Established in 1977 by Drs. James Hogg and Peter Paré

Director: Dr. Keith Walley
Associate Directors: Dr. Gordon Francis, Dr. Tillie-Louise Hackett

Principal Investigators: 33
Early Career Investigators: 6
Investigators: 19
Research Associates: 6
Technicians: 25
Visiting Scientists: 10
Post-Doctoral Fellows: 23
Graduate Students: 42
Other Students: 40
Core/Operations Staff: 31
TOTAL: 234
Funding in FY 2016-17: $9.05 Million (as of March 31, 2018)
Space: over 50,000 square feet
Hosted Biotech / Spin-off companies: 5

CORE Facilities:
Cardiovascular Registry
Lung Tissue Registry
Cellular Imaging and Biophysics
Imaging Services
Histology
Molecular Phenotyping
Preclinical Services
Clinical Research
Information Technology
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MESSAGE FROM THE DIRECTOR

Dear Colleagues,

This Annual Report highlights the achievements of the Centre for Heart Lung Innovation’s (HLI) Investigators, trainees, and staff in 2017.

Our success as a world-class research facility continues with the release of 323 publications for the calendar year 2017 and the receipt of $ 9.05 Million in funding for fiscal year 2017/2018. In 2017, we continued to gain exceptional researchers by adding Dr. Stacey Skoretz as an Investigator as well as two new Early Career Investigators, Dr. Ma’en Obeidat and Dr. Andrew Thamboo.

This past year, HLI researchers had phenomenal success in attracting prestigious and diverse research funding and awards, including a new multi-million dollar Canada Foundation for Innovation grant and numerous grants from the Canadian Institutes for Health Research, Genome BC, and the BC Lung Association.

The scientists, trainees and staff at the HLI would like to thank our funding partners: Canadian Institutes for Health Research, Canada Foundation for Innovation, BC Knowledge Development Fund, Providence Health Care, University of British Columbia, Heart and Stroke Foundation of BC and Yukon, BC Lung Association, the St Paul’s Foundation, the National Institutes of Health, and many vendors and industrial collaborators, for their crucial support of our ongoing programs for the race against cardiovascular, pulmonary, and critical care disease.

As this was my final year as Director, I would like to thank all of the investigators, trainees, and staff at the HLI for their outstanding contributions over the last 5 years that have resulted in tremendous productivity and achievements. Our success in publications, funding, and awards speaks for itself and highlights the tremendous impact we have on the UBC and Providence Health Care communities and our larger impact on the international research community. I am proud of our achievements and look forward to the continued success of the HLI under the new interim co-Directors, Dr. Tillie Hackett and Dr. Gordon Francis.

With kind regards,

Keith R. Walley, MD
Director, Centre for Heart Lung Innovation
Professor of Medicine, UBC
Associate Director ICU, St. Paul’s Hospital
The Centre for Heart Lung Innovation (HLI; previously known as the iCapture and James Hogg Research Centre) is a University of British Columbia (UBC) Senate-approved Centre of Cardiovascular, Pulmonary, and Critical Care expertise, housed within Providence Health Care at St Paul’s Hospital. The HLI’s dual reporting structure is shown below in Figure 1. This ensures that the research conducted within the HLI adheres to the UBC Strategic Research Plan and is focused on the Providence Health Care “populations of emphasis” that include people with heart and lung disease.

Figure 1. Governance structure of the Centre for Heart Lung Innovation. 2017
The management structure under the HLI Executive involves a team approach led by Principal Investigators, Operations staff, and the Technology Cores.

Figure 2. Management structure of the Centre for Heart Lung Innovation.
HLI Researchers Dr. Denise Daley and Dr. Andrew Sandford have made a discovery that could help parents prevent potentially deadly peanut reactions in their children.

“We've identified genes that predispose to the development of peanut allergy and to food allergy in general.”

The gene is called c11orf30 or EMSY for short. It’s already known to play a role in other allergic conditions such as eczema, asthma or hay fever, but this is the first time EMSY has been connected to a food allergy.

“Food allergy is the result of both genetic and environmental factors, but there are surprisingly few data regarding the genetic basis of this condition,” says Dr. Daley. This research could lead to new diagnostic methods and better treatment options.


For more: https://globalnews.ca/news/3798670/peanut-allergy-genetics/

Dr. Scott Tebbutt and Dr. Chris Carlsten develop a blood-based biomarker panel for Western Red Cedar Asthma

Western red cedar asthma (WRCA) is the most common form of occupational asthma in the Pacific Northwest. WRCA is caused by sensitivity to plicatic acid, which is found in western red cedar dust. Until now, diagnosis of WRCA was costly, time-consuming and logistically challenging, involving multiple bronchial challenges.

HLI investigators Drs. Scott Tebbutt and Chris Carlsten, along with several trainees in their labs, developed a blood-based biomarker panel to classify, at baseline (before allergen challenge), allergen-positive from allergen-negative subjects. In addition to diagnosing WRCA, transcriptional changes observed in the blood may help elucidate the disease mechanisms of WRCA. Further validation of the blood biomarker panel with a larger cohort will confirm its robustness.

HLI Investigators discover link between IgG deficiency and COPD

Reduced levels of immunoglobulin G (IgG) in the blood are associated with respiratory tract infections, which in turn are the major trigger of exacerbations in Chronic Obstructive Pulmonary Disease (COPD).

Using data from two large COPD trials (MACRO and STATCOPE), HLI investigators Drs. Don Sin and Paul Man, along with Early Career Investigator Janice Leung and trainee Fernando Sergio Leitao Filho, found that reduced total IgG levels, in a dose dependent manner, are significantly and independently related to COPD exacerbations and hospitalizations.

Because patients with selective IgG deficiency are at increased risk of respiratory infections and because respiratory infections are the leading cause of COPD exacerbations and hospitalizations, these data raise the possibility that selective IgG deficiency may be a common (modifiable) contributor of exacerbations in COPD. Further studies will investigate whether IgG replacement therapy may decrease the risk of COPD hospitalization and exacerbations.


Cardiovascular researchers at the HLI developed a new transplantation model and identified new biomarkers of cardiac viability

Over the last decade, the number of adults awaiting a heart transplant has increased by ~25%, yet the number of transplants performed annually has remained static creating a critical shortage of donor hearts. One potential solution to this problem is organ donation after circulatory death (DCD). However, there is reluctance to use DCD hearts, due to an inability to precisely identify hearts that have suffered irreversible injury.

In this study, Drs. Kearns and Boyd, along with other HLI investigators, investigated novel biomarkers and clinically relevant endpoints to identify features that are associated with hearts that are irreversibly damaged and thus not suitable for transplant. Using a rat model, they discovered a novel gene expression signature that was associated with severely injured hearts during ex vivo heart perfusion. These authors concluded that ex vivo heart perfusion appears to be necessary in order to unmask the distinguishing features of severely injured DCD hearts and that mRNA signatures may be useful for detecting injury in potential donor hearts.

Physical activity is known to have a protective effect against cardiovascular disease in high-income countries, where such activity is mainly recreational. But does non-recreational physical activity (the main form of exercise in lower-income countries) also decrease cardiovascular disease and mortality?

In one of the largest studies ever published on the heart health benefits of physical activity, Dr. Scott Lear and his collaborators found that a mere 150 minutes spent exercising per week – regardless of the type of physical activity – could cut a person’s risk of cardiovascular disease and death.

The researchers tracked exercise levels – as well as the rate of cardiovascular disease (including heart attacks, stroke, and heart failure) and all-cause mortality – of more than 130,000 adults living in 17 high (Canada, Sweden, United Arab Emirates), middle (Argentina, Brazil, Chile, Poland, Turkey, Malaysia, South Africa) and low-income countries (Bangladesh, India, Pakistan, Zimbabwe).

Following the study participants for an average of seven years, they found that the people who reported at least 150 minutes of physical activity per week were much healthier than their sedentary counterparts. Physically active participants were less likely to have heart attacks, strokes and cardiovascular disease, and less likely to die from any cause. Getting only two and a half hours of weekly exercise was associated with a 28 percent reduction in premature death, and a 20 percent reduction in heart disease.

All forms of exercise appeared to reduce a person’s risk of death and disease, whether people were sweating away in a gym class, cleaning their house, or simply walking to work.


For more: http://www.cbc.ca/news/health/physical-activity-pure-1.4301443

https://www.reuters.com/article/us-health-activity/a-daily-half-hours-exercise-could-prevent-1-in-12-early-deaths-study-shows-idUSKCN1BW34M


“Our findings indicate that non-recreational activity – work, housework, active transportation – is just as beneficial in reducing the risk for premature death and heart disease.”

Dr. Scott Lear: Lancet study shows that all physical activity lowers mortality and heart disease risks
HLI Investigators use micro-CT to evaluate emphysema phenotypes

Disease in the small conducting airways (those that are less than 2 mm in diameter) and emphysematous destruction are major pathologic features of Chronic Obstructive Pulmonary Disease (COPD).

Emphysematous destruction takes many forms (such as centrilobular, or panlobular), and can be categorized based on its morphology, but current computed tomography imaging cannot resolve the small conducting airways down to the level of the terminal bronchioles.

A team of HLI researchers including Drs. James Hogg, Peter Paré, Naoya Tanabe, Dragos Vasilescu and others, used micro-computed tomography (microCT) to investigate the microstructure of the bronchioles immediately proximal to the terminal bronchioles. In this way, they were able to quantitatively evaluate emphysematous phenotypes. In the future, this methodology can be extended to image all of the lobular airways, and then to link small airways CT imaging with the molecular determinants associated with different pathologic phenotypes of COPD.


Researchers at the HLI investigated the role of surfactant protein-D in atherosclerosis

Surfactant protein-D (SP-D) is a pneumoprotein that is predominantly synthesized by epithelial cells in the lung; however individuals with higher circulating levels of SP-D are at an elevated risk of mortality from ischemic heart disease. Whether SP-D contributes directly to atherosclerosis is unknown.

In this study, Drs. Francis, Bernatchez, Man, and Sin, along with researchers in their labs, determined the effects of deleting the SP-D gene on atherosclerosis using a mouse model. They found that mice deficient in SP-D were less likely to develop atherosclerosis when fed a high fat diet, in part due to decreased accumulation and proliferation of macrophages and reduced systemic levels of interleukin-6. Interestingly, mice deficient in SP-D were also more likely to develop hypercholesterolemia and obesity. Combined, these results suggest that SP-D may be a promising target for COPD patients with cachexia (excessive loss of weight) who have elevated circulating SP-D levels and are therefore at increased risk of cardiovascular morbidity and mortality.

The Centre for Heart Lung Innovation was successful in attracting $11.8 million in research funding for the previous fiscal year, 2016-17, which equates to 10.2% of all of the UBC Faculty of Medicine.

Available data for the fiscal year 2016–2017 indicates that the HLI Investigators were successful in attracting $8.1 million (as of March 31, 2018) in external research grants and contracts.

Details about the HLI’s funding for fiscal year 2016 – 2017 can be found in Appendix A.
HLI Investigators

33 PRINCIPAL INVESTIGATORS

Michael Allard
Pascal Bernatchez
John Boyd
Liam Brunham
Pat Camp
Chris Carlsten
Harvey Coxson
Denise Daley
Del Dorscheid
Gordon Francis
David Granville
Jordan Guenette
Tillie Hackett
James Hogg
Andrew Krahn
Scott Lear
Jonathon Leipsic
Honglin Luo
Paul Man
Bruce McManus
Raymond Ng
Peter Paré
Brad Quon
James Russell
Chris Ryerson
Andrew Sandford
Chun Seow
Don Sin
Wan Tan-Hogg
Scott Tebbutt
Stephan van Eeden
Keith Walley
Decheng Yang

6 EARLY CAREER INVESTIGATORS

Mari DeMarco
Zachary Laksman
Janice Leung
Ma'en Obeidat
Michael Seidman
Andrew Thamboo

19 INVESTIGATORS

Tony Bai
Jamil Bashir
Sammy Chan
Ed Conway
Mark Fitzgerald
Jiri Frohlich
Andy Ignazewski
Ismail Laher
Samuel Lichtenstein
John Mancini
Ed Moore
Simon Pimstone
Fabio Rossi
Robert Schellenberg
Peter Skarsgard
Stacy Skoretz
David Walker
Pearce Wilcox
Jian Ye
Andrew Thamboo, MD
Clinical Assistant Professor, UBC
Research Director, Sinus Centre, St. Paul’s Hospital

Dr. Andrew Thamboo medically and surgically manages chronic sinusitis and sinonasal tumours at St. Paul’s Sinus Centre and at Surrey Memorial Hospital. He also has a cross appointment with Vancouver General Hospital and Royal Columbian Hospital performing skull base procedures with the Neurosurgery team. He is the Research Director of the St. Paul’s Sinus Centre. In collaboration with Respirologists, he has a lab associated with the Heart and Lung Institute. Dr. Thamboo has an interest in areas of unified airway hypothesis, upper airway physiology, office based rhinology and outcomes research. He is a recent recipient of the Michael Smith Foundation Health Investigator Award.

