Centre for
Heart Lung Innovation
UBC and St. Paul's Hospital

Exceptional care through exceptional science in heart, lung and blood vessel diseases

2021
ANNUAL REPORT

Established in 1977 by Drs. James Hogg and Peter Paré, the HLI is a University of British Columbia Senate-approved research centre located within St. Paul's Hospital in downtown Vancouver.

Providence Research
We're all in.

Providence HEALTH CARE
How you want to be treated.

THE UNIVERSITY OF BRITISH COLUMBIA

Led by Dr. Don Sin (Director) and Dr. Jordan Guenette (Associate Director)

68 Principal Investigators and Affiliated Investigators

37 Research Associates and Postdoctoral Fellows

55 Graduate Students

53 Undergradate Students

6 Visiting Scientists

53 Support, Operations, and Administrative Staff

>50,000 ft²
laboratory and office space

9 Core Facilities

Cardiovascular Registry
Lung Tissue Registry
Cellular Imaging and Biophysics
Graphics and Imaging
Histology
Molecular Phenotyping
Pre-clinical Services
Digital Slide Scanning
Magnetic Resonance Imaging

>$21.8 M
in external funding*

$17.4 M
Peer-Reviewed Grants

$1.5 M
Clinical Trials

$1.1 M
Contracts and Agreements

$1.8 M
Salary Awards

*April 2021 to March 2022. Details in Appendix A. Total funding held at HLI: $18.8M

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Dear Friends and Colleagues;

I am delighted to share with you the Centre for Heart Lung Innovation (HLI)'s 2021 Annual Report. Despite all the challenges and trappings of the pandemic, HLI remained one of the top heart/lung translational units in the world for innovation and research. In the past year, HLI investigators have, collectively, secured over $20 million in research funding and published over 350 papers in high-calibre peer-reviewed journals. Impressively, their work has directly impacted patient care and improved health outcomes of millions living with heart and lung disorders in Canada and elsewhere.

HLI is also the home to 21 named research chairs, representing 9 University of British Columbia (UBC) and Simon Fraser University (SFU) faculties and departments. In 2021, HLI added 3 new prestigious Canada Research Chair (CRC) positions including a Tier 1 CRC in Airway Pathobiology (Dr. Tillie Hackett, UBC Department of Anesthesia, Pharmacology and Therapeutics); a Tier 2 CRC in Airway Translational Biology (Dr. Janice Leung, UBC Department of Medicine); and a Tier 2 CRC in Public Health Omics (Dr. Graeme Koelwyn, SFU Faculty of Health Sciences and also the inaugural holder of the James Hogg Research Chair) and four additional faculty members (Drs. Ilker Hacihaliloglu, Graeme Koelwyn, Stephanie Sellers and Ying Wang). In total, HLI is now the home to 6 CRCs including two Tier 1 CRCs.

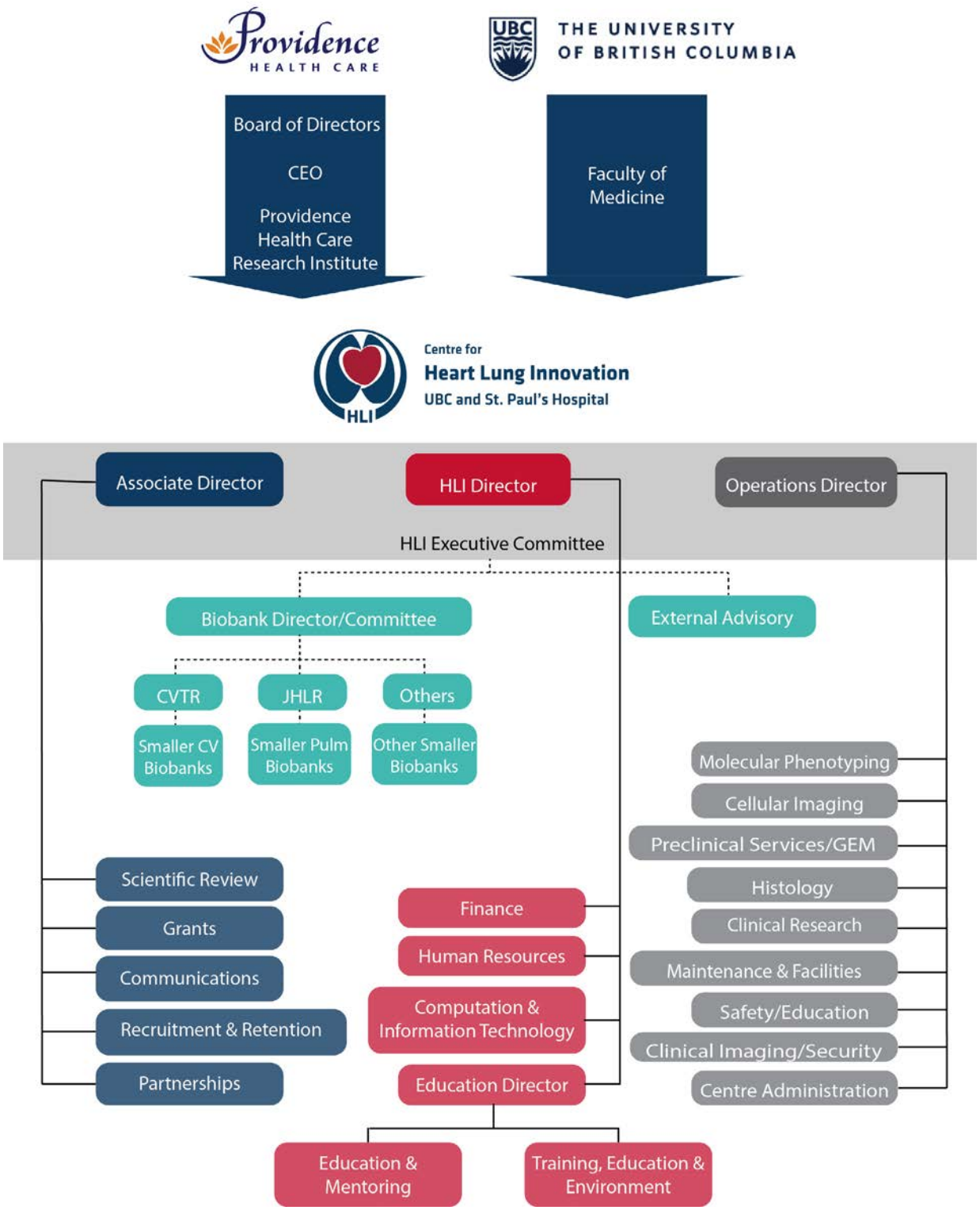
In 2021, HLI experienced a major upgrade in research infrastructure. To the 8 existing cores, HLI added organ imaging with the installation of a brand new 3-Tesla Magnetic Resonance Imaging (MRI) scanner, with hyperpolarized gas equipment to enable heart and lung scanning. This was possible through the generous investment by the Canada Foundation for Innovation (2017 CFI Innovation Fund) and our donors (St. Paul's Foundation). Special thanks goes out to Dr. Jonathon Leipsic (UBC Dept of Radiology) and Ms. Teija Beck and Ms. Cecilia Tupper of St. Paul's Foundation for their incredible fund-raising efforts and to Dr. Rachel Eddy for becoming the inaugural Associate Director for this new core. Together, these technologies will enable HLI investigators to exquisitely phenotype their cardiorespiratory patients and research volunteers and translate their novel molecular discoveries to a clinical platform for clinical implementation.

In preparation of HLI's 50th (Gold) anniversary, HLI has developed a Strategic Plan 2022-2027 in consultation with our stakeholder groups including Providence Research, the UBC Faculty of Medicine, Providence Health Care (PHC) and SFU Faculty of Health Sciences, Principal and Associate Investigators, staff and trainees. At the heart of the Plan is our compassion for our patients and our passion for science as noted in our vision statement: "inspired by patients and driven by science, we (will) discover solutions to improve the heart and lung health of peoples of British Columbia, Canada and throughout the world". Our collective core mission is to discover patient-centred therapeutic and biomarker solutions to improve cardiovascular and respiratory health. The Plan focuses on three core areas: Research, Education, and Knowledge Translation, and two cross-cutting themes: Partnerships and Organizational Excellence. Within each core area, specific goals and actions have been identified to advance the overall mission and vision of HLI. Above all, HLI will reach these goals with mutual respect, inclusion and a spirit of humility. The goals of the Strategic Plan will also be enabled by the New St. Paul's Hospital and the associated Research Centre, which will open its doors in 2026. The building will be state-of-the-art and a game-changing health innovation hub for research, education, and knowledge translation. The Strategic Plan is available at HLI's website (www.hli.ubc.ca) and will serve as a foundation for the Centre's decision-making process and priorities over the next 5 years.

Finally, I wish to thank PHC, our donors, and external partners who have made HLI a very special place to work and whose input and encouragement inspire us on a daily basis to discover, translate and innovate for the ultimate goal of bringing "exceptional care through exceptional science" for our patients with heart and lung diseases.

Thank you and all the best for 2022! The best is yet to come.

Don D. Sin, MD
Professor of Medicine, UBC
Director of HLI and the De Lazzari Family Chair
Canada Research Chair in COPD



The Centre for Heart Lung Innovation (HLI, previously known as iCapture and the 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.

Research Spotlights

Top HLI research stories from 2021

NEW TEST TO ACCURATELY DIAGNOSE ALZHEIMER'S DISEASE

Alzheimer's disease is a progressive, degenerative brain disease that causes memory impairment and deterioration of thinking ability. Over half a million Canadians are currently living with Alzheimer's or a related form of dementia, and with a rapidly aging population, that number is projected to double by 2031. Current diagnosis depends on physician evaluation of the signs and symptoms of neurodegeneration, coupled with traditional imaging. By the time most people are diagnosed, they often already have significant mental decline and cognitive impairment. Accurate and timely diagnosis is critical to ensure that a patient receives the right treatment (which is most effective if provided early), and that, together with family and caregivers, they have the ability to plan for the future.

Now, HLI Principal Investigator Dr. Mari DeMarco and her team have developed a key component of a test that can help patients find the answers they need and assist their families in planning in the face of an Alzheimer's diagnosis.

"The Alzheimer's disease biomarker test, which we have now made available to all Canadians, can help doctors accurately diagnose the disease even when only mild symptoms are present. Through the IMPACT-AD project, our aim was to gain a better understanding of how this testing impacts personal and medical decision making, and health care costs."

In this new test, the levels of two proteins (amyloid-beta and tau) present in cerebrospinal fluid are measured to help correctly identify those with Alzheimer's disease. Such testing, which can be performed early-on in the disease course, can predict whether mild symptoms are likely to progress to dementia. St. Paul's is the first hospital in Canada to offer this test.

