinical	Associate Professor	DSC	Mycology, Enterics, Wounds
Chan, Wilson	Clinical	Assistant Professor	DSC	Telediagnostics, Mycology, Parasitology
Church, Deirdre	GFT	Professor	DSC	Medical Microbiology, HIV Diagnostics, STDs, Anaerobes, Mycology
Gregson, Daniel	GFT	Associate Professor	DSC	Virology, Sirology, General Microbiology
Griener, Thomas	Clinical	Assistant Professor	DSC	Medical Microbiology
Groeschel, Michael	Clinical	Assistant Professor	DSC	Medical Microbiology
Pillai, Dylan	GFT	Professor	DSC	Molecular Diagnostics Parasitology
Pitout, Johann	GFT	Professor	DSC	Antibiotic susceptibility/ARO Bacteriology, Parasitology
Santiago Lisboa, Luiz	Clinical	Assistant Professor	DSC	Medical Microbiology
Clinical Section of Transfusion Medicine				
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Baskin, Leland	Clinical	Professor	DSC	Chemical Pathology, General Pathology
Sidhu, Davinder	Clinical	Associate Professor	FMC	General Pathology, Transfusion Medicine

1.2 Current Workforce Plan (see Workforce Planning)

1.3 Scholarly Publications

Department members with a primary appointment in the DPLM and whose primary remuneration is derived from either APL or UofC DPLM (i.e., list excludes cross-appointments) published 233 peer-reviewed papers and book chapters in 2019.

Abi Daoud, Marie

Gill P, Naugler C, Abi Daoud M. Utility of multistep protocols in the analysis of sentinel lymph nodes in cutaneous melanoma: as assessment of 194 cases. Arch Pathol Lab Med. 143(9):1126-1130, 2019

Gill P, Naugler C, **Abi Daoud M**. Utility of Ber-EP4 and MOC-31 in basaloid skin tumour detection. Appl Immunohistochem Mol Morphol. 27(8):584-588, 2019

Benediktsson, Hallgrimur

Sporinova B, McRae SA, Muruve DA, Fritzler MJ, Nasr SH, Chin AC, Benediktsson H. A case of aggressive atypical anti-GBM disease complicated by CMV pneumonitis. BMC Nephrol. 20(1):29, 2019

Smith, A., V. Iablokov, M. Mazza, S. Guarnerio, V. Denti, M. Ivanova, M. Stella, I. Piga, C. Chinello, B. Heijs, P. A. van Veelen, **H. Benediktsson**, D. A. Muruve, and F. Magni. 2020. Detecting Proteomic Indicators to Distinguish Diabet-

ic Nephropathy from Hypertensive Nephrosclerosis by Integrating Matrix-Assisted Laser Desorption/Ionization Mass Spectrometry Imaging with High-Mass Accuracy Mass Spectrometry. *Kidney Blood Press Res* 45: 233-248.

Berenger, Byron

Berenger BM, Demczuk W, Gratrix J, Pabbaraju K, Smyczek P, Martin I. Genetic Characterization and Enhanced Surveillance of Ceftriaxone-Resistant *Neisseria gonorrhoeae* Strain, Alberta, Canada, 2018. *Emerg Infect Dis*. 25(9):1660-1667, 2019

Berenger BM, Ferrato C, Chui L. Viability of bacterial enteropathogens in fecal samples in the presence or absence of different types of transport media. *Diagn Microbiol Infect Dis*. 95(3):114862, 2019

Kellner T, Parsons B, Chui L, **Berenger BM**, Xie J, Burnham CA, Tarr PI, Lee BE, Nettel-Aguirre A, Szelewicki J, Vanderkooi OG, Pang XL, Zelyas N, Freedman SB. Comparative Evaluation of Enteric Bacterial Culture and a Molecular Multiplex Syndromic Panel in Children with Acute Gastroenteritis. *J Clin Microbiol*. 57(6) e00205-19, 2019

Lisboa LF, Szelewicki J, Lin A, Latonas S, Li V, Zhi S, Parsons BD, **Berenger B**, Fathima S, Chui L. Epidemiology of Shiga Toxin-Producing *Escherichia coli* O157 in the Province of Alberta, Canada, 2009–2016. *Toxins (Basel)*. 11(10) E613, 2019