Stacey Skoretz, PhD, CCC-SLP, R.SLP
Assistant Professor, School of Audiology & Speech Sciences, Faculty of Medicine, UBC
Assistant Clinical Professor, Department of Clinical Care Medicine, Faculty of Medicine and Dentistry, U of A

Dr. Skoretz is a medical Speech-Language Pathologist, Principal Investigator for the Swallowing Sciences Research Laboratory (SSRL) and Assistant Professor (tenure-track) with the School of Audiology and Speech Sciences in the Faculty of Medicine at the University of British Columbia (UBC) in Vancouver. She is also Assistant Clinical Professor with the Department of Critical Care in the Faculty of Medicine and Dentistry at the University of Alberta in Edmonton. According to Dr. Skoretz, "the SSRL utilizes a clinical-research framework where we aim to improve health outcomes following dysphagia through evidence-based assessment and management. Our goals include: understanding the physiological processes underlying cross-system involvement in swallowing following critical illness, engaging patients to ensure patient-centered and individualized therapeutic approaches, and linking research to practice through knowledge synthesis and translation endeavours." Dr. Skoretz was awarded the Dysphagia Research Society New Investigator Award in 2012. In addition to conducting research in both British Columbia and Alberta, she teaches graduate-level courses in the areas of swallowing and motor speech at UBC-Vancouver.
Ma'en Obeidat, BSPPharm, PhD
Assistant Professor, Medicine, UBC

Dr. Ma'en Obeidat is the Computational Genomics Lead at the Providence Airway Centre and has been recently appointed Assistant Professor in the UBC Department of Medicine, Division of Respiratory Medicine. His research focuses on the use of integrative omics and big data to discover novel therapeutic and biomarker solutions and to enable precision medicine for respiratory diseases. In particular, Dr. Obeidat has pioneered the use of integrative genomics in lung tissue, blood and airway epithelium to map the causal genes and proteins underlying the risk for respiratory diseases. To date, he has identified over 100 novel genetic loci associated with variation in lung function measures, and his work has resulted in 50 publications. Dr. Obeidat received fellowship awards from CIHR, Michael Smith Foundation for Health Research and recently is the only Canadian in the last 5 years to receive the prestigious Parker B. Francis Fellowship award. He has recently been awarded funding from the BC Lung Association and Canadian Lung Association. He supervises a team of data scientists and statisticians and works closely with a large team including clinicians (lead by Dr. Don Sin), cell biologists and graduate students.
Michael Allard  
*UBC Department of Pathology and Laboratory Medicine*

Dr. Allard's research program focuses on adaptation of the heart to physiological states, such as endurance exercise, and pathological processes, such as hypertension, that result in cardiac hypertrophy. He is particularly interested in how these conditions alter substrate use by the heart and how changes in substrate use influence heart function. A major recent focus of his research has been delineation of the cellular and molecular mechanisms that account for the alterations in substrate use by the hypertrophied heart.

Pascal Bernatchez  
*UBC Department of Anesthesiology, Pharmacology, and Therapeutics*

Dr. Bernatchez's research program is aimed at the dynamic interplay between blood vessel homeostasis and chronic diseases, such as hypertension, atherosclerosis, rare muscular dystrophies and aortic aneurysm associated with Marfan syndrome, as well as exploring novel pharmacological approaches to treat and prevent endothelial dysfunction and its consequences. Dr. Bernatchez’s most recent work focuses on the novel regulation mechanism of nitric oxide bioavailability and its role in vascular disease, and how plasma lipid levels influence the loss of muscle function in dystrophic patients.

John Boyd  
*UBC Department of Medicine*

Dr. Boyd’s clinical research program is focused on defining and reversing the elements of the host response that causes sudden organ failure during severe infection. In collaboration with Dr. Robert Hancock, he recently identified a 31 gene endotoxin tolerance profile which predicts subsequent organ failure. Following the recent discovery of the role of the PCSK9 enzyme in the clearance of pathogenic bacterial and fungal lipids from the bloodstream, he collaborates with Drs. Keith Walley and James Russell to develop an anti-PCSK9 therapy as a novel treatment for sepsis.

Liam Brunham  
*UBC Department of Medicine*

Dr. Brunham’s research focuses on understanding how changes in specific genes contribute to differences in drug response as well as to alterations in plasma lipid levels and their relationship to metabolic and cardiovascular disease. His laboratory uses cutting-edge approaches in human genetics including genome-wide association studies and next-generation sequencing to investigate the role of genetic variation in these phenotypes. In December 2015, Dr. Brunham started a collaboration with Dr. Simon Pimstone to launch the SAVE BC study, aiming to identify risk factors and develop new approaches for diagnosis and treatment of BC families affected by early-onset atherosclerotic heart disease.
Dr. Camp’s research interests focus on improving the physical activity of individuals with chronic lung disease. Currently, she has three main pillars of research: 1) rehabilitation for hospitalized patients with an acute exacerbation of COPD; 2) Indigenous lung health, including epidemiological studies of COPD in remote and rural First Nations communities in BC, and developing an Indigenous pulmonary rehabilitation program; and 3) health service delivery and quality indicators for pulmonary rehabilitation programs in Canada. Her research utilizes methodologies based in implementation sciences, health services delivery, community-based research and knowledge translation. Ultimately, Dr. Camp’s research will lead to improved quality of life and physical activity for individuals with chronic lung disease.

Dr. Carlsten’s clinical and research interests centre on occupational airways disease, including the effects of inhaled exposures on asthma induction and exacerbation. His laboratory investigates the pulmonary-immunological health effects of inhaled environmental and occupational exposures, using diesel exhaust, western red cedar, and phthalates as model inhalants. His research addresses the fundamental question of the synergism of inhaled particles and allergens in mediating health effects. Dr. Carlsten’s lab uses an interdisciplinary, team-focused approach to ask related questions on genetic, cellular, functional, and epidemiologic levels.

Dr. Coxson specializes in quantitative imaging of the lung, particularly computed tomography, with correlations to quantitative pathology and pulmonary function. Dr. Coxson’s laboratory is the core imaging site for the Canadian Cohort of Obstructive Lung Disease (CanCOLD) study, a population based study of COPD, and was the core imaging analysis site for the international COPD study ECLIPSE. Dr. Coxson also works with investigators across Canada as part of the Thoracic Imaging Network of Canada and the Canadian Respiratory Research Network.

Dr. Daley is utilizing cutting-edge statistical, epigenetic, and bioinformatics techniques to obtain a better understanding of how inherited genetic variants and environmental exposures interact to modify the risk for developing disease. Her lab has recently completed several genome-wide association and sequencing studies to identify genetic susceptibility to common complex diseases such as asthma and COPD, and initiated new studies focused on the evaluation of the “epigenome”, or the genome’s response to environmental exposures. Dr. Daley’s overall research goal is to better understand the etiology of disease and the modifiable environmental risk factors to identify individuals at greatest risk and develop biomarkers and public health interventions.
Mari DeMarco  
*UBC Department of Pathology and Laboratory Medicine*

With a strong interest in bridging basic biomedical science, analytical chemistry, and laboratory medicine, Dr. DeMarco’s research group specializes in new methodological approaches for identification and quantitation of protein biomarkers of health and disease. A particular focus is advancing clinical diagnostics for neurodegenerative disorders, such as Alzheimer’s disease and frontotemporal dementia. This work to translate new biomedical discoveries into patient care is accomplished in collaboration with clinicians and scientists at HLI, the UBC Centre for Brain Health and the provincial Clinic for Alzheimer’s Disease and Related Disorders.

Delbert Dorscheid  
*UBC Department of Medicine*

Dr. Dorscheid leads an active research group investigating the role of the airway epithelium in the genesis of inflammatory airways diseases. The research program studies the role for inappropriate injury-repair cycles in the development of both chronic diseases such as asthma and acute illnesses like ALI/ARDS. Specific projects include the role of glucocorticoid-induced airway epithelial cell apoptosis, novel glycoproteins and the glycomics involved in the repair of an injured epithelium, and the expression of FasL as an immune barrier for the airway.

Gordon Francis  
*UBC Department of Medicine*

Dr. Francis’s research involves understanding the mechanisms of accumulation of cholesterol in arteries in atherosclerosis, and how to remove this cholesterol to prevent coronary heart disease and stroke. Current major projects in his lab include: understanding the role of cholesterol derived from lysosomes in regulating gene expression required for cholesterol removal from cells, and whether accumulation of excess cholesterol in lysosomes is a feature of atherosclerosis; understanding the reason arterial smooth muscle cells appear to accumulate more cholesterol than arterial macrophages; and developing synthetic peptides that turn on production of the beneficial cholesterol particles, high density lipoproteins (HDL), to help remove excess cholesterol from the artery wall and thereby reduce atherosclerosis. His lab recently demonstrated that smooth muscle cells, rather than monocyte-derived macrophages, are the primary site of cholesterol overaccumulation in human and mouse atherosclerotic plaque, which may lead to a major paradigm shift in the understanding of the pathogenesis and treatment of ischemic vascular disease.

David Granville  
*UBC Department of Pathology and Laboratory Medicine*

Dr. Granville’s research group has identified a pathogenic role for granzyme serine proteases in inflammation, impaired tissue healing and remodeling. It is now recognized that apoptosis is not the only function of granzymes and that granzymes also promote inflammation, activate protease-activated receptors, and cleave extracellular proteins. Dr. Granville’s recent publication defined a mechanism by which UV light induces GzmB in the skin, leading to collagen degradation and disrupted remodeling. In collaboration with viDA Therapeutics, Dr. Granville’s laboratory is developing a novel, small molecule inhibitor of GzmB that can be applied topically to the skin to treat UV-induced skin injury and scarring.
The primary aim of Dr. Guenette’s research program is to better understand the physiological factors that limit exercise tolerance across the spectrum of health and chronic lung disease. His lab uses a number of novel measurement techniques to simultaneously assess the respiratory, cardiovascular, muscular and neuro-physiological responses to exercise. His current project aims to identify the causes of shortness of breath in patients with interstitial lung disease (ILD) and chronic obstructive pulmonary disease (COPD). Ultimately, this research will lead to the development of more effective treatments to better manage breathlessness and improve exercise tolerance and quality of life for individuals with chronic respiratory diseases.

Dr. Hackett’s research program is focused on understanding the disruption of normal repair processes within the epithelial-mesenchymal trophic unit (EMTU) of the lung and how this propagates inflammation and tissue remodeling in patients with obstructive lung disease. Her laboratory uses an innovative and targeted approach to isolate cells from donor lungs guided by Computed Tomography imaging. The goal of this research program is to further understand the airway microenvironment to determine therapeutic targets in order to prevent the initiation and perpetuation of pathological processes which contribute to obstructive airway diseases like asthma and chronic obstructive pulmonary disease.

Dr. Hogg has been on the staff of the University of British Columbia at St. Paul’s Hospital since 1977 and is currently an Emeritus Professor of Pathology at UBC. He maintains an active research program focused on the inflammatory process in the lung with particular reference to the structure and function of the lungs in COPD. Very recently he and his colleagues used microCT to show that terminal and respiratory bronchioles are sequentially destroyed in COPD. Dr. Hogg collaborated with Dr. Avrum Spira’s group at Boston University to demonstrate a 127 gene expression signature for emphysematous destruction that showed this signature could be reversed toward control levels by the tripeptide GHK. He began to study the lung microbiome in COPD and is currently examining the host response to this microbiome in human lung.

Dr. Krahn’s current research interests include investigating the genetic causes of arrhythmias, causes of loss of consciousness, and implantable arrhythmia device monitoring. Dr. Krahn is working on creating a province-wide network that would refer individuals with inherited arrhythmia and their relatives to a clinic at St. Paul’s Hospital or Royal Jubilee Hospital in Victoria, or use telemedicine technologies to provide remote examinations and counselling.
Dr. Laksman’s research focus is on the genetic basis for diseases of the heart muscle, heart rhythm, and sudden cardiac death. An element of Dr. Laksman’s work involves using a stem cell model and growing heart cells in a dish. In doing so, Dr. Laksman’s laboratory can model an individual patient’s specific disease, apply medicines to it, and study the cause of the disease and the effect of treatment.

Dr. Lear’s research focuses on effective prevention and management policies and programs for cardiovascular and other chronic diseases. His research uses a population and health services approach to prevent and manage disease (www.CoHeaRT.ca). This work includes investigating how the “built” environment in which we live acts as either a barrier or facilitator of healthy behaviours. His Multi-cultural Community Health Assessment Trial (M-CHAT) is an ongoing investigation to identify the role of ethnic background in risk for obesity, diabetes and cardiovascular disease. For people with disease, Dr. Lear looks at how technology can support patients in managing their chronic diseases under the umbrella of the British Columbia Alliance for Telehealth Policy and Research (www.BCATPR.ca).

Dr. Leipsic’s research program is at the forefront of advanced imaging for structural heart disease and has helped guide the use of computed tomography in these procedures on a global scale. His team has published extensively in this realm as well as more broadly in the realm of coronary artery atherosclerosis, prognosis, and the interplay between ischemic heart and chronic obstructive pulmonary disease. Some of his work has informed and modified clinical practice on a global scale. He is extremely excited about the opportunity to continue to learn about how advanced imaging can help improve clinical practice at present, as well as allow for the potential for deeper understanding of the mechanisms and drivers of acute myocardial infarction, sudden cardiac death, and chronic pulmonary obstructive disease exacerbations.

Dr. Leung is studying the clinical outcomes, manifestations, and underlying mechanisms of HIV-associated chronic obstructive pulmonary disease. In particular, she is interested in the pathogenesis of accelerated aging in the lung and has detected signs of accelerated aging using the blood and airway epithelial cells from HIV-infected patients. Platforms for this research include next generation sequencing methylomics and transcriptomics as well as the microbiome.
Honglin Luo  
*UBC Department of Pathology and Laboratory Medicine*

The focus of Dr. Luo’s research is to define the pathogenetic determinants of virus-host interactions in enterovirus-induced heart disease. She is currently working on: (1) Protein degradation pathways, including the ubiquitin/proteasome pathway and the autophagy pathway, in virus-induced myocarditis and dilated cardiomyopathy; and (2) The molecular mechanisms of impaired cardiac function in viral myocarditis.