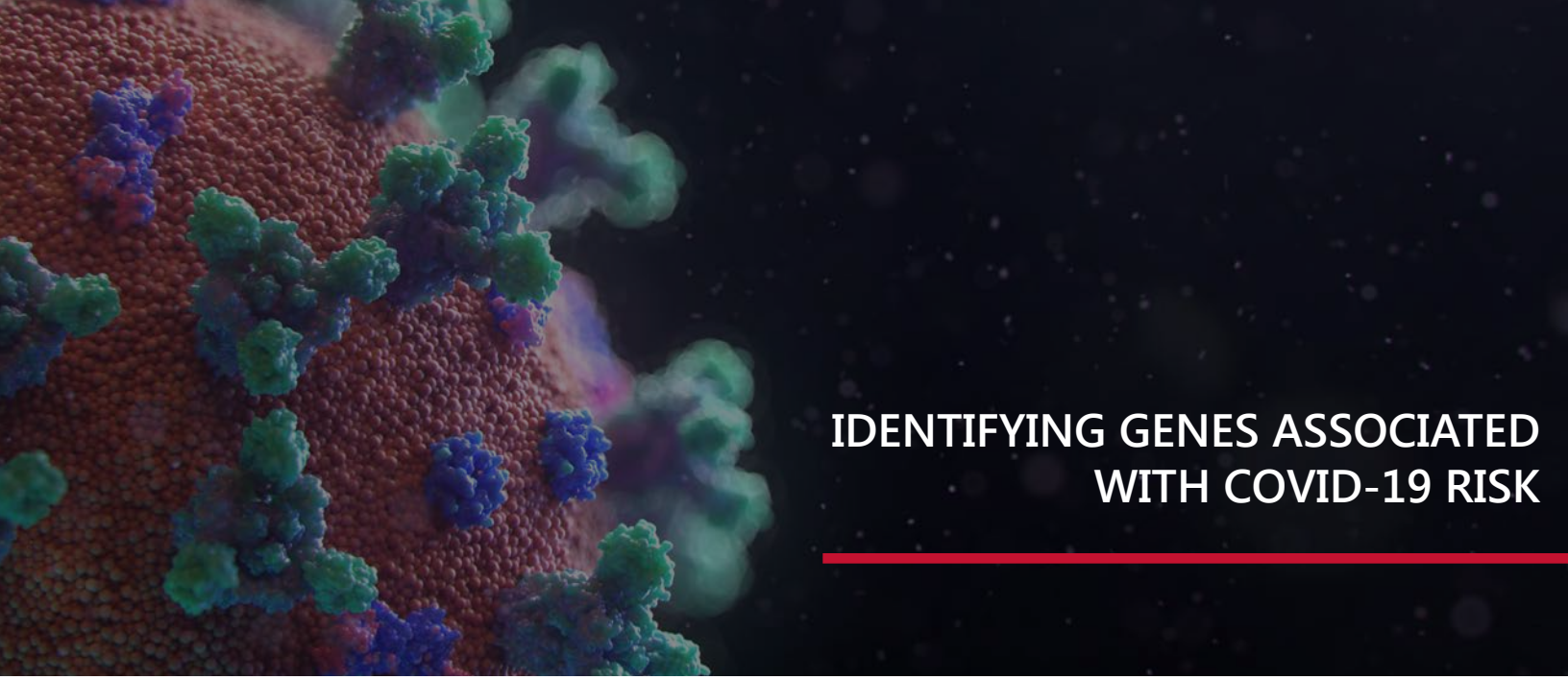
This work was part of IMPACT-AD, a Canada-wide study led by Dr. DeMarco that aims to bridge the gap between diagnostic accuracy studies and clinical utilization and implementation of these biomarker tests. IMPACT-AD will determine how the testing for these Alzheimer's disease biomarkers impacts medical and personal decision making, as well as health care costs.

The goal of the study is to inform positive change in the health care system and improve care and support for patients living with Alzheimer's, and their families. With input from patients, their families, and their doctors, DeMarco and her colleagues are working to address barriers to uptake and use in the Canadian healthcare system.

For more information, visit IMPACT-AD's website.

These stories were also covered in the following media:

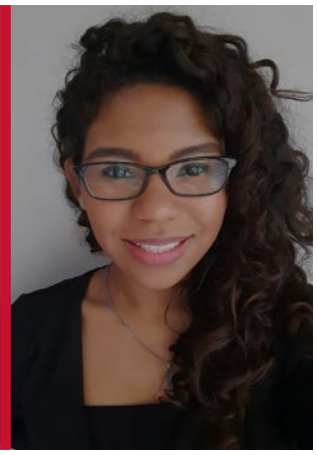
- Global News
- Real Talk Ryan Jespersen podcast
- Vancouver Sun
- Glacer Media



IDENTIFYING GENES ASSOCIATED WITH COVID-19 RISK

Since its identification in late 2019, SARS-CoV-2, the virus responsible for COVID-19, has spread all over the world and claimed over 6 million lives worldwide. Although most infections result in mild disease, a significant number of individuals develop severe disease that requires hospitalization, intensive care, and can result in death. Risk factors such as age, presence of co-morbidities like cardiovascular disease and diabetes have been identified, but it's not clear why these risk factors increase risk of severe COVID-19 outcomes.

Dr. Ana Hernandez Cordero, a postdoctoral fellow in Dr. Don Sin's lab, and colleagues, have identified genes that place an individual at greater risk of contracting the SARS-CoV-2 virus.



"By harnessing the power of genomic information, we identified genes that are related to COVID-19," said Dr. Hernandez. "In particular, we found that the ABO gene is a significant risk factor for COVID-19. Of particular note was the relationship between the blood group ABO and COVID-19 risk. We showed that the relationship is not just an association but causal."

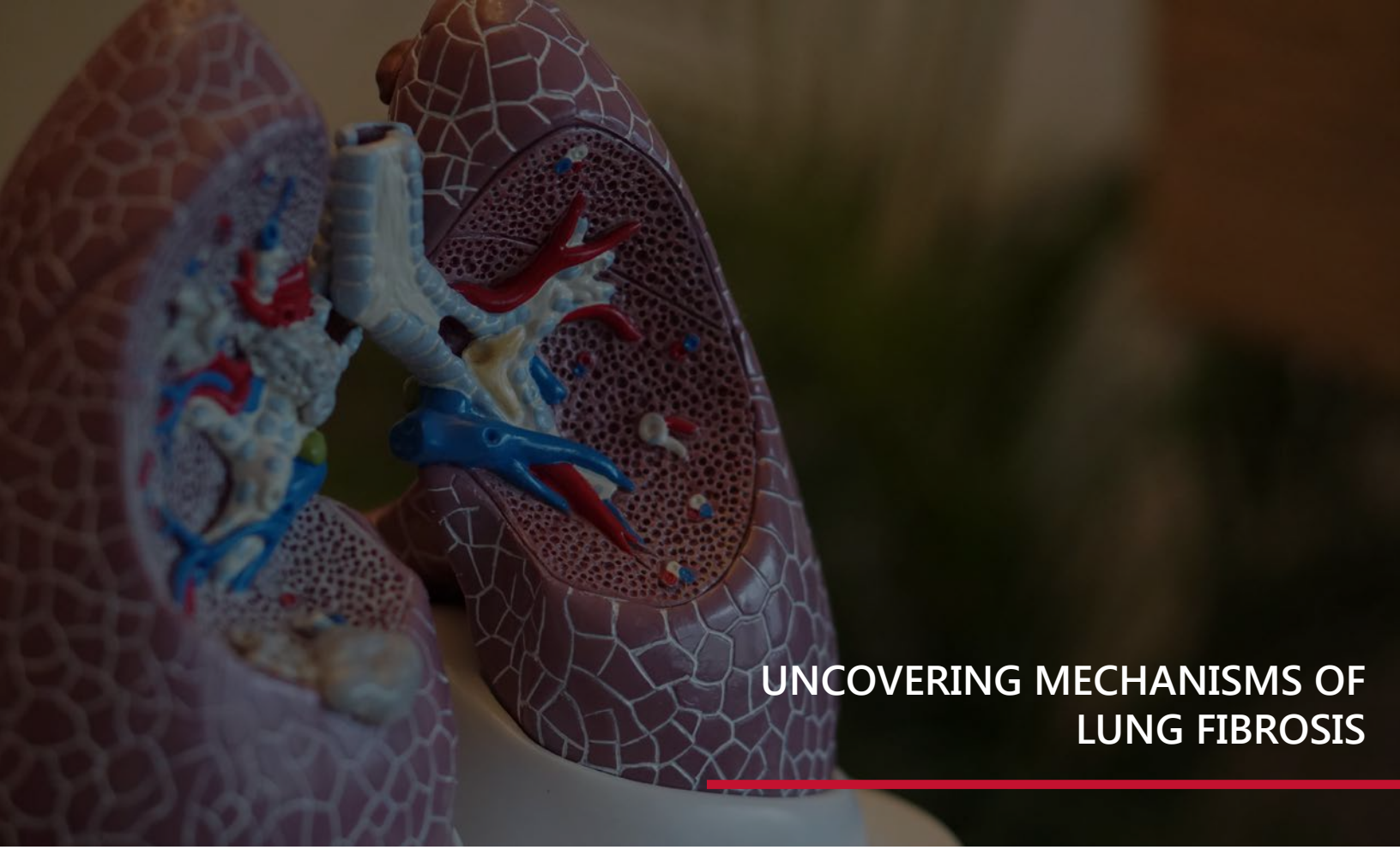
Their study combined genetic information with lung gene expression data to identify specific genetic markers linked with COVID-19 susceptibility. For the bioinformatics analysis, they integrated genomic datasets with lung and blood tissue gene expression datasets, and a proteome dataset. By doing so, they discovered that several genes responsible for the immune system's response to COVID-19 are also involved in COVID-19 susceptibility. Looking for candidate genes in blood proteins, they were able to go one step further and identify biomarkers in the blood that can be used to indicate disease status, and potentially monitor disease progression.

In addition to the ABO gene, Dr. Hernandez and colleagues found that people carrying certain other genetic variants, namely SLC6A20, ERMP1, FCER1G and CA11, also have a significantly higher risk of contracting COVID-19. Since the initial analysis, even more interesting genetic candidates, such as IL10RB, IFNAR2 and OAS1, were identified and linked to severe COVID-19.

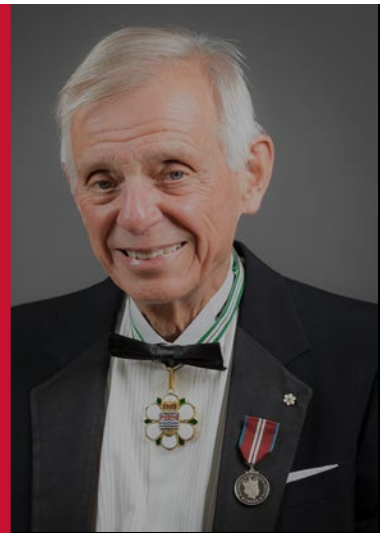
"These individuals should use extreme caution during the pandemic" Dr. Hernandez notes. "These genes may also prove to be good markers for disease as well as potential drug targets."

This study was also covered in the following media:

- CTV News
- EurekaAlert!



UNCOVERING MECHANISMS OF LUNG FIBROSIS



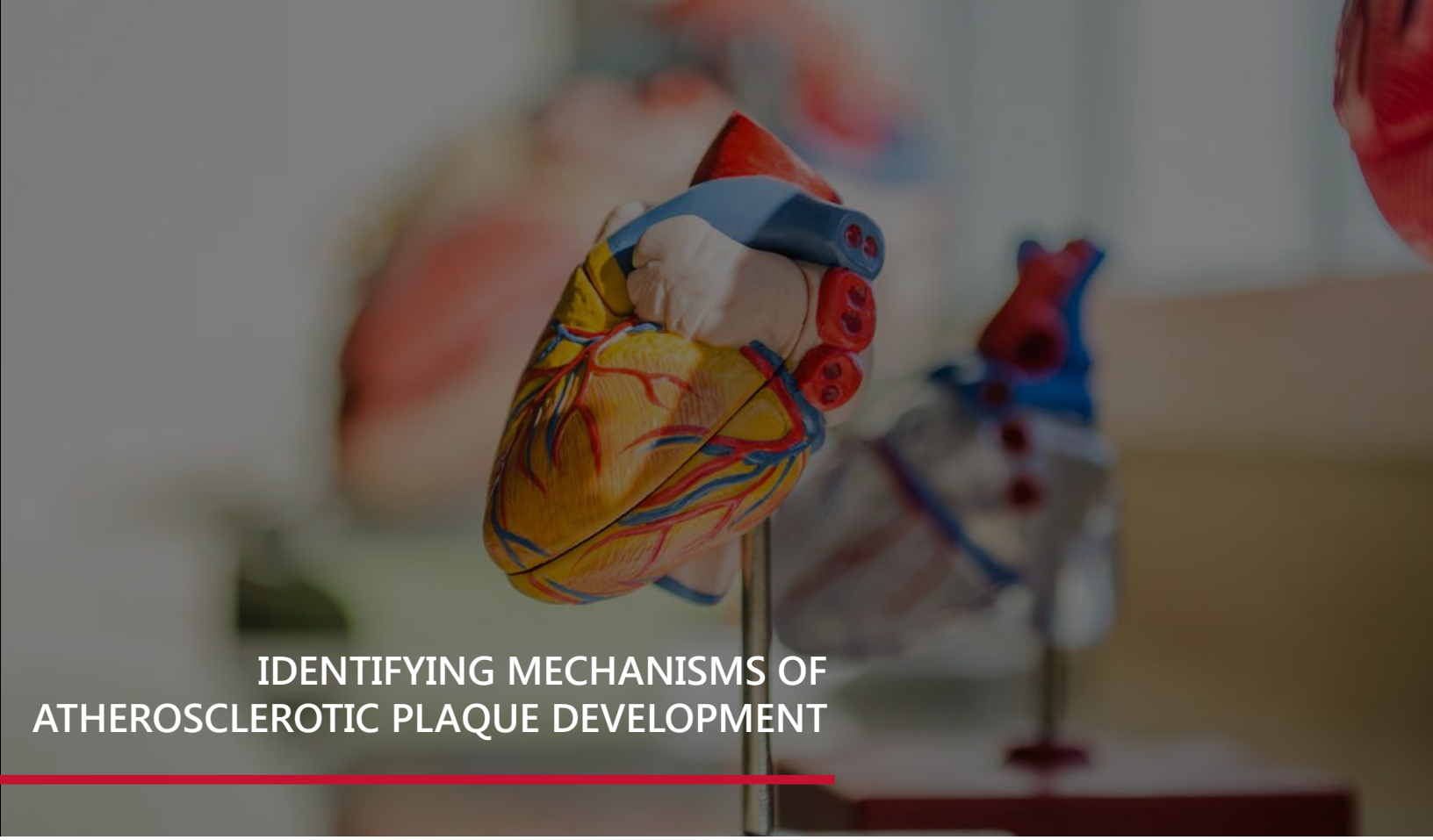
Idiopathic pulmonary fibrosis, or IPF, is a devastating lung disease that causes rapid declines in lung function; up to 50% of patients will succumb to the disease within 3-5 years of diagnosis. Current treatment options have limited benefits, and do not reliably improve quality of life for patients.