Smyczek P, Chu A, **Berenger B**. Emerging international strain of multidrug-resistant *Neisseria gonorrhoeae*: Infection in a man with urethral discharge. *Can Fam Physician*. 65(8):552-554, 2019

Tarr GAM, Chui L, Lee BE, Pang XL, Ali S, Nettel-Aguirre A, Vanderkooi OG, Berenger BM, Dickinson J, Tarr PI, Drews S, MacDonald J, Kim K, Freedman SB. Performance of Stool-testing Recommendations for Acute Gastroenteritis When Used to Identify Children With 9 Potential Bacterial Enteropathogens. *Clin Infect* 69(7):1173-1182, 2019

Xie J, Tarr GAM, Ali S, Chui L, Pang XL, Lee BE, Vanderkooi OG, Tarr PI, Zhuo R, Parsons B, **Berenger BM**, Kim K, Freedman SB. Pigment Visibility on Rectal Swabs Used To Detect Enteropathogens: a Prospective Cohort Study. *J Clin Microbiol*. 57(6) e00213-19, 2019

Berka, Nouredine

Brown N, Khan F, Alshaikh B, **Berka N**, Liacini A, Alawad E, Yusuf K. CD-34+ and VE-cadherin+ endothelial progenitor cells in preeclampsia and normotensive pregnancies. *Pregnancy Hypertens*. 16:42-47, 2019

Gareau AJ, Mostafa AA, Williams J, Stamm L, **Berka N**. Identification of a novel HLA-C allele, HLA-C*07:778, in an unrelated hematopoietic stem cell donor. *HLA*. 94(2):161-162, 2019

Gareau AJ, Mostafa AA, Stamm L, Khan F, **Berka N**. The identification of a novel HLA-B allele, HLA-B*27:05:38. *HLA*. 94(2):157-158, 2019

Smith AG, Pereira S, Jaramillo A, Stoll ST, Khan FM, **Berka N**, Mostafa AA, Pando MJ, Usenko CY, Bettinotti MP, Pyo CW, Nelson WC, Willis A, Askar M, Geraghty DE. Comparison of sequence-specific oligonucleotide probe vs next generation sequencing for HLA-A, B, C, DRB1, DRB3/B4/B5, DQA1, DQB1, DPA1, and DPB1 typing: Toward single-pass high-resolution HLA typing in support of solid organ and hematopoietic cell transplant programs. *HLA*. 94(3):296-306, 2019

Bismar, Tarek

Abou-Ouf H, Ghosh S, Box A, Palanisamy N, **Bismar TA**. Combined loss of TFF3 and PTEN is associated with lethal outcome and overall survival in men with prostate cancer. *J Cancer Res Clin Oncol*. 145(7):1751-1759, 2019

Alshalalfa M, Liu Y, Wyatt AW, Gibb EA, Tsai HK, Erho N, Lehrer J, Takhar M, Ramnarine VR, Collins CC, Den RB, Schaeffer EM, Davicioni E, Lotan TL, **Bismar TA**. Characterization of transcriptomic signature of primary prostate cancer analogous to prostatic small cell neuroendocrine carcinoma. *Int J Cancer*. 145(12):3453-3461, 2019

Boufaied N, Takhar M, Nash C, Erho N, **Bismar TA**, Davicioni E, Thomson AA. Development of a predictive model for stromal content in prostate cancer samples to improve signature performance. *J Pathol*. 249(4):411-424, 2019

Boyd, Jessica

Boyd JM, Leugh AA, Sadrzadeh SMH, Pamporaki C, Pacak K, Deutschbein T, Flidner S, Kline GA. A high rate of modestly elevated plasma normetanephrine in a populations referred for suspected PPGL when measured in a seated position. *European Journal of Endocrinology*. 181(3):301-309, 2019

Box, Adrian

Abou-Ouf H, Ghosh S, **Box A**, Palanisamy N, Bismar TA. Combined loss of TFF3 and PTEN is associated with lethal outcome and overall survival in men with prostate cancer. *J Cancer Res Clin Oncol*. 145(7):1751-1759, 2019

Brenn, Thomas

Rashid M, van der Horst M, Mentzel T, Butera F, Pace A, Rütten A, Luzar B, Marusic Z, de Saint Aubain N, Ko JS, Billings SD, Chen S, Abi Daoud M, Hewinson J, Louzada S, Harms PW, Patel RM, von der Weyden L, Bakal C, Hornick JL, Arends MJ, **Brenn T**, Adams DJ. ALPK1 hotspot mutation as a novel driver of human spiradenoma and spiradenocarcinoma. *Nat Commun*. 10(1):2213, 2019