S.F. Paul Man  
*UBC Department of Medicine*

Dr. Man’s research expertise is in clinical trials and translational research, particularly in chronic obstructive lung disease. The clinical outcomes in COPD are unexpectedly influenced by the premature development of atherosclerosis. In close collaboration with Dr. Don Sin, he has been trying to understand epidemiological observations in clinical context, and to design and execute clinical studies and trials to test specific hypotheses.

Bruce McManus  
*UBC Department of Pathology and Laboratory Medicine*

Dr. McManus is the CEO of the Centre of Excellence for Prevention of Organ Failure (PROOF) and the Co-Director of the Institute for Heart + Lung Health. His research program is focused on mechanisms, consequences, detection and prevention of injury and aberrant repair involved in inflammatory diseases of the heart and blood vessels. Dr. McManus works in a cross-disciplinary fashion on translational research questions for which answers are critically enabled by computational sciences including molecular biomarker discovery and validation, information acquisition, annotation, and use, and registry development to support heart and lung research.

Raymond Ng  
*UBC Department of Computer Sciences*

Dr. Ng’s research focuses on data mining, which can be broadly viewed as large scale data analysis. With the advancement of computer technologies and biotechnologies, data are collected and accumulated at a phenomenal rate, however our ability to collect data far exceeds the ability to analyze them. The general focus of Dr. Ng’s research is to develop tools that can help domain experts analyze their data in ways that are feasible, efficient to deal with the volume of the data, and statistically sound. One focus is to perform gene expression profiling for various heart and blood vessel diseases. A specific goal is to identify genes and pathways that are critical to the development, and hence cure, of those diseases.

Peter Paré  
*UBC Department of Medicine*

Dr. Paré is an Emeritus Professor of Respiratory Medicine and Pathology. Dr. Paré’s research expertise is in the pathophysiology and genetics of asthma and COPD. Dr. Paré and colleague Dr. Chun Seow are investigating the molecular and bio-mechanical events which relate broncho-constricting stimuli to the ultimate airway narrowing in asthma and other obstructive airway diseases. They are examining isotonic and isometric length-tension properties, and the plastic behaviour of smooth muscle using physiologic, morphologic and biochemical approaches. With colleagues Drs. Don Sin and Ma’en Obeidat, he is studying the genetic control of gene expression in the lung and blood of COPD patients.

Bradley Quon  
*UBC Department of Medicine*

Dr. Quon is an Adult Respirologist with a primary clinical and research interest in cystic fibrosis (CF). His research focuses on bridging discoveries in the basic laboratory into the clinic to improve patient outcomes. He is currently searching for novel biomarkers of inflammation and infection to improve disease monitoring in CF. He is co-Investigator of an international collaboration examining health outcomes for individuals with CF living in Canada and the United States. He is also actively involved in several quality improvement initiatives within the St. Paul’s Hospital Adult CF clinic and several clinical trials investigating new therapies in CF.
Dr. Russell has published over 225 peer-reviewed articles and editorials as well as 43 book chapters; he serves on the editorial boards of five journals. Dr. Russell has had an active research program focused on sepsis, particularly on: (1) novel, innovative therapies for sepsis; (2) genomics and pharmacogenomics of sepsis; (3) vasopressin treatment of septic shock; and (4) novel outcomes in trials in sepsis as well as the nature and mechanisms of impaired long-term outcomes of sepsis. Dr. Russell has worked closely with Drs. Walley and Boyd to discover that inhibition of the enzyme PCSK9 could improve the outcome of sepsis. They have spun off a new biotechnology company (Cyon Therapeutics) focused on development of PCSK9 inhibitors to treat sepsis.

Dr. Ryerson specializes in interstitial lung disease (ILD), idiopathic pulmonary fibrosis (IPF), emphysema, dyspnea, and pulmonary rehabilitation. His current research aims to provide a comprehensive understanding of frailty in ILD, including its prevalence, causes, and impact on outcomes. He specifically plans to develop an improved ILD-specific rehabilitation program to target the key deficits in ILD patients. This area of research is particularly important given the marginal benefits and major toxicities of existing ILD pharmacotherapies, thus having the potential to significantly improve the lives of ILD patients.

The focus of Dr. Sandford’s research is the genetic basis of obstructive lung disease. His current work includes identification of genetic risk factors for the development of asthma and chronic obstructive pulmonary disease as well as genetic modifiers of disease severity in cystic fibrosis. He is also investigating the functional impact of genetic variants that have been associated with respiratory disease.

Dr. Seidman conducts primarily collaborative research studies, and is also working on several projects of his own design aimed at improving diagnostics in cardiovascular pathology. His areas of focus are cardiovascular pathology, research histopathology, and cardiovascular genetics. His recent discoveries include the identification of biomarkers for myocarditis.

Dr. Seow specializes in smooth and skeletal muscle cell biology/physiology. His current research focus is on the mechanical function, ultrastructure and biochemistry of airway smooth muscle in health and disease. His other interests include skeletal muscle mechanics, ATPase cycle associated with the crossbridge cycle, energetics of muscle contraction, and mathematical modeling of muscle function.

Dr. Sin’s research is geared towards biomarker discovery in COPD and related conditions such as lung cancer, ischemic heart disease and stroke. His group has shown that patients with COPD experience persistent low-grade systemic inflammation, which can be assessed by interrogating their peripheral circulation. By deploying this strategy, they found that certain pneumoproteins (proteins that are synthesized predominantly in lungs but secreted into the systemic circulation) are promising biomarkers of COPD clinical endpoints. Currently, Dr. Sin’s team is using high throughput and high volume proteomics and genomics platforms to accelerate biomarker discovery in COPD.
**Wan Tan**  
*UBC Department of Medicine*

Dr. Tan is a co-principal investigator of the Canadian Cohort of Obstructive Lung Disease (CanCOLD), a multi-centre cohort study conducted across Canada, dedicated to increasing the understanding of COPD and related co-morbidities, to improve its management and to reduce its burden. The objectives are to characterize the severity of COPD and patient response to disease (link of structural/physiological, clinical variables and health perception), while taking into account lifestyle risk factors (smoking and other modifiable risk factors), age and sex, and associated co-morbidities (cardiovascular diseases, osteoporosis, anxiety and depression).

**Scott Tebbutt**  
*UBC Department of Medicine*

Dr. Tebbutt’s research program is focused on multi-omics analyses of complex respiratory diseases, including the development of biomarker signatures of early and late reactions in allergic asthma and rhinitis. His research combines hypothesis-driven study of biological mechanisms with the development of advanced tools and technology (including bioinformatics and computational biology) to better facilitate basic and translational research. Dr. Tebbutt is also Chief Scientific Officer of the Prevention of Organ Failure (PROOF) Centre of Excellence - a not-for-profit organization dedicated to moving research findings into health care, and focused on non-invasive biomarkers.

**Stephan van Eeden**  
*UBC Department of Medicine*

The focus of Dr. van Eeden's research is on the mechanisms of lung inflammation caused by infection, cigarette smoking and air pollution. His group demonstrated that pro-inflammatory mediators generated in the lung spill over in the blood stream and are responsible for the downstream adverse cardiovascular health effects following exposure to air pollution. Dr. van Eeden recently discovered that statins, a medication commonly used to treat patients with increased blood lipid/cholesterol, significantly attenuated the inflammatory response in the lung induced by exposure to air pollution particles. This novel finding holds promise for future use of this class of drug to protect the heart and lungs during episodes of worsening air pollution.

**Keith Walley**  
*UBC Department of Medicine*

The focus of Dr. Walley’s research is to investigate: (1) the mechanism of decreased left ventricular contractility and other organ failure during sepsis, and (2) the impact of genotype on patient outcomes in sepsis and systemic inflammatory states. Dr. Walley translates basic discoveries into clinical practice in the ICU. Together with Drs. Russell and Boyd, he recently demonstrated that blocking the function of PCSK9, an enzyme that inhibits the clearance of endogenous cholesterol from blood, is associated with increased pathogen lipid clearance via the LDLR, a decreased inflammatory response, and improved septic shock outcome. This important discovery facilitated the emergence of anti-PCSK9 therapies as a one of the most promising treatments for sepsis.
The first area of Dr. Yang’s research is the molecular biology and pathogenesis of coxsackievirus, an RNA virus known to cause myocarditis. Dr. Yang is studying the mechanisms of host-pathogen interactions, viral translation initiation, and cardiovirulence with the aim to develop novel antiviral therapies to treat coxsackievirus-induced myocarditis. The second area of Dr. Yang’s research is the study of host gene responses to viral infection. He and his team have previously identified genes as well as microRNAs involved in myocarditis induction. His specific focus is the roles of these selected genes and microRNAs in signal transduction pathways and epigenetic modifications leading to cardiomyocyte apoptosis or cardiac hypertrophy. These studies have great potential to discover new targets for gene therapy and molecular markers for diagnosis of viral myocarditis and other related infectious diseases.
Dr. Keith Walley receives the PHCRI Research and Mission Award

The 2017 PHCRI Research and Mission Award was received by HLI Principal Investigator and St. Paul’s Hospital ICU physician Dr. Keith Walley. The award recognizes a scientist at PHC or PHCRI who demonstrates the mission and values of PHC while conducting outstanding research. Keith was presented with the award at the PHCRI Research Day on June 9, 2017.

Dr. James Russell receives the Aubrey J. Tingle Prize

Dr. James Russell, Professor, Division of Critical Care Medicine, Department of Medicine was named winner of the 2017 Aubrey J. Tingle Prize by Michael Smith Foundation for Health Research (MSFHR). Created in honour of MSFHR’s founding president & CEO, this award is given annually to a British Columbia clinician scientist whose work in health research has had a significant impact on advancing research and improving health, and the health system, in BC and beyond.

Dr. John Boyd receives the PHC Innovation and Translational Research Award

Dr. John Boyd won an Innovation and Translational Research Award for his study "Ex-Vivo Heart Profusion; doubling the number of heart transplants performed in British Columbia." A shortage of donor organs for heart transplantation is a significant problem leading to mortality for patients on transplant waitlists. One way to address donor scarcity is to expand the donor pool from brain-dead donors to those who have died from circulatory arrest, but assessing the viability of these organs is difficult. This research will address the pressing need to quantify organ viability from circulatory arrest donors using ex-vivo heart perfusion. “Too many patients are suffering from heart failure as a result of a shortage of donor hearts,” explains Dr. John Boyd. “This project could help by feasibly doubling the number of hearts available for transplant in British Columbia.”

Dr. Peter Paré gives the J. Burns Amberson lecture

Dr. Peter Paré was nominated to give the Amberson lecture at the 2017 American Thoracic Society meeting in Washington, DC. The J. Burns Amberson Lecture recognizes a career of major lifetime contributions to clinical or basic pulmonary research and/or clinical practice. The Lecture is given in honor of J. Burns Amberson, an international authority on chest disease and tuberculosis.
Dr. Don Sin gives the Canadian Thoracic Society Honorary Lecture at the CHEST Conference

The CTS Honorary Lecture (formerly known as the Christie Memorial Lecture) is awarded to recognize exemplary leadership in respiratory research and education in Canada. The lecture is presented as part of the honorary lecture series of the CHEST Conference. Dr. Christie was an inspiration in the development of modern respiratory medicine in Canada and was renowned as dean and head of the Department of Medicine at McGill University, Montréal, Québec, as well as being a major supporter of the CTS.

Dr. James Hogg receives an honorary doctorate from SFU

Dr. James Hogg – physician, researcher and educator – received an honorary doctorate from SFU at the June 2017 convocation ceremonies. His drive, innovation and leadership have revolutionized the medical community’s understanding and treatment of Chronic Obstructive Pulmonary Disease and asthma. He is a member of the Order of Canada.

Dr. Bruce McManus wins the Bill and Marilyn Webber Lifetime Achievement Award

The UBC Faculty of Medicine Bill and Marilyn Webber Lifetime Achievement Award was bestowed on Dr. Bruce McManus. The award is made in recognition of sustained scholarly achievement in the areas of research, teaching and/or service and honours extraordinary members of the Faculty of Medicine who have had sustained distinguished careers at UBC.

Dr. Jordan Guenette receives a Distinguished Achievement Award

Dr. Jordan Guenette received a Distinguished Achievement Awards from the UBC Faculty of Medicine for his overall excellence as an Early Career Investigator in recognition of his recent success and contributions the Department of Physical Therapy.

Dr. Liam Brunham receives a Distinguished Achievement Award

Dr. Liam Brunham received a Distinguished Achievement Awards from the UBC Faculty of Medicine for his overall excellence as an Early Career Investigators in recognition of his recent success and contributions in the Department of Medicine.
The Centre for Heart Lung Innovation’s investigators and students produced 323 publications in 2017.

**Figure 4.** Publications by the Centre for Heart Lung Innovation PIs – 10 year trend. Full details about the 2017 HLI PI publications can be found in Appendix B.
In 2017, HLI investigators published more often in high-impact journals than the average UBC or national researcher. The full list of all high impact publications (IF > 10) by HLI investigators follows.

**Figure 5.** The percentage of HLI publications in Top 10 Journals was above the UBC and Canadian average in 2017 in HLI areas of expertise.