Part of the problem is that the molecular and cellular mechanisms driving fibrosis in IPF have not been well studied.

Using a combination of imaging techniques, Dr. James Hogg's group and their collaborators found a set of specific genes that are up- or down-regulated during fibrosis, compared to normal, healthy lungs. These specific changes are associated with the activation of immune responses and tissue repair processes.

These molecular and cellular changes likely trigger the development and pathology of IPF. These new findings could inform the development of better therapies for IPF.

Read the full study published in EBioMedicine.



IDENTIFYING MECHANISMS OF ATHEROSCLEROTIC PLAQUE DEVELOPMENT

Atherosclerosis is a disease where fats and cholesterol build up into "plaques" in the artery wall. These plaques cause blood vessels to narrow, and can also burst, leading to heart attack and stroke.

For a long time, scientists believed that macrophages, a type of white blood cell, were the main cells that caused atherosclerotic plaque formation. Recently, however, Dr. Gordon Francis' lab found that smooth muscle cells were the main contributors to plaque formation, representing over 50% of the "foam cells" that drive plaque development.

Drs. Gordon Francis (left) and Sima Allahverdian (right)

To further understand how smooth muscle cells contribute to plaque formation, Dr. Francis' group conducted a series of molecular and cellular experiments, and found that smooth muscle cells inherently have lower levels of LAL compared to macrophages.

LAL, or lysosomal acid lipase, is an enzyme that is responsible for degrading fats and "flushing" cholesterol out of cells. Since smooth muscle cells have less LAL, they are inefficient at removing cholesterol, which may explain why they contribute to plaque buildup in atherosclerosis. This finding may lead to new therapeutic targets for managing atherosclerosis, and future studies may explore ways to increase LAL activity to reduce plaque development.

Read the full paper published in Arteriosclerosis Thrombosis and Vascular Biology.

UNDERSTANDING THE IMPACT OF CANNABIS SMOKING ON LUNG HEALTH

On October 17, 2018, Canada became the second nation in the world to legalize recreational cannabis. Only half a year after legalization, 18% or 5.3 million Canadians already reported using cannabis, primarily through smoking. Despite the legalization of recreational cannabis and its increasing popularity, there is little to no information about the impact of cannabis smoking on lung health. Public perception of cannabis smoking has become more and more favourable over time, with the proportion of subjects perceiving its associated risks declining – only 40% of regular cannabis smokers believe that it causes considerable harm to their lungs. Given the well-documented health effects of smoking and tobacco use (including cancer, heart disease and lung disease, among others), this is a cause for major concern.

In response to this lack of concrete evidence on health and safety effects of cannabis, the Canadian Institutes for Health Research (CIHR) committed $19.5 million to support 13 studies focusing on understanding the health, safety, as well as behavioural, social, cultural, ethical and economic impacts of cannabis legalization. HLI researcher Dr. Janice Leung and co-applicants Drs. Don Sin, Wan Tan, Jonathon Leipsic, Andrea Gershon, Miranda Kirby, Grace Parraga, and Mohsen Sadatsafavi, were ranked the top application out of 52 proposals.

The Canadian Users of Cannabis Smoke (CANUCK) Study was awarded $1.5 million to study the effects of cannabis smoking on lung health. The team will use a combination of clinical measures, state-of-the-art imaging systems, and molecular profiling to measure the health outcomes and extent of structural and cellular damage to the lungs of cannabis smokers.

"Our goal is to figure out whether cannabis smoking has a detrimental impact on lung function and respiratory health in a way that might be similar to tobacco smoking," said Dr. Janice Leung. "This new funding will allow us to gain a really complete understanding of cannabis smoking, from how much it costs our health care system all the way down to how it might change the cells in your lung. This information will help to better inform Canadians about the consequences of cannabis smoking."

The CANUCK study team consists of 8 clinician-scientists, lung imaging and population health experts at UBC, Western University, Ryerson University, and the University of Toronto. The team will enroll 1,200 participants from BC and Ontario, and they will be followed up annually for 3 years. The study will assess their respiratory symptoms, any smoking-induced flare-ups, and health-care utilization. New CT and MRI imaging techniques as well as bronchoscopy will be used to assess for lung damage in a subset of patients. As other nations around the world begin to debate the merits of cannabis legalization, this study will provide critical and timely guidance for patients and health care providers regarding the effects of cannabis smoking on lung health.

UNDERSTANDING FAMILIAL HYPERCHOLESTEROLEMIA

Familial Hypercholesterolemia (FH) is an autosomal co-dominant condition, caused most frequently by mutations in the LDLR, APOB or PCSK9 genes, leading to lifelong elevations in low-density lipoprotein cholesterol (LDL-C) levels. FH affects 1 in 250 Canadians, making it the most common genetic disorder in humans and one of the most common causes of premature cardiovascular disease and death.

The HLI's Dr. Liam Brunham is the Principal Investigator of the BC FH Registry and co-lead of FH Canada. Dr. Brunham, together with Dr. Gordon Francis (HLI) and many investigators around the world participated in the European Atherosclerosis Society Familial Hypercholesterolaemia Studies Collaboration (FHSC). In a 2021 Lancet publication, the FHSC characterized the global adult population with heterozygous FH, and described FH detection and management across the world. This represents the first and largest description of patients with FH from around the world.

Using global registry data, the authors performed a cross-sectional assessment of adults (aged 18 or older) with a clinical or genetic diagnosis of probable or definite heterozygous FH. In total, 42,167 adults (21,999 [53.6%] women), from 56 countries were included in the study. Data were assessed overall and by World Health Organization region, sex, and comparing index versus non-index cases.

The study concluded that globally, FH is diagnosed late, with the median age of diagnosis at 44.4 years (32.5–56.5), and 40.2% of participants younger than 40 years when diagnosed. In addition, the authors found that guideline-recommended LDL cholesterol concentrations are infrequently achieved with single-drug therapy.

The study findings are important, as, left untreated, 50% of men and 32% of women with FH develop clinical atherosclerotic cardiovascular disease (ASCVD) by age 60. Prompt recognition and initiation of lipid-lowering therapy is much needed and highly efficacious in FH patients, markedly reducing high ASCVD risk to normal life expectancy. Earlier detection and greater use of combination therapies are needed to reduce the global burden of FH.

39 PRINCIPAL INVESTIGATORS

Michael Allard
Pascal Bernatchez
John Boyd
Liam Brunham
Pat Camp
Chris Carlsten
Denise Daley
Mari DeMarco
Del Dorscheid
Gordon Francis
David Granville
Jordan Guenette
Ilker Hacihaliloglu
Tillie Hackett
James Hogg
Graeme Koelwyn
Andrew Krahn
Zachary Laksman
Jonathon Leipsic
Janice Leung
Honglin Luo
Paul Man
Bruce McManus
Kelly McNagny
Peter Paré
Brad Quon
James Russell
Chris Ryerson
Andrew Sandford
Stephanie Sellers
Chun Seow
Don Sin
Wan-Cheng Tan
Scott Tebbutt
Andrew Thamboo
Stephan van Eeden
Keith Walley
Decheng Yang
Ying Wang

35 AFFILIATED INVESTIGATORS

Jamil Bashir
Philipp Blanke
Sammy Chan
Karen Cheung
Ed Conway
Harvey Coxson
Raouf Dridi
James Dunne
Mark FitzGerald
Jeremy Hirota
Andrew Ignaszewski
Kevin Keen
Miranda Kirby
Ismail Laher
Scott Lear
Samuel Lichtenstein
John Mancini
Yannick Molgat-Seon
Ed Moore
Raymond Ng
Ma'en Obeidat
Simon Pimstone
Jonathan Rayment
Fabio Rossi
Mohsen Sadatsafavi
Janar Sathananthan
Robert Schellenberg
Michael Seidman
Bill Sheel
Peter Skaarsgard
Stacey Skoretz
Pearce Wilcox
David Wood
Jian Ye
Xuekui Zhang

New Principal Investigators

Dr. Ilker Hacihaliloglu
UBC Department of Radiology and Medicine

Dr. Ilker Hacihaliloglu's research is aimed at developing innovative machine learning methods for processing various medical imaging data. A core mission of his research is to drive innovation in artificial intelligence (AI) towards industrial and clinical services and products. With a long-standing track record of working collaboratively with clinicians, his research aims to diminish the gap between exploratory engineering research and clinical research and bring technologies from bench-to-bedside.

Dr. Graeme Koelwyn
SFU Faculty of Health Sciences | CRC Tier 2 | Dr. James Hogg Research Chair in Public Health 'Omics in Exercise and Disease

The overarching goal of the Koelwyn lab is to apply a translational, 'omics-based approach for understanding how heart, lung and/or oncologic diseases communicate with each other through immune-specific mechanisms, leading to adverse systemic, tissue, and cellular responses. It also seeks to demonstrate how exercise – a low-cost public health strategy – can therapeutically improve immune function to protect from these diseases and their deleterious interactions.

New Principal Investigators

Dr. Stephanie Sellers
UBC Department of Medicine

Dr. Sellers directs translational and basic science research for the cardiovascular imaging group at St. Paul's Hospital. Supported by CIHR trainee awards, she completed her Master's at the UNBC and her PhD at UBC. Her graduate work centered on the development of new models of cardiovascular disease and defined mechanisms of vascular remodeling and endothelial dysfunction. The author of >70 publications, she serves on the editorial boards of Cardiovascular Pathology and European Heart Journal Case Reports. Her current work is supported by CIHR, the British Heart Foundation, the Michael Smith Foundation for Health Research, and the Jon DeHaan Foundation and primarily focuses on determining the mechanisms of valvular heart disease and bioprosthetic heart valve degeneration as well as the development of new imaging techniques for cardiovascular disease using in-vivo and ex-vivo models.

Dr. Ying Wang
UBC Department of Pathology and Laboratory Medicine

Dr. Wang's research is focused on studying cell-cell and cell-microenvironment interactions to determine why diseased cells accumulate in atherosclerotic lesions and how we can remove them. 'Functional omics on a tissue slide' is the current theme of Dr. Wang's research. With a combination of biobank associated studies, spatial biology technology, and molecular biology, the Wang Lab aims to develop new therapeutic and diagnostic tools for better treatment and prediction of atherosclerotic disease.