Wiedemeyer K and **Brenn T**. Sweat gland carcinomas with nodular and basaloid differentiation. *Diagnostic Histopathology*. 25(3):96-102, 2019

Wong K, Robles-Espinoza CD, Rodriguez D, Rudat SS, Puid S, Mateu MP, Wong CC, Hewinson J, Aguilera P, Buig-Butille JA, Bressac de Paillerets B, Zattara H, van der Weyden L, Fletcher CDM, **Brenn T**, Arends MJ, Quesada V, Newton-Bishop J, Lopez-Otin C, Bishop DT, Harms PW, Johnson TM, Durham AB, Lombard DB, Adams DJ. POT1 germline missense variant p.I78T and its association with familial melanoma. *JAMA Dermatol*. 155(5):604-609, 2019

Wong K, van der Weyden L, Schott CR, Foote A, Constantino-Casas F, Smith S, Dobson JM, Murchison EP, Wu H, Yeh I, Fullen DR, Joseph N, Bastian BC, Patel RM, Martincorena I, Robles-Espinoza CD, Iyer V, Kuijter ML, Arends MJ, **Brenn T**, Harms PW, Wood GA, Adams DJ. Cross-species genomic landscape comparison of human mucosal melanoma with canine oral and equine melanoma. *Nat Commun*. 10(1):353, 2019

Brundler, Marie-Anne

Chan E, Brundler MA, Zhang K. Identification of *Fusobacterium nucleatum* in formalin-fixed, paraffin-embedded placental tissues by 16S rRNA sequencing in a case of extremely preterm birth secondary to amniotic fluid infection. *Pathology*. 51(3):320-322, 2019

Chan, Elaine

Chan ES, Lauzon J, Resch L, Argiropoulos B, Schmitt L, Chadha R. Atypical Prenatal Ultrasound Presentation and Neuropathological Findings in a Neonate With Alpha Thalassemia Major: A Case Report. *Pediatr Dev Pathol*. 22(2):166-170, 2019

Chan ES, Lauzon J, Resch L, Argiropoulos B, Schmitt L, Chadha R. Authors' Response: Prenatal Ultrasound Presentations in Late Pregnancies Affected With Alpha Thalassemia Major. *Pediatr Dev Pathol*. (6):605, 2019

Chan E, Brundler MA, Zhang K. Identification of *Fusobacterium nucleatum* in formalin-fixed, paraffin-embedded placental tissues by 16S rRNA sequencing in a case of extremely preterm birth secondary to amniotic fluid infection. *Pathology*. 51(3):320-322, 2019

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1.4 Research Grants

APL funded the following annual 2019 Research Competition projects for Calgary Zone. A total of \$98,841.00 was awarded by APL to researchers in 2019.

Principal Investigator/ Co-Investigators	Topic	Budget
Dr. Johann Pitout, Dr. Gisele Peirano, Dr. William Stokes (Resident)	Genomic epidemiology of Enterobacter cloacae complex causing bloodstream infections in the Calgary Region (2015-17)	\$14,998.00
Dr. Martin Koebel	Clinically relevant molecular risk stratification of ovarian endometrioid carcinoma	\$15,000.00
Dr. Michael Parkins, Dr. Dan Gregson, Dr. Ranjani Somayaji, Dr. John C. Lam (Resident)	Prevalence and outcomes of high inoculum cefazolin-resistant Staphylococcus aureus blood stream infections in the Calgary Health Zone	\$9,000.00

Principal Investigator/ Co-Investigators	Topic	Budget
Dr. Nouredine Berka, Dr. Alison Gareau (Fellow), Dr. Ahmed Mostafa	The Significance of Non-HLA Antibodies in Kidney Transplant Rejection	\$15,000.00
Dr. Parham Minoo, Dr. Ksenia Chezar (Resident)	Molecular Alterations in Appendiceal Serrated Polyps and their Relationship to Serrated Colorectal Polyps and to the Carcinogenic Pathway of Low-Grade Appendiceal Mucinous Neoplasms	\$14,943.00
Dr. Thomas Brenn, Dr. Martin Hyrcza	Genetic landscape of salivary gland basal cell adenoma and adenocarcinoma	\$15,000.00
Dr. Thomas Griener, Dr. Deirdre Church, Dr. Michael Groeschel, Dr. Tarah Lynch	Broad-range 16S rRNA PCR using Nanopore Next-Generation Sequencing Technology	\$14,900.00
Competition Total		\$98,841.00