**Figure 6.** High-Impact Publications by Total Publication Number for the Centre for Heart Lung Innovation compared to top research institutions in 2017.
**High Impact Papers By HLI Investigators in 2017**

**Lancet**

**Journal Category:**
Medicine, General and Internal

**Rank Within Category:**
2/155


**Physiological Reviews**

**Journal Category:**
Physiology

**Rank Within Category:**
1/84


**Lancet: Oncology**

**Journal Category:**
Oncology

**Rank Within Category:**
3/217


**BMJ-British Medical Journal**

**Journal Category:** Medicine, General & Internal  
**Rank Within Category:** 4/155


**European Heart Journal**

**Journal Category:** Cardiac & Cardiovascular Systems  
**Rank Within Category:** 3/126


**Journal of the American College of Cardiology**

**Journal Category:** Cardiac & Cardiovascular Systems  
**Rank Within Category:** 2/126


Lancet: Respiratory Medicine


Annals of Internal Medicine


American Journal of Respiratory and Critical Care Medicine


The Journal of Allergy and Clinical Immunology

Journal Category: Allergy
Rank Within Category: 1/26

Journal Category: Immunology
Rank Within Category: 6/151


Nature Communications

Journal Category: Multidisciplinary Sciences
Rank Within Category: 3/64


KNOWLEDGE TRANSLATION
HLI Celebrates 40th Anniversary!

On October 6th, 2017, HLI investigators, trainees and staff came together to celebrate 40 years of the Centre for Heart Lung Innovation. Dr. Jim Hogg reflected on these 40 years in an Opinion Piece in the Vancouver Sun:

“The Centre for Heart Lung Innovation (HLI) is celebrating its evolution into a globally recognized research centre that currently investigates some of the most challenging problems facing people with both chronic heart and lung issues, and critical care illnesses.”


This event was featured in Providence Health Care’s Promise magazine locally and also garnered national interest – Prime Minister Justin Trudeau formally congratulated the HLI on this important anniversary!

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It is with great pleasure that I congratulate the members of the Centre for Heart Lung Innovation (HLI) on the occasion of its 40th anniversary.

Since its establishment at my alma mater, the University of British Columbia, in 1977, HLI has grown to become one of the world’s foremost centres for cardiovascular and pulmonary research. Over the past 40 years, the researchers of HLI have worked hard to create a better world, one in which the threat of heart and lung disease no longer looms over us.

Today, as you gather to celebrate this anniversary, I urge you to reflect on the foundations of HLI’s success. Through an unwavering commitment to teamwork and open channels of communication, researchers have tapped into new avenues of innovation that, without the cooperative atmosphere, would not otherwise be accessible. As you look to the future of HLI, I hope that this defining feature of the Centre remains at the core of its mission.

Thank you to all those who have helped ensure the success of HLI over the past 40 years. Please accept my warmest welcome and best wishes for an enjoyable 40th anniversary celebration.
The HLI's 40th Anniversary

Above, pictured from left to right:

Former director, Dr. Bruce McManus (2006-2012); co-founder and former director, Dr. Jim Hogg (1977-1999); outgoing director, Dr. Keith Walley (2013-2017); and co-founder and former director, Dr. Peter Paré (2000-2005).
Dr. Chris Carlsten comments on the effects of fire and smoke on lung health

Dr. Chris Carlsten’s research focuses on air quality and the health effects of air quality and inhaled exposures. This research was part of a recent commentary in the Georgia Straight, where author Charlie Smith argues that forest fires and floods are a clear sign of climate change – and that poor air quality can be fatal.

"Air pollution causes more death than motor vehicle collisions, suicide, and HIV combined."

"The latest estimates from the Global Burden of Disease suggest nearly eight thousand Canadian deaths annually (approximately 3 percent of the total) are related to air pollution, ranking tenth among all risk factors for death in Canada," according to Dr. Carlsten and UBC collaborator Dr. Michael Brauer.

Carlsten and Brauer note that "a warmer climate portends worsening of air quality". That’s because smoke emitted from increasingly frequent wildfires "is clearly linked to increased deaths and exacerbation of lung disease".

"Over a relatively short period of time, we have witnessed growth in the frequency, magnitude, and severity of wildfires in Canada, along with an extension of the length of the fire season," Brauer and Carlsten state. "Devastating fires in Fort McMurray and Slave Lake are recent examples, while generation of huge smoke plumes that affect major cities, and indeed large portions of the continent, are now becoming regular occurrences."


Dr. Liam Brunham recognized as "Top 40 under 40"

HLI Principal Investigator Dr. Liam Brunham was named one of Canada’s top 40 under 40 in 2017. Top 40 was founded by executive search firm Caldwell Partners to recognize Canada’s outstanding young achievers. This year’s recipients were selected from more than 900 nominations.

Dr. Brunham was interviewed by BNN after receiving the award, where he discussed his research that focuses on using genetics to understand why some people have heart disease or high cholesterol levels, as well as how advances in genetics can be used to develop new ways to diagnose and treat heart disease.

For more: http://www.bnn.ca/you-need-to-be-dogged-top-40-under-40-winners-share-their-secrets-to-success-1.849826
Vancouver billionaire Jim Pattison donates $75 million towards new St. Paul's Hospital

It is being described as the largest donation in Canadian history by a private citizen to a single medical facility.

“I am proud to donate to the St. Paul’s Foundation for a hospital that has been putting people first in our community for more than 120 years,” the 88-year-old Pattison said in a release.

“The new Jim Pattison Medical Centre will build on St. Paul’s Hospital’s history of serving British Columbians with excellence and compassion, and enable close collaboration among clinicians and researchers to collectively drive new standards in health care and treatment for all British Columbians.”

The new campus will be built at the 18.4-acre site (roughly the size of 15 football fields) along Station Street in False Creek Flats. In addition to the provincial Heart Centre and BC Centre for Excellence in HIV/AIDS, the campus will be home to the Centre for Heart Lung Innovation, the PHC Research Institute as well as other research and life sciences facilities. There will also be room to expand for future need.

Dr. Zachary Laksman and his team make "heart-pounding" breakthrough

Atrial fibrillation (AFib), or an irregular heartbeat, is a life-threatening condition that affects one in four people over the age of 40. It is the most common heart rhythm problem, and can lead to blood clots, stroke, heart failure and other heart-related complications. But for those suffering from heart arrhythmias, there is hope – thanks to HLI Investigator Dr. Zachary Laksman and his team.

Using AFib patient blood, Dr. Laksman and his team have grown heart cells that can mimic abnormal heart rhythms – the first time these kind of cells have been created in a petri dish. Studying these cardiomyocytes, as these cells are called, will allow them to figure out which drugs work best for people with heart arrhythmia. Importantly, this work can be done in the lab, without putting the patients at risk.


Dr. Don Sin will revolutionize COPD and asthma treatment with TORCH

Dr. Don Sin and colleagues received a $2.2 million infrastructure grant from the Canada Foundation from Innovation (CFI), which will be matched by the BC Knowledge Development Fund, to improve the understanding and identification of different COPD and asthma subtypes using state-of-the-art genetic and omics technologies. The project is called TORCH, for “Towards Omics and Imaging to Revolutionize COPD and Asthma” and was recently featured in Science in the City.

Currently, 5 million Canadians suffer from asthma and COPD, costing the Canadian health care system $3.5 billion per year, which is predicted to increase to $7.4 billion per year by 2030 if nothing changes. TORCH provides Dr. Sin and his collaborators with the tools required to develop improved diagnostics and therapies for patients. This is the 4th major CFI awarded to the HLI.

“The new CFI award for HLI and St. Paul’s Hospital will transform the way [we] study COPD, cystic fibrosis, asthma and pulmonary fibrosis and will lead to major breakthroughs in new therapies and diagnostics for these lung conditions.”

Dr. Bradley Quon reports on Cystic Fibrosis outcomes in Canada and the USA

Cystic fibrosis is a progressive genetic disease that causes persistent lung infections that compromise ability to breathe over time. A study published by Dr. Bradley Quon and colleagues in the Annals of Internal Medicine reports that cystic fibrosis patients in Canada live on average 10 years longer than their counterparts in the United States, with a median life expectancy of 50.9 years compared with 40.6 years.

The study compared records of 5,941 Canadian and 45,448 American cystic fibrosis patients between 1990 and 2013. After controlling for severity of disease, age and other factors, researchers found that overall death rates were 34% lower in Canada than in the United States. Three factors seemed to be responsible for the large difference in survival rates between American and Canadian patients: number of lung transplants, diet, and health insurance status. Interestingly, differences in outcomes vanished when researchers compared the subset of US patients with insurance to those in Canada, where universal healthcare coverage exists.

This work was highlighted by the Annals of Internal Medicine as one of their top two health policy articles for the year, and was featured in over 30 media outlets.

For more:  
The HLI currently hosts five UBC spin-off companies including Cyon Therapeutics, viDA Therapeutics Inc, Aspect Biosystems, Black Tusk, and PROOF Centre.

**Cyon Therapeutics: Better Outcomes in Sepsis**

Driven by the knowledge that better outcomes in sepsis are possible, Cyon Therapeutics Inc. was formed in 2014 to make this a reality. Led by a team of HLI scientists and critical care physicians, Drs. Keith Walley, Jim Russell and John Boyd, and supported by two CEOs, the goal of the spin-off is to bring a novel treatment platform to sepsis. Through their groundbreaking scientific discoveries, the team is developing the means to boost the body's natural ability to clear infectious toxins from the bloodstream.

Source: cyontherapeutics.com/about

**viDA Therapeutics: Novel Treatments for Inflammatory and Age-related Diseases**

Founded in 2008 by Dr. David Granville, viDA Therapeutics is committed to the discovery, development and commercialization of novel and targeted therapeutics for the treatment of inflammatory and age-related diseases. Their unique discovery platform is based on novel research regarding a distinctly different and recently identified, extracellular role for Granzymes in the destruction and inflammation of tissues.

Source: vidatherapeutics.com

**Aspect Biosystems: Human Tissues on Demand**

Dr. Sam Wadsworth, leading cell biologist at the HLI, co-founded the award-winning biotechnology company, Aspect Biosystems Ltd., in November 2013 with Dr. Konrad Walus’ research group. Aspect Biosystems specializes in 3D bioprinting and tissue engineering, bringing together a multi-talented team of individuals to develop cutting-edge custom human tissue technology for use in the life sciences.

Source: aspectbiosystems.com

**PROOF Centre: Biomarkers to prevent organ failure**

The PROOF (Prevention of Organ Failure) Centre is a not-for-profit organization that develops blood tests to better predict, diagnose, manage and treat heart, lung and kidney disease. PROOF is a cross-disciplinary biosignature development engine of partners representing academia, health care, government, industry, patients and the public. The PROOF Centre, led by HLI PI and former HLI Director Dr. Bruce McManus, was initially established by the Networks of Centres of Excellence Secretariat under the Centre of Excellence for Commercialization and Research (NCE CECR) Program, and is co-hosted by the University of British Columbia and Providence Health Care in Vancouver, British Columbia, Canada.

Source: proofcentre.ca

**Black Tusk Research Group Inc.**

Founded in 2014, by HLI Clinical Research Core Manager Ms. Lynda Lazosky and HLI PI Dr. John Boyd, Black Tusk Research Group Inc. is a site monitoring organization supporting clinical trials and biobanking. BTRG supports Principal Investigators and helps them to initiate and manage pharmaceutical phase II, III and IV clinical trials and academic grant funded clinical research projects.
The HLI prides itself on its success in attracting international trainees and research personnel from all over the world. In the past 5 years, the HLI has hosted trainees and research personnel from 39 countries and 6 continents.
HLI SUMMER STUDENT RESEARCH PROGRAM

About the HLI-SSRP

Throughout the year, numerous undergraduate students are trained at the HLI through co-operative education programs, directed studies programs or various employment opportunities. Our busiest time of year is May to August when undergraduate students participate in our Summer Student Research Program (HLI-SSRP). Students are mentored by a senior professor and an immediate supervisor, and gain hands-on basic science laboratory experience while working on a research project. Not only does each student learn, in detail, one or two technologies per four-month or eight-month fellowship, but, more importantly for this formative period of development, students learn the critical logic of complementary technologies and when to employ them to experimental advantage.

In addition to technical and scientific training, students learn to present their original work at the Summer Student Research Day, a one-day conference featuring both oral and poster presentations by student researchers.

In 2017, the HLI hosted 30 summer students through our Summer Student Research Program. The HLI was also pleased to offer the Henrietta Ehler Summer Student Respiratory Research Award to four students in 2017 (listed below).

<table>
<thead>
<tr>
<th>Henrietta Ehler Awards</th>
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<tbody>
<tr>
<td>Roxana Yan (Sin lab)</td>
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<tr>
<td>Wai Lam Tam (Tebbutt lab)</td>
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<td>Wiebke Bartels (van Eeden lab)</td>
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<tr>
<td>Cameron Miller (Dorscheid lab)</td>
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Summer Student Research Day - August 11, 2017

Dr. Bruce McManus Presentation Awards

<table>
<thead>
<tr>
<th>Award</th>
<th>Recipient</th>
<th>HLI Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Heart Oral Presentation</td>
<td>Cheng (Kim) Li</td>
<td>Michael Seidman</td>
</tr>
<tr>
<td>Top Lung Oral Presentation</td>
<td>Valerie Kim</td>
<td>Don Sin</td>
</tr>
<tr>
<td>Top Innovation Oral Presentation</td>
<td>Veronica Rally</td>
<td>Harvey Coxson</td>
</tr>
<tr>
<td>Top Poster</td>
<td>Roxana Yan</td>
<td>Delbert Dorscheid</td>
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</table>
Heart + Lung FEST

The annual Heart + Lung Health FEST is an activity of, developed by and hosted by the community-wide umbrella organization, the Institute for Heart + Lung Health. The FEST is an opportunity for HLI trainees to present their ongoing research and engage and learn alongside professionals from all relevant heart and lung domains. The 2017 FEST was held March 15-18th at the Sheraton Vancouver Wall Centre Hotel.