Dr. 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.

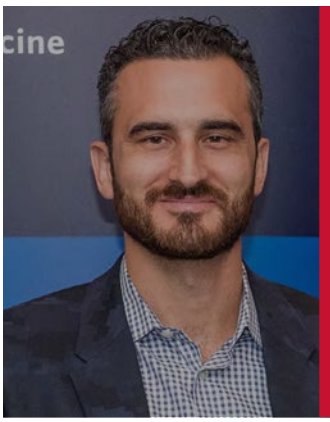
Dr. Pascal Bernatchez
UBC Department of Anesthesiology, Pharmacology, and Therapeutics

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.

Dr. 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.

Dr. Liam Brunham
UBC Department of Medicine | CRC Tier 2 | MSFHR Scholar



Dr. Brunham's research focuses on genetic susceptibility to cardiovascular and metabolic diseases. He is the PI of the BC Familial Hypercholesterolemia Registry, and together with Dr. Simon Pimstone, is the co-PI of the Study to Avoid cardioVascular Events in BC (SAVE BC). His laboratory uses genome-wide association studies and next-generation sequencing to investigate the role of genetic variation in these phenotypes. His laboratory also studies genetic susceptibility to adverse drug reactions, using patient-specific induced pluripotent stem cells as a model to understand variation in drug response. Recently, his laboratory has identified an important role for high density lipoprotein (HDL) cholesterol in protecting against the risk of infections and sepsis.

Dr. Pat Camp
UBC Department of Physical Therapy

Dr. Camp's research focuses 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 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. Christopher Carlsten
UBC Department of Medicine | CRC Tier 2

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. Denise Daley
UBC Department of Medicine

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.

Dr. Mari DeMarco
UBC Department of Pathology and Laboratory Medicine | MSFHR Scholar

With a strong interest in bridging protein biochemistry and laboratory medicine, Dr. DeMarco's research group focuses on building innovative biofluid tests for direct translation into patient care. A particular area of interest is advancing protein-based clinical diagnostics for dementias, such as Alzheimer's disease, frontotemporal dementia, and Lewy body dementia. The goal of this program of research is to ensure that these new biomarker tools make the challenging jump from research into healthcare. A key outcome of Dr. DeMarco's research (and role as a Clinical Chemist at St. Paul's Hospital) is the first-in-Canada biomarker testing program for Alzheimer's disease.

Dr. Delbert Dorscheid
UBC Department of Medicine | MSFHR Health Professional Investigator

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.

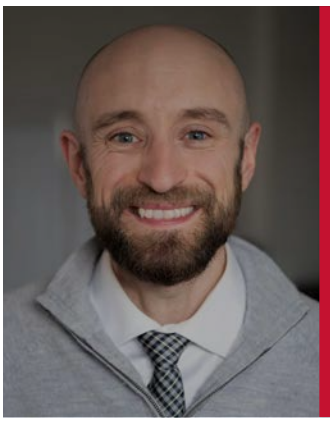
Dr. Gordon Francis
UBC Department of Medicine | MSFHR Health Professional Investigator

Dr. Francis's research involves understanding the mechanisms of cholesterol accumulation in atherosclerosis, and how to remove this cholesterol to prevent coronary heart disease and stroke. For example, 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.

Dr. David Granville
UBC Department of Pathology and Laboratory Medicine

Dr. Granville's research group focuses on vascular injury, inflammation and remodeling in the context of atherosclerosis, transplant vasculopathy, atherosclerosis, and ischemia and reperfusion injury. In recent years, Dr. Granville's group discovered a key pathogenic role for a family of serine proteases known as granzymes in autoimmune and/or age-related chronic diseases. Granzymes are a family of 5 serine proteases that play unique roles in tissue injury, inflammation, vascular permeability, loss of structural integrity and impaired remodeling. This has led to the filing of over two dozen patents, development of novel therapeutics, and the formation of a UBC spinoff company, viDA Therapeutics.

Dr. Jordan Guenette
UBC Department of Physical Therapy

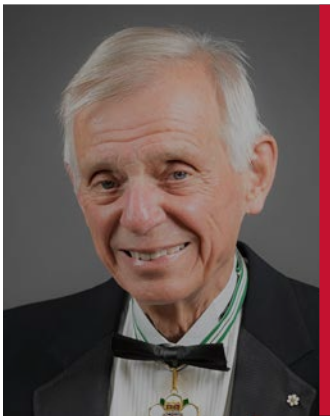


The primary aim of Dr. Guenette's research program is to better understand the physiological mechanisms of dyspnea and exercise intolerance across the spectrum of health and chronic lung disease. His lab uses a number of novel measurement techniques to simultaneously assess the respiratory, cardiovascular, sensory, muscular and neurophysiological responses to exercise. His team conducts both mechanistic exercise physiology experiments and clinical trials in patients with interstitial lung disease (ILD), cystic fibrosis, and chronic obstructive pulmonary disease.

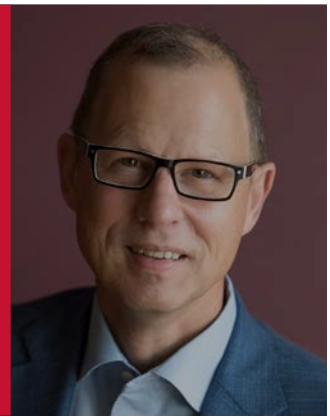
Dr. Tillie-Louise Hackett
UBC Department of Anesthesiology, Pharmacology, and Therapeutics | CRC Tier 1

Dr. Hackett 's research program is focused on understanding and treating airway remodeling in obstructive lung diseases, which daily affects the ability of over 4.5 million Canadians to breathe. Her lab uses ultra-resolution biomedical imaging and human in vitro models to investigate and identify new treatments for the pathobiology of asthma and chronic obstructive pulmonary disease (COPD). She has also served as the Director of the HLI, James Hogg Lung Registry since 2014, which was established in 1977 and is one of the largest lung registries in the world.

Dr. James Hogg
UBC Department of Pathology and Laboratoy Medicine | Order of BC | Order of Canada



Dr. Hogg has been with UBC St. Paul's Hospital since 1977 and is currently an Emeritus Professor. 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. 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. Andrew Krahn
UBC Department of Medicine | Sauder Family and HSF Chair

Dr. Krahn has research funded by a CIHR Foundation grant through 2027, with 416 peer reviewed publications. Current research interests include investigation of genetic causes of arrhythmias, causes of loss of consciousness and implantable arrhythmia devices. He is the founder of the Hearts in Rhythm Organization (HiRO, www.heartsinrhythm.ca), a Canadian network of inherited arrhythmia clinics. HiRO aims to facilitate collaborative research and engage patients and families with inherited arrhythmias, as well as ensure high quality and standardized care across Canada. Dr. Krahn is also the President of the Canadian Cardiovascular Society and second Vice President of the Heart Rhythm Society.

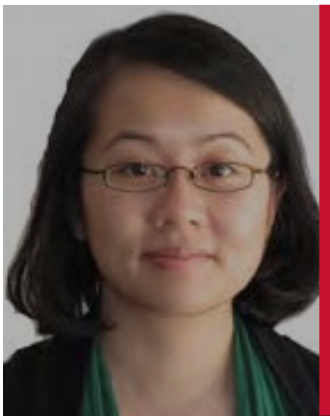
Dr. Zachary Laksman
UBC Department of Medicine | MSFHR Health Professional Investigator

Dr. Laksman's reserach focus is on the genetic basis for diseases of the heart muscle, heart rhythm, and causes of 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. Jonathon Leipsic
UBC Department of Radiology | CRC Tier 2

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 in coronary artery atherosclerosis, prognosis, and the interplay between ischemic heart and chronic obstructive pulmonary disease. 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. Janice Leung
UBC Department of Medicine | CRC Tier 2 | MSFHR Health Professional Investigator | CIHR-AstraZeneca Early Career Investigator



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.

Dr. Honglin Luo
UBC Department of Pathology and Laboratory Medicine

Dr. Luo's research is focused on defining the molecular and pathogenic determinants of virus-host interactions in enterovirus-induced cardiac and neurodegenerative diseases. Ongoing projects include: 1) Understanding molecular mechanisms of impaired cardiac function in enteroviral myocarditis; (2) Determining the possible role of enteroviral infection in the development of amyotrophic lateral sclerosis; and (3) Developing coxsackievirus B3 (CVB3) as an oncolytic virus for lung cancer treatment. Using cell and mouse models, Dr. Luo's group found that CVB3 is an extremely potent anti-tumor virus. The present research aims to genetically engineer CVB3 to further enhance its safety and anti-tumor potency for the treatment of lung cancer.

Dr. S.F. Paul Man (Emeritus)
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.

Dr. Bruce McManus (Emeritus)
UBC Department of Pathology and Laboratory Medicine | Order of BC | Order of Canada

Professor McManus' research program probes mechanisms, consequences, detection and prevention of injury and aberrant repair in inflammatory diseases of the heart and blood vessels. Dr. McManus works on molecular biomarker signature development which is critically enabled by computational sciences. He continues to enable the heart pathology registry function and development. He has a major focus on the multi-institutional clinical validation of the HEARTBiT rejection exclusion biomarker assay. In 2019, Dr. McManus was appointed to the Order of British Columbia and received the Cy Frank Distinguished Service Award from FCIHR.

Dr. Kelly McNagny
UBC Department of Medical Genetics

Dr. Kelly McNagny is a Professor in the Department of Medical Genetics at the University of British Columbia (UBC). His research program is focused on hematopoietic stem cell biology, specifically in understanding the signaling networks that regulate stem cell differentiation and how these cells interact with their microenvironment. These processes have important implications in chronic allergy, asthma, and other inflammatory diseases. Dr. McNagny's research interests also include the innate immune response, kidney function, immuno- and cell-based therapies. He is a Michael Smith Foundation for Health Research Senior Scholar, a member of the Stem Cell Network of Canada, as well as the Associate Director of the AllerGen NCE network.

Dr. Peter Paré (Emeritus)
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 investigated the molecular and bio-mechanical events which relate broncho-constricting stimuli to the ultimate airway narrowing in asthma and other obstructive airway diseases. They examined 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 studied the genetic control of gene expression in the lung and blood of COPD patients.

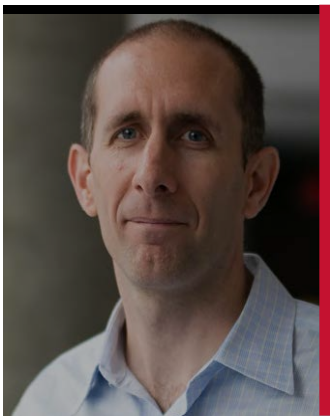
Dr. Bradley Quon
UBC Department of Medicine | MSFHR Scholar | Gilead Sciences Research Scholar

Dr. Quon is a clinician-scientist with a primary focus in cystic fibrosis (CF). He is currently searching for novel biomarkers of inflammation and infection to improve disease monitoring in CF. He also has expertise in clinical epidemiology and is part of an international collaboration examining health outcomes for individuals with CF living in Canada and the United States using national registry data. He is also actively involved in several clinical trials investigating new therapies in CF, several of which have transformed patient care. He is also the Medical Director of the newly formed CF Canada Clinical Trial Network (CF CanACT).

Dr. James Russell
UBC Department of Medicine

Dr. Russell has published over 285 articles and 45 book chapters; he serves on the editorial boards of 5 journals. He also wrote the septic shock chapter for the prestigious Goldman's Cecil Medicine. Dr. Russell has three major current themes of research: 1) randomized controlled trials in patients with septic shock, 2) genomics and pharmacogenomics of septic shock, and 3) defining the operating characteristics and predictive value of short-term versus long-term outcome measures in sepsis and their utility as primary endpoints in pivotal randomized controlled trials in sepsis and septic shock. Recently, Dr. Russell initiated a Canada wide clinical trial on the use of angiotensin II type 1 receptor blocker for COVID-19 treatment.