2019 External Research Grants and Awards

(held by DPLM Faculty) - Does not include those of cross-appointments

Medical Staff	Year	Funding Source	Total Award	*PI/Co-Inv
Berka, Nouredine				
Precision Medicine Can PREVENT AMR: Applying Precision Medicine Technologies in Canada to Prevent Antibody Mediated Rejection and Premature Kidney Transplant Loss	2018-2022	2017 Large-Scale Applied Research Project Competition Genomics and Precision Health	\$9,700,000.00	Co-Ap- plicant & End User
Bismar, Tarek				
Characterization of Novel Molecular Signature for Accurately Predicting Prostate Cancer Progression in Active Surveillance	2018-2021 Oct - Sept	Prostate Cancer Canada	\$1,499,650.00	PI
Role of WNT/B-Catenin pathway in transition from cirrhosis to hepatocellular carcinoma	2018-2020	Cultural and Educational Bureau of Egypt in Canada	\$2,500.00	PI
Employing Biomarkers in Active Surveillance Prostate Cancer – Improved Clinical Management and Addressing Overtreatment	2018-2019 Aug - July	Arnie Charbonneau Cancer Institute	\$50,000.00	PI
Novel molecular biomarkers of Genitourinary, Breast & Gynecological malignancies in United Arab Emirates population	2017-2019	Sheikh Hamdan Bin Rashid Al Maktoum Award for Medical Sciences	\$48,183.00	PI
Chan, Jennifer				
Drivers of oligodendrocyte precursor cell dysfunction in the origin and maintenance of oligodendroglioma	2019-2022	Canadian Institutes of Health Research (CIHR)	\$502,606.00	PI
PROFYLE Model Systems Activities in Calgary	2019-2022	Alberta Cancer Foundation, partnered with Terry Fox Research Institute	\$276,500.00	PI
Precision Oncology for Young People (PROFYLE)	2016-2021	Terry Fox Research Institute	\$159,254.00	Co-Inv

Medical Staff	Year	Funding Source	Total Award	*PI/Co-Inv
Church, Deirdre				
Rapid Infection Diagnostics (RID) Centre: A new weapon in the global battle against infections	2020-2022	Canadian Foundation for Innovation (CFI)	~\$10,000,000.00	Co-Inv
Reducing the burden of antimicrobial resistance via rapid diagnosis of urinary tract infections	2019-2022	Canadian Institutes of Health Research (CIHR)	\$725,000.00	Co-Inv
Reducing the Global Burden of Infectious Diseases through Precision Population Health	2018-2022	Genome Alberta (Large Scale Applied Research Project (LSARP)	\$11,030,000.00	Co-Inv
Microscale Metabolomics for rapid Detection of Infections and Identification of Drug Resistance	2017-2021	Genomic Applications Partnership Program (GAPP)/Genome Canada	\$6,024,696.00	Co-Inv
Microscale Metabolomics for Rapid Detection of Infections and Identification of Drug Resistance	2016-2019	Biomedical Engineering, University of Calgary	\$150,000.00	Co-Inv
de Koning, Lawrence				
Development of novel risk prediction scores for emergency department patients with suspected coronary artery disease.	2019-2021	Canadian Institutes of Health Research (CIHR)	\$123,000.00	Co-Inv
Maternal Iron Nutrition & its Consequences in Pregnant Women & Their Children in The AB Pregnancy Outcomes & Nutrition (APrON)	2018-2020	Canadian Institutes of Health Research (CIHR)	\$385,000.00	Co-Inv
Demetrick, Doug				
Demetrick DJ. Identification of NTRK-fusion Cancers.	Jan-Dec 2020	Bayer	\$25,798.00	PI
Characterizing sexually dimorphic drug metabolism using induced pluripotent stem cell derived hepatocytes	2017-2019	Canadian Institutes of Health Research (CIHR)	\$80,000.00	Co-Inv
Dharmani-Khan, Poonam				
Early Detection of Acute Myeloid Leukemia (AML) relapse after allogeneic HCT	2019-2022	Alberta Cancer Foundation (ACF) R. K. Dixon Award	\$925,000.00	Co-Inv
Green, Francis				
The improvement of mine safety and Health	2017-2020	Alpha Foundation USA	\$1,800,000.00 \$75,000.00 USD	Co-Inv Dr. Franko
High resolution microscopy of living human cells using Richardson Technology Microscopy	2004-2020	Multiple Sources	\$509,145.00	PI
Gregson, Daniel				
Reducing the burden of antimicrobial resistance via rapid diagnosis of urinary tract infections	2018-2023	University of Calgary	\$225,000.00	Co-Inv
Research Funds	2018-2023	University of Calgary/ Operating Grant	\$32,308.00	PI
AMR One Health Consortium 2018-2023 Alberta Economic Development and Trade	2018-2023	Alberta Economic Development and Trade	\$140,000.00	Co-Inv