HLI Inaugural Trainee Research Day

On October 6th, 2017 the HLI hosted the first inaugral Trainee Research Day. During this exciting day of science and discovery, HLI trainees presented their research and progress towards finding cures for heart, lung, vessel and critical care disease. The event was highlighted by four honoured decade speakers, each of whom presented on the amazing work conducted during their time at the HLI.

The four speakers were:

1st Decade: Dr. Julio Montaner
2nd Decade: Dr. Claire Doerschuk
3rd Decade: Dr. Jonathan Choy
4th Decade: Dr. Tillie Hackett

Trainees presented in three categories: Heart, Lung and Innovation. The winners of each category were:

Heart: Paul Hanson (Dr. Bruce McManus' lab)
Lung: Emmanuel Osei (Dr. Tillie Hackett’s lab)
Innovation: Steve Booth (Dr. Tillie Hackett’s lab)

In addition Feng Xu (Dr. Jim Hogg’s lab) won the best poster award!

Pictured: Keith Walley, Paul Hanson, Emmanuel Osei, Steve Booth, Tillie Hackett, Claire Doerschuk, Feng Xu, Jonathon Choy
For one week in spring and fall each year, high school students participate in the High School Science Week hosted at the HLI. Eight students are invited to participate in various laboratory sessions and seminars. This program is a very unique opportunity for students to get real hands-on biomedical lab experience that can help shape their education and career paths.

Students who participate in the High School Science Week are eligible to apply for the Peter D. Paré Scholarship, an eight-week summer internship at the HLI (valued at $2,000).

The Peter D. Paré Scholarship recipient for 2017 was Tony Guo. Tony worked in Dr. Del Dorscheid's lab together with Gurpreet Singhera on a pilot project to characterize the basal epithelial cell profile from individuals with asthma and COPD and establish its connection to airway epithelial repair. He presented his research at the HLI Summer Student Research Day 2017.
The Centre for Heart Lung Innovation holds two weekly seminars, the Research in Progress Seminar Series and the HLI Friday Seminar Series, both of which run from September through June each year.

The HLI Friday Seminar Series features invited experts in specific fields from all over the world to give talks which encourage education and collaboration. Detailed information about the 2017 HLI Friday Seminars can be found in Appendix C. The Research in Progress seminar series gives graduate students and post-doctoral fellows at the HLI the opportunity to present their ongoing research to other HLI researchers. The idea behind these seminars is for a critical, but supportive, audience to give feedback at the conceptual or analytic stage of the trainees’ research program. Detailed information about the 2017 Research in Progress Seminars can be found in Appendix D.

Below: A few of our featured Friday Seminar Series speakers.

Dr. Zachary Laksman and guest speaker Dr. Peter Backx

Dr. Jim Hogg and guest speaker Dr. Peter JM Openshaw

Guest speaker Dr. Rebecca Kusko and Dr. Jim Hogg
## Trainee Fellowships and Scholarships

<table>
<thead>
<tr>
<th>Name</th>
<th>Type/Award Name</th>
<th>Awarding Body</th>
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<tbody>
<tr>
<td>Alex Leung</td>
<td>Trainee Research Award</td>
<td>MSFHR</td>
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<tr>
<td>Ali Alasmari</td>
<td>Respiratory Rehabilitation Fellowship</td>
<td>BC Lung Association</td>
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<tr>
<td>Amrit Singh</td>
<td>Trainee Research Award</td>
<td>MSFHR</td>
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<tr>
<td>Andrew Ramsook</td>
<td>CGS - Doctoral Scholarship</td>
<td>NSERC</td>
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<tr>
<td>Arash Tehrani</td>
<td>Graduate Award</td>
<td>UBC Faculty of Medicine</td>
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<tr>
<td>Ji-Young Kim</td>
<td>Elevate Postdoctoral Fellowship</td>
<td>MITACS</td>
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<td>Kang Dong</td>
<td>MicroGrant Award</td>
<td>Rare Disease Foundation</td>
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<td>Kelly Genga</td>
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<td>Leila Mostaco-Guidolin</td>
<td>Postdoctoral Fellowship</td>
<td>CIHR</td>
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<tr>
<td>Ma’en Obeidat</td>
<td>Parker B. Francis Fellowship</td>
<td>Parker B. Francis Fellowship Program</td>
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<td>Mohammed Algamdi</td>
<td>Interstitial Lung Disease Fellowship</td>
<td>UBC Faculty of Medicine</td>
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<td>Leila Mostaco-Guidolin</td>
<td>Postdoctoral Fellowship</td>
<td>CIHR</td>
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<td>Steve Booth</td>
<td>Tuition Award</td>
<td>UBC Graduate Student Initiative – Dept. of Anesthesiology, Pharmacology and Therapeutics</td>
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<tr>
<td>Yannick Molgat-Seon</td>
<td>Respiratory Rehabilitation Fellowship</td>
<td>BC Lung Association</td>
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# Other Trainee and Staff Awards and Recognitions

<table>
<thead>
<tr>
<th>Name</th>
<th>Award</th>
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<tbody>
<tr>
<td>Aida Eslami</td>
<td>Travel Award</td>
<td>AllerGen</td>
</tr>
<tr>
<td>Aida Eslami</td>
<td>Postdoctoral Travel Award</td>
<td>Genetic Epidemiology Society</td>
</tr>
<tr>
<td>Aida Eslami</td>
<td>Travel Award</td>
<td>CIHR Travel Award, ICS</td>
</tr>
<tr>
<td>Anthony Tam</td>
<td>Travel Award</td>
<td>CIHR Travel Award, ICS</td>
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<tr>
<td>Dragos Vasilescu</td>
<td>Abstract Scholarship – Assembly on Respiratory Structure and Function Program</td>
<td>American Thoracic Society</td>
</tr>
<tr>
<td>Dragos Vasilescu</td>
<td>Abstract Award</td>
<td>American Thoracic Society</td>
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<tr>
<td>Emmanuel Osei</td>
<td>Travel Award</td>
<td>AllerGen</td>
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<td>Emmanuel Osei</td>
<td>Travel Award</td>
<td>HLI Trainee Research Day</td>
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<tr>
<td>Emmanuel Osei</td>
<td>Best Research Award</td>
<td>Netherlands Respiratory Society and Netherlands Asthma Foundation</td>
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<td>Fernando Studart</td>
<td>Travel Award</td>
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<td>Gurpreet Singhera</td>
<td>Travel Award</td>
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<tr>
<td>Jasemine Yang</td>
<td>Travel Award</td>
<td>AllerGen</td>
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<tr>
<td>Josh Dubland</td>
<td>Trainee Award – Best Oral Presentation</td>
<td>Canadian Lipoprotein Conference</td>
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<td>Josh Dubland</td>
<td>Trainee Travel Award</td>
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<td>Margaret Huang</td>
<td>Travel Award</td>
<td>Stemcell Network</td>
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<td>Minhee Jin</td>
<td>Abstract Award</td>
<td>American Thoracic Society</td>
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<tr>
<td>Nawaf Alotaibi</td>
<td>Abstract Award – Assembly on Clinical Problems through the National Emphysema Foundation</td>
<td>American Thoracic Society</td>
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<tr>
<td>Sabina Guler</td>
<td>Travel Award</td>
<td>CIHR Travel Award, ICS</td>
</tr>
<tr>
<td>Steve Booth</td>
<td>Travel Award</td>
<td>American Thoracic Society</td>
</tr>
<tr>
<td>Steve Booth</td>
<td>Best Oral Presentation Award</td>
<td>UBC Anesthesiology, Pharmacology and Therapeutics Research Day</td>
</tr>
</tbody>
</table>
The award winners were Drs. Amrit Singh and Alex Leung in the cardiovascular category, and Dr. Miranda Kirby in the pulmonary category!

These generous endowments supported a Postdoctoral Research Grant Program in 2017. The goal of this program is to support promising postdoctoral researchers conducting cardiovascular and pulmonary research at the HLI. The awards provide the winning postdoctoral researchers with operating/salary support to ensure their research is successful and to increase their competitiveness in their future careers. The awards were valued at $20,000 per researcher, over 2 years ($10,000 per year to each fellow).

Two awards, supported by the Sidhoo Fund, were given to cardiovascular researchers and one award, supported by the Foundation’s pulmonary endowments, was given to a pulmonary researcher.

Dr. Amrit Singh - co-supervised by Drs. Bruce McManus and Raymond Ng. His research aims to identify and improve the biological understanding of mechanisms and biomarkers of heart failure and heart transplant rejection.

Dr. Alex Leung - supervised by Dr. John Boyd. His research focuses on the role of lipoproteins in mediating the clearance of bacterial endotoxins during sepsis, which often leads to heart failure.

Dr. Miranda Kirby - supervised by Dr. Jim Hogg. Her research is focused on developing imaging biomarkers of the progression of emphysema and small airway disease in smokers.
In 2017, ten of our graduate students and postdocs finished their training at the HLI. Here are some of the impressive scientific career paths they moved on to.

<table>
<thead>
<tr>
<th>Trainee</th>
<th>Supervisor(s)</th>
<th>Start/End Date</th>
<th>Degree/Study Level</th>
<th>Present Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jessica Inskip</td>
<td>Pat Camp</td>
<td>June 2017</td>
<td>Postdoctorate</td>
<td>Medical Science and Education Liaison – Roche</td>
</tr>
<tr>
<td>Konosuke Moritani</td>
<td>Don Sin</td>
<td>March 2017</td>
<td>Postdoctorate</td>
<td>Assistant Professor of Surgery, Keio University (Tokyo, Japan)</td>
</tr>
<tr>
<td>Naoya Tanabe</td>
<td>Jim Hogg</td>
<td>March 2017</td>
<td>Postdoctorate</td>
<td>Kyoto University, Japan</td>
</tr>
<tr>
<td>Ravipati (Swamy) Anjaneya</td>
<td>Mari DeMarco</td>
<td>August 2017</td>
<td>Postdoctorate</td>
<td>Metabolomics and Proteomics Research Management Consulting</td>
</tr>
<tr>
<td>Walden Cheung</td>
<td>Pat Camp</td>
<td>August 2017</td>
<td>MSc Student,</td>
<td>UBC Master of Physical Therapy Program</td>
</tr>
<tr>
<td>Yolanda Yang</td>
<td>Pat Camp</td>
<td>November 2017</td>
<td>PhD Student</td>
<td>Lecturer and Research Assistant, UVIC</td>
</tr>
<tr>
<td>Ma'en Obeidat</td>
<td>Don Sin</td>
<td>October 2017</td>
<td>Postdoctorate</td>
<td>Assistant Professor, UBC</td>
</tr>
<tr>
<td>Dragos Vasilescu</td>
<td>Jim Hogg</td>
<td>June 2017</td>
<td>Postdoctorate</td>
<td>Research Associate, HLI</td>
</tr>
<tr>
<td>Ying Yang</td>
<td>Gordon Francis</td>
<td>August 2017</td>
<td>Postdoctorate</td>
<td>Postdoctorate, Stanford</td>
</tr>
<tr>
<td>Carmen Sima</td>
<td>Pat Camp</td>
<td>November 2017</td>
<td>PhD Student</td>
<td>Lecturer and Research Assistant, UVIC</td>
</tr>
</tbody>
</table>
Research Technician Basak Sahin demonstrating the use of a microscope to a group of high school students
New Digital Slide Scanner - The Aperio AT2 System

The HLI would like to thank multiple investigators, and especially Dr. Jim Hogg, for their significant funding support for the new Leica Aperio AT2 High Volume, Digital Whole Slide Scanner. For the last 9 years, the HLI hosted an Aperio XT digital pathology slide scanner to scan and analyze tissue sections from any human or disease model. This system was replaced by an updated model this year with the capacity to scan 400 slides in one 16-hour run. This new scanner will enable clinicians and researchers to image their tissue slides with unprecedented image quality, speed, reliability and most importantly have them stored within a searchable digital database. This means that high resolution images (1X to 40X magnification) from any point on the tissue slide can be used for analysis at any time for subsequent studies.

New GEM Equipment – Digigait

In 2017 the GEM facility, courtesy of Dr. Pascal Bernatchez, added a DigiGait system to its equipment list. This is an innovative gait measurement device for mice that uses a transparent treadmill to image the ventral side of the mouse while they walk or run at set speeds and inclines. Their gait can then be analyzed for changes in a number of parameters that may change due to disease states.

New Water Distiller and Room Reno

The update to the HLI distillation equipment required extensive renovations to the room before installation. Asbestos was removed, new ‘Aquaboard’ walls were installed, and new flooring, lighting, and waterproof electrical panels. The water heating components were moved to the GEM HVAC room on the roof. We are happy that installation was successful and the new still is up and running!
**Preclinical Services**

GEM (Preclinical Services) staff continued to contribute to UBC Facility Management and Policy Development Committees. The GEM group completed successful inspections with UBC, particularly with the ACC and Post Approval Monitoring groups, ensuring the highest standards of animal care were delivered.

**IT Services**

The HLI’s Information Technology team had a very busy year. Just a few of the projects that were completed in 2017 were high speed data networking for the Confocal, Aperio and Micro CT scanners, remote high resolution graphical analysis installation, new and expanded storage for imaging scanners and a web portal for secure high-resolution analyses.