Dr. Christopher Ryerson
UBC Department of Medicine | MSFHR Health Professional Investigator



Dr. Ryerson specializes in interstitial lung disease (ILD), idiopathic pulmonary fibrosis (IPF), dyspnea, and pulmonary rehabilitation. His current research is focused on the diagnosis and prognostication of ILD, as well as how to best manage patients using non-pharmacological therapies. This area of research is particularly important given the lack of a cure from existing ILD pharmacotherapies. Dr. Ryerson also leads the Canadian Registry for Pulmonary Fibrosis, which is among the largest multicentre registries in the world, and has participated in numerous guideline documents on the diagnosis and management of ILD.

Dr. Andrew Sandford
UBC Department of Medicine

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. Chun Seow
UBC Department of Pathology and Laboratory Medicine

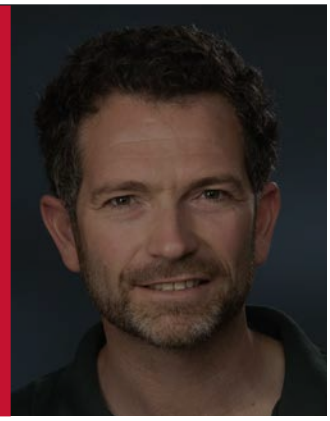
Dr. Seow specializes in smooth and skeletal muscle cell physiology, biochemistry, and pharmacology. His current research focus is on the mechanical function, ultrastructure and biochemistry of airway and vascular smooth muscle in health and disease. He is also interested in the mechanical function and structure of isolated lungs from sheep and human donors. His other interests include skeletal muscle mechanics, ATPase cycle associated with the crossbridge cycle, energetics of muscle contraction, and mathematical modeling of muscle structure and function.

Dr. Don Sin
UBC Department of Medicine | CRC Tier 1 | De Lazzari Family Chair

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.

Dr. Wan-Cheng 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).



Dr. Scott Tebbutt
UBC Department of Medicine

Dr. Tebbutt's research program is focused on systems biology and the use of multi-omics to unravel the molecular signatures of complex disease and other health-related conditions, including asthma, allergic rhinitis, heart failure, neonatal vaccinology, and the interaction between Aspergillus fumigatus and airway epithelial cells. His research combines hypothesis-driven studies 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 CEO of PROOF Centre, a not-for-profit organization dedicated to developing non-invasive biomarkers that can diagnose and/or predict organ failure (heart, lung and kidney).

Dr. Andrew Thamboo
UBC Department of Surgery | MSFHR Health Professional Investigator

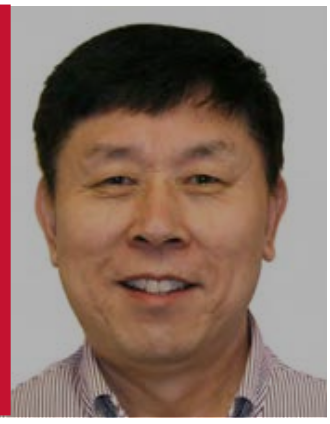
Dr. Andrew Thamboo medically and surgically manages chronic sinusitis and sinonasal tumours at St. Paul's Sinus Centre and at Surrey Memorial Hospital. He also has a cross appointment with Vancouver General Hospital and Royal Columbian Hospital performing skull base procedures with the Neurosurgery team. 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.

Dr. Stephan van Eeden
UBC Department of Medicine | CIHR/GSK Professor of COPD

The focus of Dr. van Eeden's research is on the mechanisms of lung inflammation caused by infection and inhalation exposures, particularly cigarette smoking and air pollution. His group demonstrated that following exposure to ambient air pollutants, pro-inflammatory mediators are generated in the lung and spill over in the blood stream, which are responsible for the downstream adverse cardiovascular health effects. These adverse effects are particularly important for subjects with underlying lung diseases such as COPD. He currently works on understanding the molecular mechanisms underlying these exacerbations and exploring novel methods for early identification and treatment of these exacerbations.

Dr. 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 one of the most promising treatments for sepsis.



Dr. Decheng Yang
UBC Department of Pathology and Laboratory Medicine

Dr. Yang's research is focused on the pathogenesis of coxsackievirus B3 (CVB3)-induced myocarditis. Ongoing research projects include: 1) Molecular mechanisms of CVB3 replication, specifically focusing on the role of cellular 5'TOP, 2) The role of m6A methylation in viral replication efficiency and pathogenesis, and 3) Host response to viral infection. These studies are aimed at identifying the key genes involved in signal transduction pathways leading to cardiomyocyte injury/death or hypertrophy. The identified novel genes may serve as potential targets to design nucleic acid-based therapeutics (siRNA, artificial miRNA) for the treatment of the disease.

AFFILIATED INVESTIGATORS

Dr. Jamil Bashir
Surgery, UBC

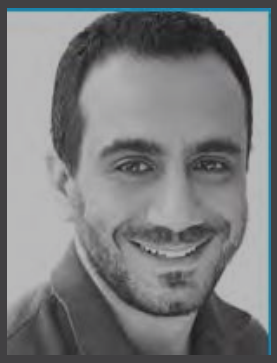
Dr. Philipp Blanke
Radiology, UBC

Dr. Sammy Chan
Medicine, UBC

Dr. Karen Cheung
Biomedical Engineering, UBC

Dr. Ed Conway
Medicine, UBC

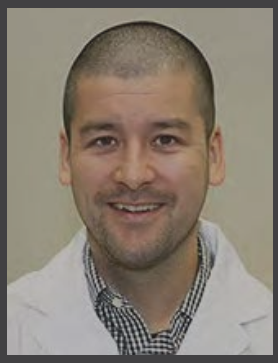
Dr. Harvey Coxson
Boehringer Ingelheim



Dr. Raouf Dridi
Quantum Computing

Dr. James Dunne
Medicine, UBC

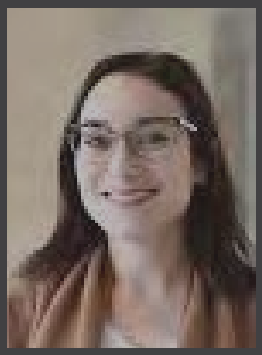
Dr. Mark FitzGerald
Medicine, UBC



Dr. Jeremy Hirota
Medicine, McMaster

Dr. Andrew Ignaszewski
Medicine, UBC

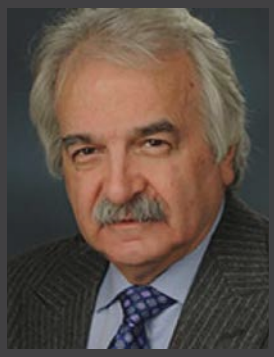
Dr. Kevin Keen
Mathematics, UNBC



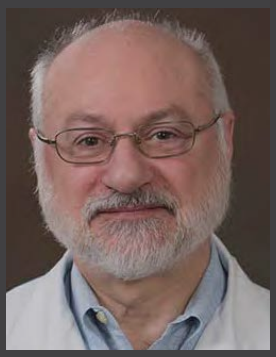
Dr. Miranda Kirby
Physics, Ryerson

Dr. Ismail Laher
Anesthesiology, UBC

Dr. Scott Lear
Health Sciences, SFU



Dr. Samuel Lichtenstein
Surgery, UBC



Dr. John Mancini
Medicine, UBC

Dr. Yannick Molgat-Seon
U. Winnipeg

Dr. Ed Moore
Physiology, UBC

Dr. Raymond Ng
Computer Science, UBC

Dr. Ma'en Obeidat
Novartis

Dr. Simon Pimstone
Medicine, UBC

Dr. Jonathan Rayment
Pediatrics, UBC

Dr. Fabio Rossi
Biomedical Engineering, UBC

Dr. Mohsen Sadatsafavi
Pharmaceutical Sciences, UBC

Dr. Janar Sathananthan
Medicine, UBC

Dr. Robert Schellenberg
Medicine, UBC

Dr. Michael Seidman
UHN

Dr. Bill Sheel
Kinesiology, UBC

Dr. Peter Skaarsgard
Surgery, UBC

Dr. Stacey Skoretz
Audiology, UBC

Dr. Pearce Wilcox
Medicine, UBC

Dr. David Wood
Medicine, UBC

Dr. Jian Ye
Surgery, UBC

Dr. Xuekui Zhang
Mathematics, UVic

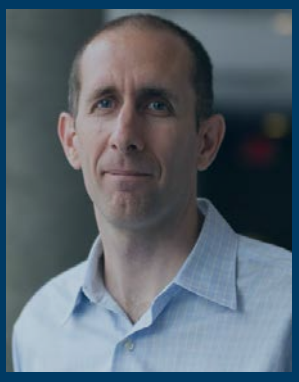
2021 FACULTY AWARDS

Dr. Gordon Francis
MSFHR Health Professional Investigator

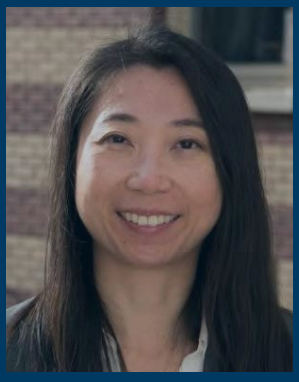
Dr. Jordan Guenette
UBC Faculty of Medicine Distinguished Achievement Award

Dr. Tillie-Louise Hackett
Tier 1 Canada Research Chair in Asthma and COPD Pathobiology and Therapeutics

Dr. Kelly McNagny
AllerGen Michelle Harkness Mentorship Award



Dr. Chris Ryerson
PHC Research and Mission Award



Dr. Ying Wang
UBC Faculty of Medicine New Faculty Research Award
Leducq Foundation - PlaqOmics Consortium Junior Investigator Award

PI GRANTS
Awarded in 2021

CIHR Project Grant
Dr. Tillie Hackett
The contribution of sex differences to small airways disease in chronic obstructive pulmonary disease
Dr. Don Sin
A Novel Approach to Discover Therapeutic and Biomarker Targets and Enable Precision Health in COPD: TORCH (Towards Omics and imaging to Revolutionize COPD Health)

CIHR COVID Operating Grant
Dr. Honglin Luo
Repurposing an FDA-approved anti-gout drug for the treatment of COVID-19
Dr. Scott Tebbutt
Identifying host molecular endotypes associated with diverse COVID-19 outcomes and new variants in a longitudinal multiomics cohort study of 1000 patients
Dr. Don Sin
Biomarker Discovery for the Post-COVID Pulmonary Syndrome

CIHR Team Grant: Personalized Health
Dr. Don Sin (co-PI)
IMplementing Predictive Analytics toward efficient COPD Treatments (IMPACT)

CFI/BC Knowledge Development Fund
Dr. Tillie Hackett
Single Cell Imaging Platform
Dr. Janice Leung
Optical Coherence Tomography to Phenotype Small Airways in Chronic Obstructive Pulmonary Disease
Dr. Don Sin
Enabling Precision Health in COPD

Genome BC: Genesolve Program
Dr. Liam Brunham
The Advancing Cardiac Care Unit-based Rapid Assessment and Treatment of hypErcholesterolemia (ACCURATE) Study

ALS Canada - Brain Canada Discovery Grant
Dr. Honglin Luo
Cytosolic DNA sensing in ALS-related neuroinflammation

PI GRANTS
Awarded in 2021

VCHRI Innovation and Translational Research Award

Dr. Liam Brunham
- The Advancing Cardiac Care Unit-based Rapid Assessment and Treatment of hypErcholesterolemia (ACCURATE) Study

Dr. Scott Tebbutt
- Developing biomarkers for guiding immunosuppression strategy during cytomegalovirus infection in heart transplant patients

St. Paul's Foundation

Dr. John Boyd
- NUWISE (Nutritional Supplement for Patients with Severe Infection)

Dr. Jordan Guenette
- Post-COVID-19 Dyspnea

Drs. Jonathon Leipsic & Don Sin
- ImPCR-COVID-19 (Pulmonary Imaging of Post-COVID-19 Recovery)