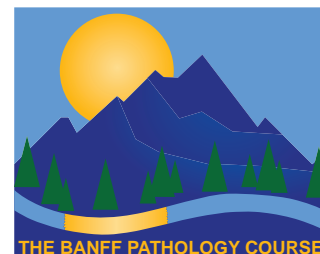
Medical Staff	Year	Funding Source	Total Award	*PI/Co-Inv
Microscale Metabolomics for rapid Detection of Infections and Identification of Drug Resistance	2017-2020	Genomic Applications Partnership Program (GAPP) /Genome Alberta	\$6,024,696.00	Co-Inv
Joseph, Jeffrey				
Donald Burns and Louise Berlin Professor in Dementia Research	2015-2020	University of Calgary	\$500,000.00	PI
Calgary Brain Bank	2015-2020	Marion Lamb (Private)	\$500,000.00	PI
Kelly, Margaret				
ACHF Pediatric Chair in Respiriology	2019-2024	ACHRI, Alberta Lung Association, Cumming School of Medicine, UofC	\$1,000,000.00	PI
CIHR Fall 2019 Project Grant	2019-2024	CIHR	\$839,590.00	Co-Inv
Khan, Faisal				
Early detection of Acute Myeloid Leukemia Relapse after Allogeneic Hematopoietic Cell Transplantation	2019-2022	R.K. Dixon Award, Alberta Cancer Foundation	\$925,000.00	PI
Methylation Patterns of cell-free DNA as a Biomarker of Erythroid Engraftment post-Hematopoietic Stem Cell Transplantation for Sickle Cell Anemia	2018-2020	Innovation Research Grant. Department of Pediatrics, University of Calgary	\$25,000.00	Co-Inv
Role of Natural Killer Cells in Blood and Marrow Transplantation	2016-2020	Anonymous donation for HCT Research	\$185,000.00	PI
Immunogenetic Biomarkers Important for Pathogenesis and Therapy of Complications of Paediatric Hematopoietic Cell Transplantation	2015-2020	Alberta Children Hospital Foundation Equipment funds as part of Childhood Cancer Research Program	\$300,000.00	PI
Role of Natural Killer Cells Receptor genes in the immunopathogenesis and prognosis of different types of Lymphoma	2015-2019	Alberta Cancer Foundation	\$97,125.00	PI
5+14=0: A new Maths based on KIR genes to reduce Graft versus host disease after allogeneic HCT	2014-2020	Buckley Family Cancer Research Excel Award	\$193,000.00	PI
Barb Ibbotson ACHF Chair Award	2010-2020	Alberta Children's Hospital Foundation	\$500,000.00, (\$50,00.00 per year)	PI
Koebel, Martin				
A Population-Based Study of Ketorolac and Ovarian Cancer Survival	2019-2023	National Institutes of Health (NIH)	\$1,430,914.00	Co-Inv
Validation of CCNE1 as prognostic marker in tubo-ovarian high-grade serous carcinoma	2018-2020	Terry Fox Research Institute	\$25,000.00	PI
Kurek, Kyle				
ROHHAD: Stem Cell Models to Investigate Cause and Consequences	2019-2020	ROHHAD Foundation (UK)	\$150,000.00	Co-PI
ROHHAD- Determining the Genetic Basis	2019-2020	Illumina Corporation	\$300,000.00	Co-PI