The IT team takes a break from overseeing a long list of projects for HLI and other groups at St. Paul’s Hospital. Left to right: Nghia Tran, Dean English, Kyle Johnson, Joe Comeau and Andrew Ferris.

**Cardiovascular and Lung Tissue Registry**

The HLI is built upon a rich history of Lung and Cardiovascular registries that collectively contain over 90,000 biospecimens and associated clinical data, donated to research by patients undergoing heart or lung surgery over the past 33 years at St. Paul’s Hospital. The HLI Lung and Cardiovascular Tissue registries are currently directed by Drs. Tillie Hackett and Michael Seidman who, with their teams, enable academic and industry researchers from around the world access with ethical approval to these important samples for biomedical and translational research questions.

The Heart and Lung registries have provided human samples for research worldwide to investigators both Provincially (BC Cancer (Drs. Gilks, Huntsman, Hoodless, Lam, and Wan), Centre for Heart Lung Innovation (Drs. Dorscheid, Francis, Hackett, Hogg, Luo, Sin, Seow, Van Eeden), St. Paul’s Hospital (Drs. Leipsic, Ostry) Vancouver General Hospital (Drs. Carlsten, Granville, & Hiroti), Simon Fraser University (Dr. Choy), Nationally (McGill University, Sick Kids Toronto, University of Manitoba) and Internationally (Duke University, Stanford University, University of Cincinnati, University of Edinburgh, University of Florida, University of Pittsburgh) to as far as the University of Tasmania.
**Laboratory Safety in 2017**

The Health and Safety Team held its second annual HLI Health and Safety Day in 2017 with presentations on hospital security, UBC Health & Wellbeing Programs, liquid nitrogen and dry ice safety, services offered by UBC’s Workplace Health Services and, in addition, gave out some well-deserved Safety Awards. Throughout the year, under the leadership of Ivan Leversage, the team continued to achieve their goals including conducting more frequent lab inspections, completing chemical waste removal and updating the laboratory and large spill and flood kits.

![HLI Safety Day Banner](image)

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**Expansion of Translational Research**

Under the management of Lynda Lazosky, the HLI Clinical Research group has made great strides in aiding principal investigators to initiate and manage ongoing clinical projects. The team has been instrumental in clinical research project management, ethics applications and study coordination to help HLI realize translational research plans.

![KPMG Header](image)

---

**Maintenance and Equipment Management Services**

The Maintenance and Equipment Management Team continued with a busy schedule handling a number of equipment repair tickets. They also provided expertise to renovation projects and lead the renovations team for the new water distillation unit installation.

![KPMG Header](image)
Healthy Workplace Initiatives

Basak Sahin, Beth Whalen, Claire Smits and Ivan Leversage organized events throughout the year to enhance the inclusive nature of the environment at the HLI. Thanks to support from UBC’s Healthy Workplace Initiatives Fund, they held a number of “Take 5 Cafés” to promote mental health and wellness. With a main focus on stress relief, the Take 5 Cafés held in 2017 included:

1 - Relaxing Music
2 – Exercise
3 – Puzzles and Colouring Books
4 – Mindful May
5 – Pumpkin Carving (pictured below).

The group worked with the UBC Thrive campaign and held a Canadian Mental Health Association Workshop: Awareness of Mental Health at Work. They also provided information for HLI employees in the form of weekly mental health tips and led fundraising initiatives for the Lights of Hope campaign. Previous initiatives which began in 2016, such as weekly yoga classes, are ongoing thanks to contributions by participants and the HLI.

Lights of Hope

The HLI supports the St. Paul’s Foundation and the lights of Hope Campaign. The HLI again achieved a GOLD STAR and donation goal again in 2017! Thanks to all who helped with fundraising events we were able to raise a total of $25,560.
The Centre for Heart Lung Innovation staff have extensive training and experience to provide consistent and reliable results with minimal turnover time. Some of our services, equipment and tools available are:

**HLI Cardiovascular and Lung Tissue Registries**
- Tissue and sample archiving
- Gross and microscopic specimen images
- Gross specimen photography
- New expanded formalin storage facility

**Cellular Imaging & Biophysics**
- Automatic tissue processing capabilities
- Nikon Model XTH225ST Micro Computed Tomography System
- Pelco BioWave Microwave Processor
- Image processing work stations
- Wide Field Fluorescence Microscope
- Leica Upright Fluorescence Microscope with Fast Confocal Scanner and CCD camera
- Leica Inverted Fluorescence microscope with Confocal Scanner
- Tunable Ultra-short pulse Infrared Laser for Two-Photon Excitation microscopy

**Imaging Services**
- Digital slide scanning
- Poster and banner printing

**Histology**
- Processing and embedding
- Staining and Sectioning
- Immunohistochemistry
- Immuno-peroxidase
- Immuno-alkaline phosphatase
- FITC immunofluorescence
- TUNEL staining
- In situ Hybridization (ISH)

**Molecular Phenotyping**
- BeckmanCoulter Astrios EQ® high speed cell sorter
- Laser Capture Microdissection Pixcell II
- Siemens Advia 2120 Hematology analyzer
- BeckmanCoulter Gallios® Flow Cytometer
- Miltenyi AutoMACS
- ABI ViiA 7 Real-Time PCR
- Luminex IS100 XYP
- NanoString nCounter System
- Biobanking services
- SpectraMax i3 Plate Reader

**Preclinical Services**
- Contract animal research projects
- Flexivent Lung Function system
- DSI Telemetry
- Visualsonics Echocardiography
- Mouse Specifics Gait Analyzer
- Level 2 Containment suite
- Colony management services
- Microsurgical / Tech services

**Clinical Research**
- Consultation and project management
- Assistance with ethics applications

**Information Technology**
- Advanced computing services
- Hosting of physical servers, virtual servers
- Secured and controlled access
- Long term storage
- Custom database and data management services
- Secure web development

For more information contact:
Claire Smits, Operations Director
t: 604.806.8852 | e: claire.smits@hli.ubc.ca
Partnerships and Acknowledgements

The HLI is grateful to our funding partners: Canada Foundation for Innovation, British Columbia Knowledge Development Fund, Providence Health Care, University of British Columbia, Heart and Stroke Foundation of BC and Yukon, BC Lung Association, the St. Paul’s Hospital Foundation and many vendors and industrial collaborators, for their crucial support of our ongoing programs.

We wish to thank our current partners:

Adiga Life Sciences Inc.
Agartee Technology Inc.
AllerGen
Alpha-1 Foundation
Alzheimer Society of Canada
Amarin Pharma Inc.
AMGEN Canada Inc.
Asahi Kasei Pharma America
AstraZeneca Canada Inc.
Bayer AG
Boehringer Ingelheim (Canada) Ltd.
British Columbia Knowledge Development Fund (BCKDF)
British Columbia Lung Association
British Columbia Proteomics Network
Canada Foundation for Innovation
Canada Research Chairs
Canadian Diabetes Association
Canadian Foundation for AIDS Research
Canadian Institutes of Health Research (CIHR)
Cyon Therapeutics Inc.
Cystic Fibrosis Canada
Cystic Fibrosis Foundation (US)
Genentech Inc.
Genome British Columbia
Gilead Sciences Inc.
GlaxoSmithKline
Grifols Shared Services North America Inc.
Heart and Stroke Foundation of British Columbia and Yukon
Heart and Stroke Foundation of Canada
Hoffmann-La Roche Ltd. (Canada)
Networks of Centres of Excellence (NCE)
Industry Canada

Interior Health Authority
InterMune Inc.
Ionis Pharmaceuticals, Inc.
Janssen Inc.
Juvenile Diabetes Research Foundation International
La Jolla Pharmaceutical Company
Leading Biosciences Inc.
MedImmune LLC
Merck Sharp & Dohme Corp.
Michael Smith Foundation for Health Research
National Institutes of Health
National Research Council
Natural Sciences and Engineering Research Council of Canada (NSERC)
Novartis Pharmaceuticals Canada Inc.
Octapharma Canada Inc.
Pfizer Canada Inc.
Pharmaxis Ltd.
ProMetic Life Sciences Inc.
PROOF Centre of Excellence
Providence Health Care Research Institute (PHCRI)
Province of British Columbia
Respivert Ltd.
RxSource Corp.
sanofi-aventis Canada Inc.
St. Paul’s Hospital Foundation
The Lung Association
Trius Therapeutics Inc.
UBC Department of Medicine
UBC Department of Physical Therapy
University of Calgary
Vertex Pharmaceuticals Inc.
viDA Therapeutics Inc.

We are grateful to the following individuals for their assistance in the creation of this report: Kasia Celler, Nicole Rosin, Kim Schmidt, Leslie Rae, Claire Smits, Kelly Ceron, Chris Robinson, Jo-Lynn Mervyn, Gwen Sin, Ivan Leversage, Dean English, Dr. Keith Walley and all the HLI Principal investigators.
SUPPORTING OUR FIGHT AGAINST HEART AND LUNG DISEASES

Heart and lung diseases combined are still the world’s number one cause of death and disability. Help us win this fight.

The Centre for Heart Lung Innovation has been extremely successful at attracting infrastructure grants and government research dollars. However, attracting funds to allow us to retain our expertly trained staff and purchase new equipment remains a challenge. We actively seek interest and donations from private and individual donors whose interests are in alignment with our research, with the help of the following organizations.

St. Paul’s Foundation
178 – 1081 Burrard Street
Vancouver, BC V6Z 1Y6
Phone (for residents of Metro Vancouver): 604-682-8206
Phone (toll-free number for residents of rest of BC): 1-800-720-2983
sphfoundation@providencehealth.bc.ca
www.helpstpauls.com

University of British Columbia
Development and Alumni Engagement
500 - 5950 University Blvd
Vancouver, BC Canada V6T 1Z3
Phone: 604-822-8900
info@startanevolution.ubc.ca
https://startanevolution.ubc.ca/category/projects-by-faculty/faculty-of-medicine
## Appendix A: Centre for Heart Lung Innovation Grants, Contracts, Clinical Trials* and Agreements (April 2017 – March 2018)

* Data from the UBC RISe (Research Information Services) list.