Dr. Janice Leung
- Finding novel therapeutics for COVID-19 using epithelial cultures

Dr. Kelly McNagny
- Blood Biomarkers for Severe COVID-19

Dr. Jim Russell
- Prediction of Long COVID-19 (PREDICT LONG C-19)

HLI Heart Tissue Registry & Histology Core
- ABCD (Accelerating Blood and Cardiopulmonary COVID-19 Diagnostics)

UBC Grants for Catalyzing Research Clusters

Dr. Don Sin
- The Airway Centre

UBC Collaborative Research Mobility Award

Drs. Janarthanan Sathananthan & Stephanie Sellers
- Ex-vivo Testing of Cardiac Interventional Techniques and Clinical Validation of Novel Cardiovascular Function Measurements

UBC Advancing Education Renewal

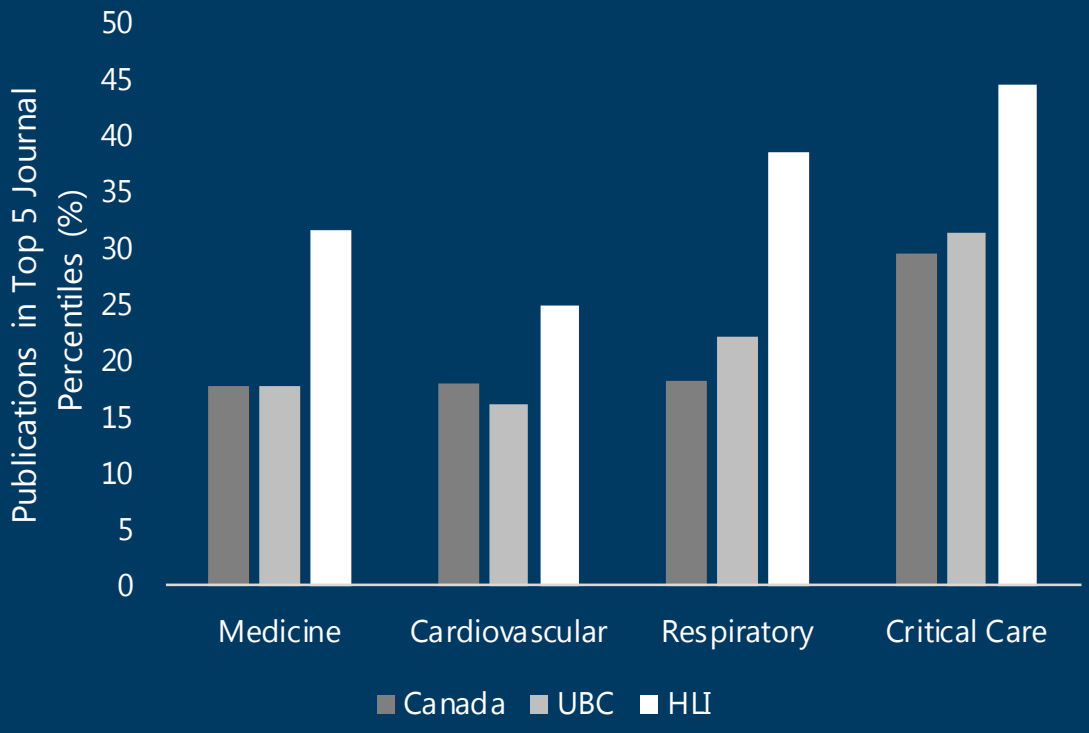
Dr. Scott Tebbutt
- Knowledge Translation and Mobilization: Reimagining Graduate Student Education to Create the Next Generation of Health Professionals, Advocates and Communicators

UBC Faculty of Medicine Seminar Series Fund

Dr. Chun Seow and Ivan Leversage
- HLI Friday Seminar Series

In 2021, HLI Principal Investigators published **358** Peer-reviewed journal articles, together receiving **1,493** Citations

HLI researchers published more frequently in top journals compared to UBC and Canadian researchers, and are cited **2.56** times more than the average paper in the field.*



High-impact publications in 2021

Nature
Lancet
Lancet Respiratory Medicine
European Respiratory Journal
Nature Communications
European Heart Journal
Circulation
Journal of Allergy and Clinical Immunology
American Journal of Respiratory and Critical Care Medicine

*Data obtained from SciVal. Comparisons were made using Field Weighted Citation Impact. A full list of publications can be found in Appendix B.

Knowledge Mobilization

HLI RESEARCHERS IN THE NEWS

IMPROVING THE LIVES OF HEART TRANSPLANT PATIENTS

Led by Drs. Bruce McManus and Scott Tebbutt, a team at HLI and the Prevention of Organ Failure (PROOF) Centre are developing a new test to detect the earliest sign of rejection for patients after heart transplant.

Traditionally, heart transplant patients undergo regular heart biopsies to monitor for rejection. This procedure is invasive, causes great stress and discomfort, and could even injure the patient's new heart. In BC, biopsies are only done in Vancouver, making the recovery process even more difficult for patients who do not live in the city centre. To overcome these challenges, Drs. McManus and Tebbutt led the development of HEARTBiT, a test that measures a selected panel of genes in blood to diagnose transplant rejection. Implementation of this test could reduce up to 50% of the healthcare costs for these patients.

The team has worked for years to narrow down the panel to nine genes that can predict risk of rejection. Now, one of the final steps is to validate the test in a laboratory setting and prove its reliability. This involves testing different storage conditions, and how time of day or user variation can affect the results. The team is hopeful that this new test will bring significant improvements to patient care.

"The patients are the reason we get up every morning," says Dr. McManus. "Our work is entirely driven by the desire to improve the recovery journey for heart transplant patients. And without them—without their participation, their samples, and their engagement—we would have nothing."

Read the full article in UBC Faculty of Medicine News.

RAPID TESTING FOR COVID-19 AT YVR AIRPORT

HLI researchers teamed up with the Westjet and Vancouver Airport Authority (YVR) to investigate whether a rapid screening program at YVR is a practical and effective way to contribute to a unified future solution for the global aviation industry.

Dr. Don Sin, repirologist and Director of HLI, and co-Principal Investigator Dr. Marc Romney, initiated a pilot project on passengers aged 19 years and older on select departing WestJet flights at YVR. Passengers who were willing to participate had nasopharyngeal swabs collected, as well as mouth rinses and were screened for COVID-19 (SARS-CoV-2) using a rapid antigen test. These tests provided results within 15 to 20 minutes, making them a feasible option for study in the live airport environment at YVR.

The research team was interested in understanding how many passengers departing from YVR are asymptomatic, but have the virus. Results may help public health leaders better understand to what degree asymptomatic individuals are contributing to the spread of COVID-19 and how rapid COVID-19 testing can be implemented in places such as airports.

Read the full articles in UBC News, The Daily Scan, and CBC News.

PODCASTS FOR KNOWLEDGE DISSEMINATION

LungFIT Podcasts

Launched in 2020, the LungFIT podcast is about all things related to pulmonary rehabilitation, which is a multi-disciplinary intervention for people with chronic lung disease. Dr. Pat Camp, a physical therapist and HLI principal investigator, started the LungFIT podcast as a way to disseminate evidence about the efficacy of pulmonary rehabilitation, and help translate lab findings into clinical practice. Podcast topics also include helpful information and tips for healthcare providers working in pulmonary rehabilitation.

The LungFIT Pulmonary Rehabilitation podcast includes topics such as:

- upcoming research
- clinical updates on assessment, tests, and tools
- journal clubs
- interviews with pulmonary rehabilitation experts
- tips on how to improve your program

Check out the episodes here: https://lungfit.med.ubc.ca/lungfit-podcast-episode-guide/

Engineering stem cells to study heart disease

Normal cell-to-cell communication within the heart is essential for normal heart function. In fact, disrupting these communication pathways can lead to heart diseases like atrial fibrillation, a common type of arrhythmia (irregular heartbeat) that can cause blood clots and stroke.

To study why these disruptions occur in arrhythmia patients, Dr. Leili Rohani, a postdoctoral research fellow in Dr. Zachary Laksman's lab, is focused on developing laboratory models using patient stem cells. These stem cells can be grown into various types of heart cells, generating a model of the patient's heart that can then be used for testing therapies.

In a recent episode of The Stem Cell Podcast, Dr. Rohani discussed her research and advice for those who wish to pursue a career in academic research.

Listen to the full episode here.

RECYCLING CHAMPIONS AT HLI

HLI Research Associate and Manager of the Cardiovascular Tissue Registry, Dr. Gurpreet Singhera – or the "Recycling Queen" as she is affectionately known by her colleagues – is a member of the Green+Leaders Network, a collection of volunteers working to improve the sustainability and environmental performance of health care and research laboratories across the Lower Mainland.

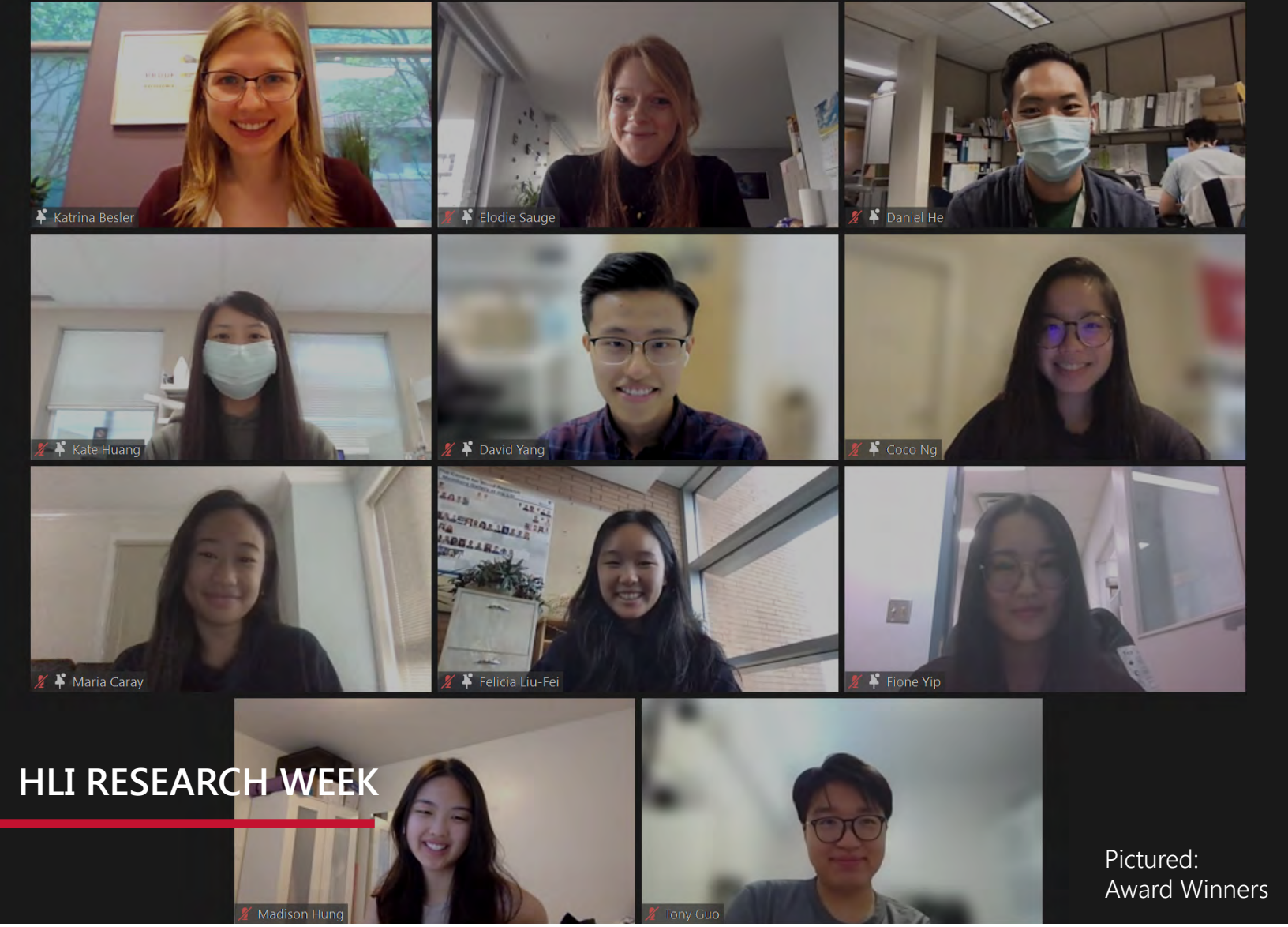
"I'm a self-proclaimed recycling champion and am always looking for ways to keep the recycling program active and better at HLI. My colleagues at HLI have always supported me in doing so," she says.