Medical Staff	Year	Funding Source	Total Award	*PI/Co-Inv
ROHHAD Syndrome The project aims to determine the genetic basis for this rare disorder, Rapid-onset Obesity with Hypothalamic dysfunction, Hypoventilation, and Autonomic Dysregulation, and to characterize the neural crest tumors associated with this condition	2018-2020	ROHHAD Fight Association Award	\$132,000.00	Co-PI
Non-heritable genetic diseases of the skeletal system: pathogenesis and treatment. The project aims to establish several animal models for PIK3CA-associated vascular anomaly-overgrowth disorders and to determine the genetic basis for other vascular and skeletal disorders	2014-2019	National Institutes of Health (NIH)- National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)	\$500,000.00	Co-PI
Mansoor, Adnan				
Pan Canadian harmonization of Immunohistochemistry protocols for cell of origin classification of diffuse large B-cell lymphoma (DLBCL)	2017-2022	Jensen Canada / Johnson & Johnson Research Fund	\$56,430.00	Co-PI
Naugler, Christopher				
Reducing the Global Burden of Infectious Diseases through Precision Population Health	2018-2022	Genome Alberta (Large Scale Applied Research Project (LSARP)	\$11,030,000.00	Co-Inv and Clinical Lead
De-implementing low value care: a research program of the Choosing Wisely Canada Implementation Research Network	2018-2022	Canadian Institutes of Health Research (CIHR) SPOR Innovative Clinical Trial Multi-Year Grant	\$3,000,000.00, \$1,500,000.00 (CIHR) + \$1,500,000.00 (Matching Funds)	Co-Inv
Understanding the barriers and facilitators to care in patients with poorly controlled diabetes	2017-2019	Canadian Diabetes Association Operating Grant	\$274,338.00	Co-Inv
Using novel population-based datasets to produce and implement clinical prediction models for preterm preeclampsia stillbirth, maternal ICU and long-term cardiovascular disease among Canadian women	2016-2020	Canadian Institutes of Health Research (CIHR) Project Scheme	\$36,382.00	Co-Inv
Misutilization of laboratory tests: pathways to correction	2015-2020	Canadian Institutes of Health Research (CIHR) Foundation Scheme	\$1,056,420.00	PI
Misutilization of laboratory tests: pathways to correction	2015-2020	University of Calgary & AB Innovates Health Solutions	\$25,000.00	PI
Improving the efficient and equitable care of patients with chronic medical conditions	2014-2019	Alberta Innovates Health Solutions, CRIO Team Grant	\$5,000,000.00	Collaborator
Implementation and evaluation of a clinical pathway for chronic kidney disease in primary care	2014-2019	Canadian Institutes of Health Research (CIHR)	\$524,421.00	Co-Inv

Medical Staff	Year	Funding Source	Total Award	*PI/Co-Inv
Pillai, Dylan				
Calgary Colombo Dengue Diagnosis	2019-2020	University of Calgary International	\$12,500.00	PI
C. difficile near patient testing (NPT): a cluster randomized trial	2018-2020	Clinical Research Fund, University of Calgary	\$50,000.00	PI
C. difficile near patient testing (NPT): a cluster randomized trial	2017-2020	Canadian Institutes of Health Research (CIHR)	\$328,950.00	PI
LAMP diagnostic for malaria in pregnancy	2017-2019	Grand Challenges Canada	\$100,000.00	PI
Pitout, Johann				
The molecular basis of the carbapenem resistance epidemic	2018-2022	National Institutes of Health (NIH)	\$190,000.00	PI
Escherichia coli ST131: a model for high-risk transmission dynamics of antimicrobial resistance	2017-2020	Joint Programming Initiative on Antimicrobial Resistance (JPIAMR/CHIR)	\$599,000.00	PI
Schell, Andrew				
Fecal Immunochemical Test for post-polypectomy surveillance to reduce unnecessary endoscopy (FIT2RUN Study)	2019-2022	Canadian Institutes of Health Research (CIHR)	\$225,676.00	CO-Inv
Zhang, Kunyan				
Molecular assay development and their applications in the Centre for Antimicrobial Resistance (CAR) Program	2017-2022	Alberta Health Services-CAR Program Laboratory Operating Grant	\$300,000.00	PI
Development of a New Multiplex PCR (M-PCR) Assay for Rapid Detection of Methicillin-Resistant Staphylococcus aureus (MRSA) Directly from Clinical Samples. (AMR Phase I)	2017-2020	Canadian Institutes of Health Research (CIHR) Operating Grant	\$389,976.00 (CIHR: \$194,988.00; Industrial Partner Funds: \$194,988.00)	PI