<table>
<thead>
<tr>
<th>Principal Investigator</th>
<th>Funding Agency</th>
<th>Award Amount</th>
<th>Project Title</th>
<th>Award Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bernatchez, Pascal</td>
<td>Heart and Stroke Foundation of Canada</td>
<td>$86,678.00</td>
<td>Aberrant endothelial mechano-sensing is a cause of early atherosclerosis and a pharmacological target</td>
<td>Grant</td>
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<tr>
<td>Boyd, John</td>
<td>La Jolla Pharmaceutical Company</td>
<td>$2,215.00</td>
<td>A Phase 3, Placebo-Controlled, Randomized, Double-Blind, MultiCenter Study of LJPC-501 in Patients with Catecholamine-Resistant Hypotension (CRH)</td>
<td>Clinical Trial</td>
</tr>
<tr>
<td>Boyd, John</td>
<td>Michael Smith Foundation for Health Research</td>
<td>$24,208.33</td>
<td>The role of PCSK9 in the clearance of bacterial lipids and the development of anti-PCSK9 treatment for sepsis</td>
<td>Grant</td>
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<tr>
<td>Boyd, John</td>
<td>Cyon Therapeutics Inc.</td>
<td>$47,952.00</td>
<td>PCSK9 Inhibitors for SIRS, Sepsis and Septic Shock</td>
<td>Contract</td>
</tr>
<tr>
<td>Boyd, John</td>
<td>Providence Health Care Research Institute (PHCRI)</td>
<td>$50,000.00</td>
<td>Ex-vivo heart perfusion; doubling the number of heart transplants performed in British Columbia</td>
<td>Grant</td>
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<tr>
<td>Boyd, John</td>
<td>Transplant Research Foundation of British Columbia</td>
<td>$50,000.00</td>
<td>Biomarkers of transplant viability in marginal donor hearts</td>
<td>Grant</td>
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<tr>
<td>Brunham, Liam</td>
<td>AMGEN Canada Inc.</td>
<td>$4,777.50</td>
<td>Guidelines Oriented Approach to Lipid lowering in Canada (GOAL I &amp; II)</td>
<td>Clinical Trial</td>
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<tr>
<td>Brunham, Liam</td>
<td>The Medicines Co.</td>
<td>$8,593.85</td>
<td>An open label, active comparator extension trial to assess the effect of long term dosing of inclisiran and evolocumab given as subcutaneous injections in subjects with high cardiovascular risk and elevated LDL-C (ORION-3)</td>
<td>Clinical Trial</td>
</tr>
<tr>
<td>Brunham, Liam</td>
<td>Providence Health Care Research Institute (PHCRI)</td>
<td>$20,000.00</td>
<td>Startup funds</td>
<td>Grant</td>
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<tr>
<td>Brunham, Liam</td>
<td>VGH and UBC Hospital Foundation</td>
<td>$25,000.00</td>
<td>Understanding patient priorities in cardiovascular prevention research</td>
<td>Grant</td>
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<tr>
<td>Brunham, Liam</td>
<td>Cerenis Therapeutics</td>
<td>$30,193.95</td>
<td>Phase III, Multi-Center, Randomized, 48 Weeks, Double-Blind, Parallel-Group, Placebo-Controlled Study to Evaluate Efficacy and Safety of CER-001 on Vessel Wall Area in Patients with Genetically Defined Familial Primary Hypoalphalipoproteine</td>
<td>Clinical Trial</td>
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<tr>
<td>Brunham, Liam</td>
<td>UBC Department of Medicine</td>
<td>$45,000.00</td>
<td>Startup funds</td>
<td>Grant</td>
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<td>Brunham, Liam</td>
<td>Heart and Stroke Foundation of Canada</td>
<td>$49,420.00</td>
<td>Genomic markers of leukoaraiosis in patients with premature vascular disease</td>
<td>Grant</td>
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<tr>
<td>Name</td>
<td>Organization</td>
<td>Amount</td>
<td>Description</td>
<td>Type</td>
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<td>Brunham, Liam</td>
<td>Genome British Columbia</td>
<td>$100,000.00</td>
<td>SAVE BC, the Study to Avoid cardioVascular Events in British Columbia</td>
<td>Agreement</td>
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<tr>
<td>Brunham, Liam</td>
<td>Providence Health Care Research Institute (PHCRI)</td>
<td>$100,000.00</td>
<td>Co funding: SAVE BC, the study to avoid cardiovascular events in British Columbia</td>
<td>Grant</td>
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<td>Brunham, Liam</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>$116,280.00</td>
<td>Investigating pharmacogenetic mechanisms of doxorubicin-induced cardiotoxicity in human pluriplent stem cell-serviced cardiomyocytes</td>
<td>Grant</td>
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<tr>
<td>Brunham, Liam</td>
<td>Genome British Columbia</td>
<td>$157,994.00</td>
<td>Using genomics to improve the care of patients with familial hypercholesterolemia</td>
<td>Agreement</td>
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<tr>
<td>Camp, Pat</td>
<td>Canada Foundation for Innovation</td>
<td>$7,500.00</td>
<td>CFI Infrastructure Operating Fund</td>
<td>Grant</td>
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<tr>
<td>Camp, Pat</td>
<td>British Columbia Lung Association</td>
<td>$12,500.00</td>
<td>Pulmonary rehabilitation in rural BC: Engaging with communities to create novel telehealth approaches</td>
<td>Grant</td>
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<tr>
<td>Camp, Pat</td>
<td>Michael Smith Foundation for Health Research</td>
<td>$14,500.00</td>
<td>Planning for a community-based participatory research study to improve the lung health of First Nations peoples living in remote communities in Northern British Columbia</td>
<td>Grant</td>
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<tr>
<td>Camp, Pat</td>
<td>British Columbia Lung Association</td>
<td>$25,000.00</td>
<td>&quot;Bayis II Tus - A Strong Breath&quot; A community-based research project to improve lung health in remote and rural First Nations communities in British Columbia</td>
<td>Grant</td>
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<tr>
<td>Coxson, Harvey</td>
<td>British Columbia Lung Association</td>
<td>$25,000.00</td>
<td>Development and validation of novel non-invasive imaging tools to enhance our understanding of airways in asthma</td>
<td>Grant</td>
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<tr>
<td>Daley, Denise</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>$1,000.00</td>
<td>Genome wide meta-analysis of parent-of-origin effects of asthma in four cohorts</td>
<td>Grant</td>
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<tr>
<td>Daley, Denise</td>
<td>Michael Smith Foundation for Health Research</td>
<td>$11,500.00</td>
<td>Development of hierarchical models to investigate the role of long non coding RNA regions in the etiology of asthma</td>
<td>Grant</td>
</tr>
<tr>
<td>Daley, Denise</td>
<td>Genome British Columbia</td>
<td>$50,000.00</td>
<td>Epigenetic Mechanisms for the Development of Asthma</td>
<td>Agreement</td>
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<tr>
<td>Daley, Denise</td>
<td>Allergy, Genes and Environment Network (AllerGen) - Networks of Centres of Excellence (NCE)</td>
<td>$189,860.00</td>
<td>Causes and Prevention: Identifying the genetic basis of peanut allergy</td>
<td>Grant</td>
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<tr>
<td>Daley, Denise</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>$250,000.00</td>
<td>Epigenetic mechanisms for the development of asthma</td>
<td>Grant</td>
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<td>Daley, Denise</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>$340,000.00</td>
<td>Get-facts: Genetics, environment and therapies: Food allergy clinical tolerance studies</td>
<td>Agreement</td>
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<tr>
<td>Name</td>
<td>Organization</td>
<td>Amount</td>
<td>Description</td>
<td>Type</td>
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<tr>
<td>DeMarco, Mari</td>
<td>Alzheimer's Drug Discovery Foundation</td>
<td>$106,296.31</td>
<td>Quantitation of TDP-43 isoforms in CSF by mass spectrometry</td>
<td>Agreement</td>
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<tr>
<td>Dorscheid, Delbert</td>
<td>Allergy, Genes and Environment Network (AllerGen) - Networks of Centres of Excellence (NCE)</td>
<td>$3,500.00</td>
<td>IgE-mediated inflammation generated by the airway epithelium is antigen independent: cause of a novel asthma phenotype</td>
<td>Grant</td>
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<tr>
<td>Dorscheid, Delbert</td>
<td>Novartis Pharmaceuticals Canada Inc.</td>
<td>$4,240.00</td>
<td>REAL-Life® EFFECTiveness and safety of omalizumab in patients with severe allergic asthma: The Latin American and Canadian experience (RELIEF)</td>
<td>Clinical Trial</td>
</tr>
<tr>
<td>Dorscheid, Delbert</td>
<td>Novartis Pharmaceuticals Canada Inc.</td>
<td>$8,000.00</td>
<td>A 2-treatment period, randomized, placebo-controlled, multicenter parallel-group study to assess the safety of QAW039 when added to existing asthma therapy in GINA steps 3, 4 and 5 patients with uncontrolled asthma</td>
<td>Clinical Trial</td>
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<tr>
<td>Dorscheid, Delbert</td>
<td>Novartis Pharmaceuticals Canada Inc.</td>
<td>$20,974.00</td>
<td>A 52-week, multicenter, randomized, double-blind, placebo-controlled study to assess the efficacy and safety of QAW039 when added to existing asthma therapy in patients with uncontrolled severe asthma</td>
<td>Clinical Trial</td>
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<tr>
<td>Dorscheid, Delbert</td>
<td>sanofi-aventis Canada Inc.</td>
<td>$64,932.40</td>
<td>A randomized, double blind, placebo controlled, parallel group study to evaluate the efficacy and safety of dupilumab in patients with severe steroid dependent asthma</td>
<td>Clinical Trial</td>
</tr>
<tr>
<td>Francis, Gordon</td>
<td>The Medicines Co.</td>
<td>$3,405.00</td>
<td>A placebo-controlled, double-blind, randomized trial to compare the effect of different doses of ALN-PCSSC given as single or multiple subcutaneous injections in subjects with high cardiovascular risk and elevated LDL-C</td>
<td>Clinical Trial</td>
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<tr>
<td>Francis, Gordon</td>
<td>Ionis Pharmaceuticals, Inc.</td>
<td>$9,996.90</td>
<td>A Randomized, Double-Blind, Placebo-Controlled, Phase 3 Study of ISIS 304801 Administered Subcutaneously to Patients with Familial Chylomicronemia Syndrome (FCS) - The APPROACH study</td>
<td>Clinical Trial</td>
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<tr>
<td>Francis, Gordon</td>
<td>Michael Smith Foundation for Health Research</td>
<td>$17,291.69</td>
<td>The role of arterial smooth muscle cells in foam cell formation in atherosclerosis</td>
<td>Grant</td>
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<tr>
<td>Francis, Gordon</td>
<td>Ionis Pharmaceuticals, Inc.</td>
<td>$33,405.15</td>
<td>An Open-Label Extension Study of Volanesorsen Administered Subcutaneously to Patients with Familial Chylomicronemia Syndrome (FCS)</td>
<td>Clinical Trial</td>
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<tr>
<td>Francis, Gordon</td>
<td>Canada Foundation for Innovation</td>
<td>$150,844.00</td>
<td>Molecules to human: enhanced phenotyping for discovery, prevention, &amp; treatment of heart, lung, &amp; blood vessel disease</td>
<td>Grant</td>
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<td>Francis, Gordon</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>$154,658.00</td>
<td>The unrecognized importance of smooth muscle foam cells in atherosclerosis development and treatment</td>
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<td>Frohlich, Jiri</td>
<td>AMGEN Canada Inc.</td>
<td>$16,143.00</td>
<td>Creation and implementation of a Registry for Familial Hypercholesterolemia</td>
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<td>Guenette, Jordan</td>
<td>Canadian Respiratory Research Network</td>
<td>$1,200.00</td>
<td>The effects of diesel exhaust on pulmonary physiology in mild chronic obstructive pulmonary disease (COPD) and 'at risk' smokers</td>
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<td>Guenette, Jordan</td>
<td>Canada Foundation for Innovation</td>
<td>$7,500.00</td>
<td>CFI Infrastructure Operating Fund</td>
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<td>Guenette, Jordan</td>
<td>British Columbia Lung Association</td>
<td>$12,500.00</td>
<td>Investigating the role of skeletal muscle dysfunction on dyspnea and exercise intolerance in interstitial lung disease</td>
<td>Grant</td>
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<td>Guenette, Jordan</td>
<td>British Columbia Lung Association</td>
<td>$25,000.00</td>
<td>A double-blind placebo-controlled crossover study to assess the effects of bronchodilation on dyspnea, ventilatory responses, and exercise tolerance in adults with cystic fibrosis</td>
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<td>Guenette, Jordan</td>
<td>Natural Sciences and Engineering Research Council of Canada (NSERC)</td>
<td>$30,000.00</td>
<td>Respiratory and locomotor muscle blood flow regulation during physiological stress</td>
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<td>Guenette, Jordan</td>
<td>Canadian Respiratory Research Network</td>
<td>$50,000.00</td>
<td>Mechanisms of dyspnea and exercise intolerance in patients with chronic respiratory diseases</td>
<td>Agreement</td>
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<td>Hackett, Tillie</td>
<td>National Institutes of Health</td>
<td>-$870.53</td>
<td>Integrative omics to discover molecular determinants of COPD</td>
<td>Agreement</td>
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<td>Hackett, Tillie</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>$5,000.00</td>
<td>Multimodal characterization of airway remodeling with label-free nonlinear optical imaging and spectroscopy</td>
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<td>Michael Smith Foundation for Health Research</td>
<td>$17,291.69</td>
<td>Multimodal characterization of airway remodeling with label-free nonlinear optical imaging</td>
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<td>$23,333.00</td>
<td>Multimodal characterization of airway remodeling with label-free nonlinear optical imaging and spectroscopy</td>
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<td>Hackett, Tillie</td>
<td>UBC VP Research &amp; Innovation</td>
<td>$36,000.00</td>
<td>Excellence in biobanking &amp; digital pathology for translational research in heart and lung disease</td>
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<td>Hackett, Tillie</td>
<td>National Institutes of Health</td>
<td>$42,924.00</td>
<td>MUPPITS 2mECHANISTIC: Inner city asthma consortium 3 (ICAC3)</td>
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<td>Hackett, Tillie</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
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<td>Molecular determinants of small airway obstruction in COPD</td>
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<td>Hogg, James</td>
<td>Alpha-1 Foundation</td>
<td>$4,989.35</td>
<td>Molecular determinants of small airway disease in AATD</td>
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<td>Hogg, James</td>
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<td>$25,000.00</td>
<td>Developing novel computed tomography imaging measurements for predicting accelerated lung function decline in individuals at risk of chronic obstructive pulmonary disease</td>
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<td>Hogg, James</td>
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<td>$45,011.98</td>
<td>Genomic Analysis of Tissue and Cellular Heterogeneity in IPF</td>
<td>Agreement</td>
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<td>$98,557.86</td>
<td>Parametric response mapping in COPD</td>
<td>Agreement</td>
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<td>Janssen Research and Development, LLC</td>
<td>$358,509.00</td>
<td>Characterising the Molecular Alterations Associated with Structural Progression of Small Airways Disease and Emphysema in COPD</td>
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<td>Laksman, Zachary</td>
<td>Canadian Cardiovascular Society</td>
<td>$30,000.00</td>
<td>Cardiac RyAnodine receptor variants in early-onset atrial fibrillation: The CRAVE-AF Study</td>
<td>Grant</td>
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<td>Leung, Janice</td>
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<td>The role of the gut-lung axis in the aging HIV lung</td>
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<td>Leung, Janice</td>
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<td>Luo, Honglin</td>
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<td>Development of a novel coxsackievirus B3-based oncolytic virus for lung cancer therapy</td>
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<td>Luo, Honglin</td>
<td>Natural Sciences and Engineering Research Council of Canada (NSERC)</td>
<td>$44,000.00</td>
<td>Understanding the interplay between coxsackieviruses and the host ubiquitin-proteasome system</td>
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<td>Luo, Honglin</td>
<td>Heart and Stroke Foundation of Canada</td>
<td>$91,460.00</td>
<td>Molecular chaperones in viral cardiomyopathy</td>
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<td>McManus, Bruce</td>
<td>Michael Smith Foundation for Health Research</td>
<td>$24,208.33</td>
<td>Development and validation of blood-based biomarkers for improved heart failure management</td>
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<td>McManus, Bruce</td>
<td>Genome British Columbia</td>
<td>$100,000.00</td>
<td>Canadian International Data Sharing Initiative (Can-SHARE) - User-centric genomics data exchange and aggregation with Blockchain technologies</td>
<td>Agreement</td>
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<td>McManus, Bruce</td>
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<td>A novel multi-marker blood test for management of acute cardiac allograft rejection</td>
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<td>McManus, Bruce M.</td>
<td>UBC Strategic Excellence Fund</td>
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<td>Data analytics and systems science (DASS) to optimize heart + lung health</td>
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<td>Obeidat, Ma‘en</td>
<td>British Columbia Lung Association</td>
<td>$21,700.00</td>
<td>The effect of sex on molecular signatures in lung tissue from COPD patients</td>
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<td>Pare, Peter</td>
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<td>Expression and biological functions of FAM13A and PITCH1 in patients with chronic obstructive pulmonary disease</td>
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<tr>
<td>Quon, Bradley</td>
<td>Cystic Fibrosis Foundation (US)</td>
<td>$4,842.68</td>
<td>Utilizing the CFFT biorepository to identify Y validate CF biomarkers</td>
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<tr>
<td>Quon, Bradley</td>
<td>ProMetic BioSciences, Inc.</td>
<td>$5,275.00</td>
<td>A Phase 2, Double Blind, Placebo Controlled Study to Evaluate the Safety &amp; Tolerability of PBI-4050 and its Effects on Pancreatic and Pulmonary Function in Cystic Fibrosis Patients with Abnormal Glucose Tolerance</td>
<td>Clinical Trial</td>
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<tr>
<td>Quon, Bradley</td>
<td>Proteostasis Therapeutics, Inc.</td>
<td>$6,700.00</td>
<td>A Multi-Center, Randomized, Placebo-Controlled, Phase 1, Two-Part Study Designed to Assess the Safety, Tolerability, Pharmacokinetics, Food Effect, and Drug-Drug Interactions of PTI-801 in Healthy Volunteers, and Safety, Tolerability, and P</td>
<td>Clinical Trial</td>
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<tr>
<td>Quon, Bradley</td>
<td>Gilead Sciences Inc.</td>
<td>$13,607.29</td>
<td>A Phase 2b, Dose-Ranging Study of the Effect of GS-5745 on FEV1 in Adult Subjects with Cystic Fibrosis</td>
<td>Clinical Trial</td>
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<td>Quon, Bradley</td>
<td>Pharmaxis Ltd.</td>
<td>$16,936.07</td>
<td>Long Term Administration of Inhaled Mannitol in Cystic Fibrosis â€” A Safety and Efficacy Trial in Adult Cystic Fibrosis Subjects</td>
<td>Clinical Trial</td>
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<td>Quon, Bradley</td>
<td>British Columbia Lung Association</td>
<td>$22,500.00</td>
<td>Discovery of blood protein biomarkers to monitor treatment response during CF pulmonary exacerbations</td>
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<td>Quon, Bradley</td>
<td>Proteostasis Therapeutics, Inc.</td>
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<td>A Phase I, multi-center, randomized, placebo-controlled, study designed to assess the safety, tolerability, and pharmacokinetics of PTI-428 in subjects with cystic fibrosis</td>
<td>Clinical Trial</td>
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<td>Quon, Bradley</td>
<td>Vertex Pharmaceuticals Inc.</td>
<td>$34,969.60</td>
<td>A Phase 2, Randomized, Double-blind, Controlled Study to Evaluate the Safety and Efficacy of VX-440 Combination Therapy in Subjects Aged 12 Years and Older With Cystic Fibrosis</td>
<td>Clinical Trial</td>
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<td>Quon, Bradley</td>
<td>Vertex Pharmaceuticals (Canada) Inc.</td>
<td>$47,107.20</td>
<td>A Phase 3, Open-label, Rollover Study to Evaluate the Safety and Efficacy of Long-term Treatment WithVX-661 in Combination With Ivacaftor in Subjects Aged 12 Years and Older With Cystic Fibrosis, Homozygous or Heterozygous for the F508del-C</td>
<td>Clinical Trial</td>
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<td>Quon, Bradley</td>
<td>Novoteris LLC</td>
<td>$59,947.90</td>
<td>Prospective, randomized, placebo controlled trial of the efficacy and safety of inhaled nitric oxide (NO) in cystic fibrosis (CF) patients</td>
<td>Clinical Trial</td>
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<td>Quon, Bradley</td>
<td>Cystic Fibrosis Canada</td>
<td>$75,000.00</td>
<td>Cystic fibrosis Canada professorship at the University of British Columbia</td>
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<td>PIPE-CF Biomarker Study</td>
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<td>Quon, Bradley</td>
<td>British Columbia Knowledge Development Fund (BCKDF)</td>
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<td>Blood protein signatures to enable personalized care in cystic fibrosis</td>
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<tr>
<td>Quon, Bradley</td>
<td>Canada Foundation for Innovation</td>
<td>$113,685.00</td>
<td>Blood protein signatures to enable personalized care in cystic fibrosis</td>
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<td>Ryerson, Chris</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>$1,000.00</td>
<td>Prevalence, diagnostic and prognostic features of unclassifiable interstitial lung disease: A systematic review and meta-analysis</td>
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<td>Ryerson, Chris</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
<td>$1,000.00</td>
<td>Predictors of physical activity in fibrotic interstitial lung disease</td>
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<td>Ryerson, Chris</td>
<td>InterMune Inc.</td>
<td>$1,817.12</td>
<td>A Prospective Observational Study to Evaluate Adherence and Treatment Outcomes in Patients with Idiopathic Pulmonary Fibrosis (IPF) treated with Esbriet® (pirfenidone) in Canada</td>
<td>Clinical Trial</td>
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<td>Ryerson, Chris</td>
<td>Boehringer Ingelheim (Canada) Ltd.</td>
<td>$7,881.08</td>
<td>A twelve week, open-label, randomised, parallel-group study evaluating safety, tolerability and pharmacokinetics (PK) of oral nintedanib in combination with oral pirfenidone, compared to treatment with nintedanib alone, in patients with idiopathic pulmonary fibrosis</td>
<td>Clinical Trial</td>
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<td>Ryerson, Chris</td>
<td>Hoffmann-La Roche Ltd. (Canada)</td>
<td>$13,846.18</td>
<td>Multicenter, international, doubleblind, two-arm, randomized, placebo controlled phase II trial of pirfenidone in patients with unclassifiable progressive fibrosing ILD</td>
<td>Clinical Trial</td>
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<td>Ryerson, Chris</td>
<td>ProMetic Life Sciences Inc.</td>
<td>$21,719.03</td>
<td>A Phase 2, Open-label, Single Arm, Exploratory, Observational Study to Evaluate the Safety and Tolerability of PBI-4050 in Patients with Idiopathic Pulmonary Fibrosis (IPF)</td>
<td>Clinical Trial</td>
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<td>Ryerson, Chris</td>
<td>Boehringer Ingelheim (Canada) Ltd.</td>
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<td>A double blind randomized placebo controlled trial evaluating the effect of oral nintedanib 150 mg twice daily on high resolution computerized tomography quantitative lung fibrosis score, lung function, six minute walk test distance and St.</td>
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<td>A 24-week, double-blind, randomized, parallel-group study evaluating the efficacy and safety of oral nintedanib coadministered with oral sildenafil, compared to treatment with nintedanib alone, in patients with idiopathic pulmonary fibrosis</td>
<td>Clinical Trial</td>
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<td>Ryerson, Chris</td>
<td>St. Paul's Hospital Foundation</td>
<td>$141,048.00</td>
<td>Quantitative Computed Tomography in Systemic Sclerosis-associated Interstitial Lung Disease</td>
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<td>Ryerson, Chris</td>
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<td>High Oxygen Delivery to Preserve Exercise Capacity in PIF Patients Treated with Nintedanib: The HOPE-IPF Study</td>
<td>Clinical Trial</td>
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<td>Ryerson, Chris</td>
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<td>$287,142.86</td>
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<td>Seow, Chun</td>
<td>British Columbia Lung Association</td>
<td>$25,000.00</td>
<td>Cytoskeletal stiffness of airway smooth muscle - A new target of asthma therapy</td>
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<td>Seow, Chun</td>
<td>Natural Sciences and Engineering Research Council of Canada (NSERC)</td>
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<td>Seow, Chun</td>
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<td>Seow, Chun</td>
<td>Canadian Institutes of Health Research (CIHR)</td>
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<td>Mechanisms underlying the bronchodilatory effect of deep inspiration in health and asthma: from airway smooth muscle to the whole lung</td>
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<td>Sin, Don</td>
<td>Boehringer Ingelheim (Canada) Ltd.</td>
<td>$6,643.31</td>
<td>A randomised, double-blind, active-controlled parallel group study to evaluate the effect of 52 weeks of once daily treatment of orally inhaled tiotropium + olodaterol fixed dose combination compared with tiotropium on Chronic obstructive Pulmonary Disease</td>
<td>Clinical Trial</td>
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<td>Sin, Don</td>
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<td>Novel insight into the H1N1 pandemic: murine allergic sensitization with house-dust extract induces a dysregulated anti-viral immune response</td>
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<td>Sin, Don</td>
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<td>$20,000.00</td>
<td>Serum immunoglobulins and risk of exacerbations in COPD</td>
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<td>Sin, Don</td>
<td>AstraZeneca Canada Inc.</td>
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<td>A randomised, double-blind, chronic dosing (56 week), placebo-controlled, parallel group, multicentre, phase III study to evaluate the efficacy and safety of 2 doses of benralizumab (MEDI-563) in patients with moderate to very severe Chronic Obstructive Pulmonary Disease</td>
<td>Clinical Trial</td>
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<td>Sin, Don</td>
<td>Merck Sharp &amp; Dohme Corp.</td>
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<td>Integrative Genomics to Identify Therapeutic Targets for COPD</td>
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<td>Sin, Don</td>
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<td>$58,333.00</td>
<td>The role of genes and sex in determining therapeutic responses in chronic obstructive pulmonary disease (COPD)</td>
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<td>Sin, Don</td>
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<td>$61,880.00</td>
<td>integrative genomics to identify novel therapeutic targets and biomarkers for COPD</td>
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<td>Sin, Don</td>
<td>IKOMED Technologies Inc.</td>
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<td>Frequency Treatment for Emphysema Rat Model</td>
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<td>A Prospective Safety and Feasibility Study of the RejuvenAirâ&quot;¢ System Metered</td>
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<td>Using multi-omics to discover novel biomarkers and therapeutic targets for</td>
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<td>Tan-Hogg, Wan</td>
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<td>Innovation, Science and Economic Development, Canada</td>
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<td>Discovering the mechanism of action of a novel immunotherapy, Cat-SPIRE,</td>
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<td>Tebbutt, Scott</td>
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<td>Tebbutt, Scott</td>
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<td>Tebbutt, Scott</td>
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<td>British Columbia Lung Association</td>
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<td>Novel diagnosis of Western Red Cedar Asthma</td>
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269. D Daley, A Sandford, and S Tebbutt are CHILD Study Investigators.