Over the years Dr. Singhera has led numerous environmental initiatives and forged several partnerships to help divert waste from the landfill. Read more about her efforts in this Earth Day feature on Daily Scan.

EDUCATION

Training the next generation of scientists

The HLI prides itself on its success in attracting international trainees and research personnel from all over the world. The HLI has hosted trainees and research personnel from **39 countries** and **6 continents**.



HLI RESEARCH WEEK

Pictured:
Award Winners

In 2021, The HLI Trainee Association hosted its first ever Research Week. All sessions were held online and included a series of student talks, keynote lectures, and poster presentations throughout the week of August 16-20, 2021. This year, 49 students presented their work to peers and a panel of judges comprised of senior researchers, Principal Investigators, post-doctoral fellows, and graduate students at the Centre. The presentations were divided into 7-minute oral presentations and poster presentations. There were an average of 60 attendees per day, and 49 attendees of the student poster session, for a total of 351 sign-on's throughout the week.

We were also excited to host the Bruce McManus Lecture by Dr. Sam Wadsworth, who is currently the CSO of Aspect Biosystems and an HLI alumnus, as well as the Dr. Peter Paré Lecture by Dr. Mireille Ouimet, who is the Director of the Cardiovascular Metabolism and Cell Biology Laboratory at the University of Ottawa Heart Institute.

Research Week also included a poster session, held on an online platform called Gather. This allowed participants to virtually "walk around" the conference room, converse and network with other attendees, view posters, and ask questions of the student presenters. This innovative platform was a welcome change to Zoom meetings, and participants enjoyed being able to mingle and view posters in the virtual space throughout the week. The week's events and awards were generously supported by the St. Paul's Foundation, the Providence Health Care Research Institute (PHCRI), the Michael Smith Foundation for Health Research, and the HLI. Special thanks to Ms. Basak Sahin and HLI Operations for their support.

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. In 2021, all seminars were conducted through Zoom, with hybrid options at the end of 2021.

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 2021 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 2021 Research in Progress Seminars can be found in Appendix D

HLI TRAINEE ASSOCIATION

Established in 2018, the mission of the **HLI Trainee Association** (TAHLI) is to enhance the academic experience of HLI trainees by promoting a training environment enriched with collaboration, education, professional growth, and career success. In 2021, TAHLI solidified a working executive team with many new members. The members and their roles are as follows.

Co-chairs: Katrina Besler and Naomi Potter

VPs of mentorship: Aileen Hsieh and Eric Xiang

Internal communications: Sunaina Chopra

VPs of events: Khushbu Patel and Nina Huang

Postdoctoral Fellow Representative: Tim Xue

In 2021, TAHLI developed a logo designed by Simran Samra, which was produced by Ardin Sacayanan.

HLI
TRAINEE
ASSOCIATION

HLI TRAINEE ASSOCIATION

Mentorship

TAHLI launched a 5-month pilot mentorship program in fall 2021 for HLI trainees (graduate and postdoctoral level) and had 9 pairs of mentors and mentees. The program included events such as a kickoff event, a career panel event and various social opportunities. Mentors and mentees met once a month at minimum and feedback on the program was collected at a mid-point check-in for mentees and after the program completed through focus groups for all participants.

Awards and Scholarships

HLI, in collaboration with TAHLI established the new Peter Paré and Bruce McManus Awards for trainees. These awards were designed for any HLI trainee at the graduate or postdoctoral level to fund activities that enhance trainee education, valued at up to $1000. TAHLI established a scholarship committee to help shape the criteria for these awards and to shape future trainee awards. The committee is working on establishing workshops to provide trainees with the tools for successful award applications.

TAHLI established the Keith Walley Trainee Mentorship Award to recognize those who go above and beyond to mentor, support, and advocate for trainees at HLI, beyond their own labs. The inaugural winner was Dr. Scott Tebbutt.

James Hogg Award:
- Yun Li (DeMarco)
- Hattie Luo (Laksman)
- Tony Guo (Dorscheid)
- Aileen Hsieh (Hackett)

Bruce McManus Award:
- Yasir Mohammud (Luo)
- Eric Xiang (Francis)
- Kate Huang (Brunham/Laksman)

Peter Paré Award:
- Naomi Potter (Quon)
- Abhinav Kumar Checkervarty (Tebbutt)


Outdoor Social

Paint Night


Ornament Decorating

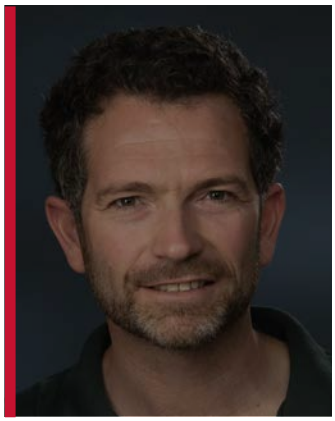
TRAINING STUDENTS IN KNOWLEDGE MOBILIZATION

The Centre for Heart Lung Innovation, together with partners from PHC and various UBC Departments and Units, received $50,000 to develop a new training initiative for graduate students and postdocs whose research focuses on health disciplines.

Launching in 2022, this new program will equip students with the basic tools and skills to engage and communicate with diverse stakeholders, to ensure that their research is properly designed, implemented, and translated into real-world practices. These skills are critical as graduate students and postdocs become the next generation of scientific experts, leaders, professionals, and advocates in society. The new funding will enable the team to build an organized, formal training program that is not currently offered by graduate programs at UBC.

In 2022, the team will develop a series of seminars and workshops focused on knowledge translation (KT) basics implementation. The team will also work with UBC's Knowledge Exchange Unit to develop a set of modular training materials that is tailored for students in health research. Students will then put these new skills into practice through a series of patient forums and focus groups and participation in the UBC 3-Minute Thesis competition.

Learn more about the program in this interview published in The Daily Scan.



Drs. Scott Tebbutt (Education Director, left) and Gurprit Randhawa (KTM Program Coordinator, right).

Trainee Scholarships & Fellowships
Awarded in 2021

Dr. Valentin Blanchard (Francis)
CIHR Fellowship

Abhinav Kumar Checkervarty (Tebbutt)
Friedman Award for Scholars in Health

William Gervasio (Tebbutt)
UBC FoM Multidisciplinary Research Program

Dr. Lara Utsch Mendes Gouveia (Granville)
MSFHR Research Trainee

Emily Gubskaya (Tebbutt)
UBC FoM Multidisciplinary Research Program

Daniel He (Tebbutt/Ryerson)
UBC FoM Graduate Student Collaboration Fund
National Health Research Presentation Award

Dr. Ana Hernandez Cordero (Leung/Sin)
MSFHR Research Trainee

Kate Huang (Brunham)
UBC FoM Graduate Student Award

Madison Hung (Tebbutt)
UBC FoM Multidisciplinary Research Program

Olivia Hutchinson (Guenette)
CGS-M Award

Felicia Liu-Fei (Heart Registry)
UBC Pathology Presentation Award

Hattie Luo (Laksman)
CASCADIA Regenerative Medicine Symposium
Presentation Award

Jasmine Memarzadeh (Tebbutt/Dorscheid)
NSERC Undergraduate Student Research Award

Dr. Kate Milne (Guenette)
MSFHR Research Trainee

Dr. Layla Nabai (Granville)
CIHR Fellowship

Coco Ng (Heart Registry)
UBC Pathology Presentation Award

Shanay Niusha (Tebbutt)
Mitacs Accelerate
CGS-M Award
UBC FoM Graduate Student Award

Kingsley Nwozor (Hackett)
Mitacs PhD Studentship

Dr. Emmanuel Osei (Hackett)
Nominee, Killam Postdoctoral Research Prize
UBC-O ASPIRE Program

Trainee Scholarships & Fellowships

Awarded in 2021

Debora Petry-Moecke (Camp)
BC Lung Respiratory Rehabilitation Scholarship
UBC 4-Year Fellowship
UBC President's Academic Excellence Initiative PhD Award

Naomi Potter (Quon)
CGS-M Award

Dr. Leili Rohani (Laksman)
CASCADIA Regenerative Medicine Symposium Rising Star Presentation Award

Dr. Michele Schaeffer (Guenette)
ERS RESPIRE4 Marie Sklodowska-Curie Postdoctoral Research Fellowship

Shayan Soleymani (Tebbutt)
UBC FoM Summer Student Research Award

Justin Turner (Camp)
SSHRC CGS-D Award
BC NEIHR Doctoral Scholarship

Denitsa Vasileva (Daley)
UBC 4-Year Fellowship

Eric Xiang (Francis)
CGS-M Award

Guangze Zhao (Yang)
UBC Affiliated Fellowships, Doctoral Program

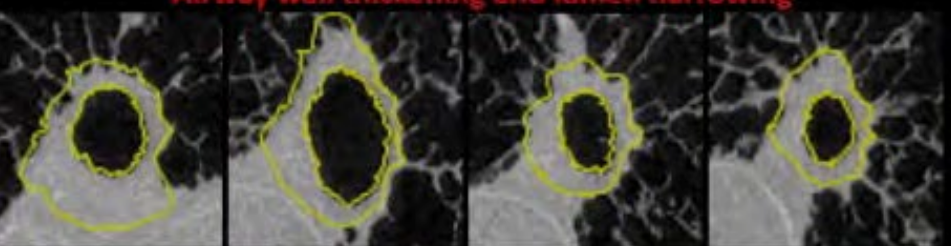
OPERATIONS

NEW MRI CORE

Following a multi-year fundraising effort, in 2021 St. Paul's Hospital acquired a brand new 3T Magnetic Resonance Imaging (MRI) scanner. MRI is one of the gold standards in medical imaging, allowing for visualization of the body's soft tissue, from ligaments and tendons, to the most complex regions such as the brain, spinal cord, and heart. It is widely used by cardiology, neurology, orthopedics, intensive care, and other areas to diagnose a range of complex pathologies and conditions. Additional hyperpolarized gas equipment acquired by St. Paul's Hospital and HLI enables visualization of the lungs and lung function, that is otherwise not possible using conventional MRI techniques.

With this acquisition, the HLI MRI Core was established. Although the MRI will be a critical component of patient care at St. Paul's Hospital, imaging time has also been set aside exclusively for research use, with 16 hours available per week for approved and funded research projects, and HLI PIs having prioritized use for dedicated heart and lung studies.

The MRI Core Associate Director is Dr. Rachel Eddy, who brings experience with pulmonary MRI and hyperpolarized gas research projects, and is also undertaking postdoctoral research in Drs. Don Sin and Jonathon Leipsic's labs.



CELLULAR IMAGING AND BIOPHYSICS CORE

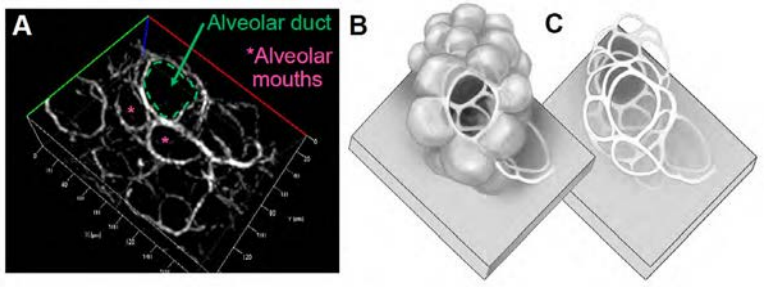
Under the Scientific Direction of Dr. Dragos Vasilescu and led by Core Manager Dr. Aaron Barlow, the Cellular Imaging and Biophysics Core (CIB) is a multi-user facility that supports research groups within the HLI, providing access to cutting-edge imaging technology and expertise. Featured instruments include the Zeiss LSM 880 confocal microscope with super-resolution and multiphoton capabilities, and the Nikon XTH 225-ST high-resolution microCT scanner. In 2021, the CIB, with generous support from the tissue culture lab, recently acquired a new EVOS 5000 fluorescent microscope, which complements the existing imaging capacity by providing extremely fast, but low-resolution fluorescence imaging for cells and tissues. 2021 was a productive year for the CIB team, with several major projects producing significant research results.