1.5 Banff Pathology Course

2019 Banff Pathology Course Program
Breast Pathology
Banff Centre for Arts and Creativity
September 4-7, 2019



Wednesday, September 4	
08:00-17:00	Resident Leadership Focus Day
17:00-18:30	Registration is open in KC 200 Galleria South
Thursday, September 5	
06:30-07:30	Registration in KC 200 Galleria South
06:30-07:30	Full Breakfast in KC103
07:30-07:40	Introductory Remarks & Welcome (Drs. Mengel/Naugler) in KC 201/203
Morning Theme: Recurring Problems in Breast Pathology	
07:40-08:40	Keynote - Dr. Hannah Wen: Molecular Classification and Prognostic Testing in the Management of Breast Cancer
08:40-09:30	Special-type and Uncommon Breast Cancers, Dr. Mara Rendi
09:30-10:20	Handling of Neoadjuvant Breast, Dr. Deborah Dillon
10:20-10:50	Break KC 200 Galleria North
10:50-11:40	New Developments in Triple Negative Breast Cancer, Dr. Hannah Wen
11:40-12:30	Updates on the 8th Edition of the AJCC Breast Cancer Staging Manual, Dr. Mara Rendi
12:30-14:00	Joint Sponsored Lunch Symposium (Merck & Astra Zeneca)
Afternoon Theme: Benign Conditions and Mimickers of Disease	
14:00-15:00	Breast Biomarkers - Current Standard and Future Assays, Dr. Deborah Dillon
15:00-15:20	The Changing Role of Cytology in Breast Pathology, Dr. Moosa Khalil
15:20-15:40	Case Presentation, Dr. Peter Dromparis
15:40-16:00	A Tumor with Many Faces (Case Presentation), Dr. Jennifer Vuong
16:00-17:00	PD-L1 Testing in Breast Cancer Symposium
17:30	Wine & Cheese Reception in KC 105
Friday, September 6	
06:30-07:30	Registration in KC 200 Galleria South
06:30-07:30	Full Breakfast in KC 103



07:30-07:40	Introductory Remarks & Welcome (Drs. Naugler/Mengel) in KC 201/203
Morning Theme: Recurring Problems in Breast Pathology	
07:40-08:40	The Low Grade Breast Neoplasia Pathway Keynote - Dr. Mara Rendi
08:40-09:30	Epithelial and Myoepithelial Proliferations, Dr. Deborah Dillon
09:30-10:20	Fibroepithelial Lesions, Dr. Hannah Wen
10:20-10:50	Break KC 200 Galleria North
10:50-11:40	Papillary Lesions, Dr. Sveta Silverman
11:40-12:00	Case Presentation, Dr. Erene Farag
12:00-12:20	Case Presentation, Dr. Hunter Wang
12:20-14:00	Lunch KC103
12:30-14:00	ASLP Annual Meeting in KC 205
14:00-15:00	Keynote - Inflammatory Conditions and Benign Mimics of Carcinoma, Dr. Hannah Wen
15:00-15:40	Nipple Lesions, Dr. Deborah Dillon
15:40-16:00	Vascular Lesions of the Breast, Dr. Hua Yang
17:30 - 19:00	Wine & Cheese Reception (Sponsored by Hologic)
Saturday, September 7	
06:30-07:30	Registration in KC 200 Galleria South
06:30-07:30	Full Breakfast in KC 105
07:30-07:40	Introductory Remarks & Welcome (Drs. Naugler/Mengel) in KC 201/203
Morning Theme: Clinical-Pathologic Correlation and Emerging Therapies for Breast Cancer	
07:40-08:40	Estrogen Treatment in ER+ Breast Cancers Keynote - Dr. Judith Hugh
08:40-09:20	Radiologic-Pathologic Correlation of Breast Lesions, Dr. Hua Yang
09:20-09:50	Pathology Requirements for Surgical Assessment, Dr. David Olson
09:50-10:20	Oncoplastic Surgery in Breast Cancer, Dr. Lashan Peiris
10:20-10:50	Break KC 200 Galleria North
10:50-11:40	
11:40-12:10	Pathological Considerations with respect to Radiotherapy Treatment Decision Making and Planning, Dr. Jeff Cao
12:10-12:30	Case Presentation, Dr. David Beyer
12:30	Closing Remarks in KC 201/203
12:40	Departure