E Published in 2017


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<td>Martin Kolb</td>
<td>Chris Ryerson</td>
<td>Progression of IPF – How breathing more makes things get worse</td>
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<td>Jim Hogg</td>
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<td>Conquering Chronic Obstructive Pulmonary Disease in the 21st Century – it will take a village</td>
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<td>Teresa To</td>
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<td>Tania Bubela</td>
<td>Don Sin</td>
<td>Priming Systems for Development, Implementation, and Evaluation of Precision Health Technologies: Lessons from Alberta</td>
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<td>Mathieu Morissette</td>
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<td>Interplay Between Smoking and Pulmonary Lipid Homeostasis: Implications for New Pathological Mechanisms, Therapies and Biomarkers</td>
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<td>Virus Impact on Hemostasis: Diabolical Dengue, Heinous Herpes</td>
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<td>John Hanrahan</td>
<td>Bradley Quon</td>
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<td>Macrophages are not the main source of foam cells in Apolipoprotein-E-deficient mice</td>
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<td>Yasir Mohamud</td>
<td>Coxsackievirus subversion of the autophagy pathway</td>
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<td>Manipulating trypsin digestion conditions to accelerate proteolysis and simplify digestion workflows in development of protein mass spectrometric assays for the clinical laboratory</td>
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<td>Kimia Shahangian</td>
<td>Investigations into the H1N1 Pandemic: Why did Asthmatics Experience Greater Morbidity and Mortality?</td>
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<td>Konesuke Moritani</td>
<td>The objective is to investigate the potential value of using RF to selectively eliminate the diseased regions of the lungs. The potential value is that if this technology can be safely translated to clinical application, many patients with severe emphysema could survive without invasive surgery</td>
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<td>Cody Lo</td>
<td>The Role of Genetics in Modulating HDL Levels during Sepsis</td>
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<td>Lysosomal Lipid Accumulation and Dysregulation of Downstream Cholesterol Homeostasis in Human Arterial Smooth Muscle Cells</td>
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<td>Comparison of Microbial Communities in the Gut-Lung Axis of HIV Donors</td>
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<td>CRISPR-Cas9-Based Genome Editing to Investigate Functional Impact of Genetic Variants Associated With Doxorubicin-Induced Cardiotoxicity</td>
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<td>Arash Tehrani</td>
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<td>Minhee Jin</td>
<td>The Relationship of Absolute Telomere Length with Quality of Life, Exacerbations and Mortality in COPD</td>
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<td>Virus, An Unexpected Cause of Amyotrophic Lateral Sclerosis</td>
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<td>Reduced PCSK9 function increases LTA clearance and improves outcomes in gram positive septic shock patients</td>
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<td>Eric Deng</td>
<td>CVB3 is an oncolytic virus against KRAS-mutant Non-Small-Cell-Lung-Cancer</td>
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<td>Heat shock protein 70 promotes coxsackievirus B3 translation via the Akt-mTORC1 pathway</td>
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<td>Aaron Barlow</td>
<td>Revealing Fine Structure of Fibrillar Collagen Using Super-Resolution Second Harmonic Generation Microscopy</td>
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<td>Steve Booth</td>
<td>Profiling the molecular and cellular landscape of emphysema &amp; small airways disease in Mild/Moderate COPD</td>
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