Research Highlights include:

• Led by Dr. Vasilescu, the CIB has undertaken a major study of the parenchymal structures of lung tissues in idiopathic pulmonary fibrosis. This study required several hundred hours of microCT scanning time to scan over 200 frozen tissue samples. This study aims to understand the underlying pathologies of interstitial lung disease and relate them to radiological and clinical diagnostic criteria. This study has already resulted in several notable publications in the American Journal of Respiratory and Critical Care Medicine, the American Journal of Pathology, the Canadian Journal of Respiratory, Critical Care, and Sleep Medicine.

• The CIB has continued our ongoing collaborations with the cardiology group of Dr. John Webb, using microCT imaging to help elucidate the performance and failure modes of transcatheter heart valves and formation of calcium deposits on valve leaflets. The studies have helped inform clinical best practice for redeployment and replacement of transcatheter valves in patients. These studies have resulted in publications in JACC Cardiovascular Interventions, Catheterization and Cardovascular Interventions, and EuroIntervention.

• Building on previous work combining multiphoton and super resolution microscopy in the Centre's LSM 880, the CIB, in collaboration with Dr. Hackett's lab, were able to visualize and interrogate the structural arrangement of sub-pleural alveolar ducts. This study showed that a loss of the structural integrity of this collagen scaffolding was a hallmark of emphysema and loss of lung function, which was published in Histochemistry and Cell Biology.



• Imaging work from the CIB has been featured in a number of other studies throughout the HLI, including research on COPD, asthma, and atherosclerosis. The CIB also develops new imaging methods protocols that are frequently published in supplementary resources of research publications. The CIB did suffer a setback in the latter half of 2021 as the MicroCT scanner began suffering serious malfunctions that greatly reduced image quality. Resolving these issues required extensive consultations with the vendor and several service visits, which were difficult to arrange due to COVID protocols during this period. We have now successfully been able to perform the required repairs and the system has been fully tested and is up and running again. Although the microCT scanner was only useable for 6 months of 2021, scanning productivity was only partly affected. A lot of imaging had been done during the first part of the year which enabled users to proceed with image analysis.

For 2022/2023, multiple projects are lined up that include scanning more than 400 samples on the microCT scanner from 4 major projects as well as facilitating microscopy work for more than 40 users spanning 12 different research groups. With these projects, the core is running almost at capacity all the time.

MOLECULAR PHENOTYPING CORE

Throughout 2021, the staff of the Molecular Phenotyping Core Laboratory (MPCL) were in the lab on a regular basis supporting equipment being used for COVID-19 research as well as numerous other research endeavours.
As patient clinic visits continued to take place mostly virtually, some of our existing biobanks moved to community-based sample collection, e.g. Life Labs locations. This meant that many of our samples were coming from offsite collection sites and were being delivered via courier. This small change was important to help continue research efforts despite the ongoing pandemic. It also kept us busy receiving dry ice shipments.

During 2021, we provided support for several collaborative research projects, such as sample processing for a new clinical trial – the Early Initiation of Antiplatelet ThERapy In HeArt TranspLantation: AERIAL trial, coordinated by the Ottawa Heart Research Institute (OHRI). St. Paul's Hospital Interventional Cardiology transplant surgeon Dr. Mustafa Toma was the site lead/co-investigator for this trial. For this study, we provided sample processing support as well as testing on the T-TAS Total Thrombus formation Analysis System, a microchip-based flow chamber system that mimics in vivo conditions for evaluating whole blood thrombogenicity, which was provided by OHRI and Diapharma.

In addition, we assisted in the launch of Dr. Jasmine Grewal's Adult Congenital Heart Disease (ACHD) biobank to support research of this serious condition, and provided sample processing support to Dr. Anita Palepu's Canadian COVID-19 prospective cohort study (CANCOV), as well as to Drs. Brittany Barker and Hudson Reddon, for an investigation of COVID-19 vaccine confidence uptake among people who use drugs in Vancouver's Downtown Eastside and Downtown South neighbourhoods. In collaboration with the HLI Cardiovascular Registry, MPCL staff also performed DNA/RNA extraction on heart tissues for a collaboration with Nanyang Technology University in Singapore.

In 2021 we started to inventory and consolidate the large BC Centre on Substance Use biobank that moved to the HLI in 2020. Over the year UBC co-op students worked hard to inventory and consolidate 883 freezer boxes containing 46,908 cryovials (blood samples). After the consolidation, the samples were able to fit into 471 freezer boxes. This process was necessary to help us optimize our -80 °C freezer space, which is very limited.

Our staff were instrumental in establishing 3 new flow cytometric staining protocols and panel designs for mouse blood (7 colours using 10 antibodies), bronchoalveolar lavage fluid (8 colours using 7 antibodies) and liver (9 colours using 11 antibodies). These panels are used to identify changes in neutrophil and macrophage/monocyte percentages following treatment, as well as subsets of macrophages (new/mature/ tissue resident) and activation state (pro-inflammatory marker).

Finally, the MPCL conducted 3, 1.5 hr long educational workshops online in 2021:
- Road to Successful PCR, Parts 1 & 2
- Kaluza Software training

These workshops were well attended by HLI trainees, who learned how to use the MPCL's Real Time qPCR and Flow Cytometry instrumentation.

JAMES HOGG LUNG REGISTRY

2021 was a productive year for the James Hogg Lung Registry (JHLR), which continues to expand. Lung tissue specimens and associated data have been provided to not only Primary Investigators at HLI but also to researchers at University of California at San Francisco, University of North Carolina, Institute of Pharmacy – Berlin, Fred Hutchinson Cancer Research Centre – Seattle, University of Alberta and The University of Manitoba.

The JHLR database was expanded in 2021. The digitization of pre-surgery radiology reports was completed. The Biobank Information Management System (BIMS) is currently being updated to include spacial information and processing methods for individual samples. The JHLR has initiated collaboration with Thoracic Surgery - Fraser Health in order to biobank human lung tissue from lung cancer surgeries. The regulatory documentation has been completed and we are now preparing for the arrival of our first lung tissue samples originating from Surrey Memorial Hospital. This collaboration will also provide fresh tissue for application of the latest technologies available to researchers. The JLHR has been very active in supporting IKOMED Technologies Inc. with an Emphysema model and preclinical evaluation of their lead technology originating from the Sin Lab. These human lung tissues and associated clinical data have contributed to several publications submitted or published in 2021:

- Gaikwad AV et al. Vascular remodelling in idiopathic pulmonary fibrosis patients and its detrimental effect on lung physiology: potential role of endothelial-to-mesenchymal transition. ERJ Open Res. 2022 Mar 21;8(1):00571-2021.
- Lu W et al. Angiotensin-Converting Enzyme 2 (ACE2), Transmembrane Peptidase Serine 2 (TMPRSS2), and Furin Expression Increases in the Lungs of Patients with Idiopathic Pulmonary Fibrosis (IPF) and Lymphangioleiomyomatosis (LAM): Implications for SARS-CoV-2 (COVID-19) Infections. J Clin Med. 2022 Jan 31;11(3):777.
- Brake SJ et al. SARS-CoV-2 (COVID-19) Adhesion Site Protein Upregulation in Small Airways, Type 2 Pneumocytes, and Alveolar Macrophages of Smokers and COPD - Possible Implications for Interstitial Fibrosis. Int J Chron Obstruct Pulmon Dis. 2022 Jan 11;17:101-115.
- Xu F et al. The molecular and cellular mechanisms associated with the destruction of terminal bronchioles in chronic obstructive pulmonary disease. Eur Respir J. 2021 Oct 21:2101411.
- Ikezoe K et al. Small Airway Reduction and Fibrosis Is an Early Pathologic Feature of Idiopathic Pulmonary Fibrosis. Am J Respir Crit Care Med. 2021 Nov 1;204(9):1048-1059.
- Eapen et al. Increased myofibroblasts in the small airways, and relationship to remodelling and functional changes in smokers and COPD patients: potential role of epithelial-mesenchymal transition. ERJ Open Res. 2021 Jun 7;7(2):00876-2020.
- Xu F et al. The transition from normal lung anatomy to minimal and established fibrosis in idiopathic pulmonary fibrosis (IPF). EBioMedicine. 2021 Apr;66:103325.
- Eapen MS, Lu W, Hackett TL, Singhera GK, Thompson IE, McAlinden KD, Hardikar A, Weber HC, Haug G, Wark PAB, Chia C, Sohal SS. Dysregulation of endocytic machinery and ACE2 in small airways of smokers and COPD patients can augment their susceptibility to SARS-CoV-2 (COVID-19) infections. Am J Physiol Lung Cell Mol Physiol. 2021 Jan 1;320(1):L158-L163. doi: 10.1152/ajplung.00437.2020. Epub 2020 Nov 11. PMID: 33174446; PMCID: PMC7869956.
- Mostaço-Guidolin LB et al. Pulmonary Vascular Remodeling Is an Early Feature of Fatal and Nonfatal Asthma. Am J Respir Cell Mol Biol. 2021 Jul;65(1):114-118.
- Tam A et al. FAM13A as potential therapeutic target in modulating TGF-β-induced airway tissue remodeling in COPD. Am J Physiol Lung Cell Mol Physiol. 2021 Aug 1;321(2):L377-L391.

CARDIOVASCULAR TISSUE REGISTRY

With the ongoing pandemic in 2021, the Cardiovascular Registry (CVR) at the HLI continued its operations, advancing scientific developments in cardiac biobanking and COVID-19-based research, establishing new, world-class collaborations and strengthening existing ones. To continue growing the repository, our team remains committed to procuring cardiac tissue from surgical and autopsy cases from St. Paul's Hospital - including explanted hearts, valve replacement tissues, ventricular assist devices, prosthetics, etc.

In March 2020, the new pandemic restrictions brought several limitations in approaching patients to obtain informed consent for the use of biospecimens in research. However, the relaxation of restrictions in the past year prompted us to move forward with seeking participant consent - we are proud to report that we have achieved a consent rate of 100% for heart transplant patients from 2020 and 2021. In an effort to engage these patients in our research and promote knowledge mobilization, the CVR has welcomed many of the heart transplant recipients into the registry space to learn about cardiac research and to view their explanted hearts. Such heart-viewing sessions help foster positive research partnerships between patients and the CVR team.

The CVR has continued to develop our collaborative partnership with the St. Paul's Hospital Pathology and Laboratory Medicine department. Our team facilitated cardiac sample processing for effective evaluation for the hospital's cardiovascular pathologist and prepared samples for transport for regional, national, and international research collaborations (ex., transport of cardiac samples for genetic testing for the BC Inherited Arrhythmia Program). We also strengthened our relationship with HLI's Histology Department by working closely together to conduct quality control assessments on preserved tissue samples. Our new quality control system is one strategic improvement that contributed to our growth this past year - we continue to harness available resources to maximize the quality of our samples.

The CVR provided co-op positions and facilitated various learning opportunities for undergraduate students during the summer, fall, and winter sessions. Our students successfully obtained prestigious summer funding and summer studentship awards. Our current 8-month co-op student successfully received BioTalent subsidies as her salary support. In addition, in November 2021, the CVR hosted a "take your kid to work" day, where one Grade 9 student was able to visit our research environment and learn about tissue biobanking. The student also participated in simple laboratory tasks, including micro pipetting, labeling, and cleaning, while learning important laboratory safety rules. This event marked the re-start of HLI's annual student mentorship program that was on pause for last two years due to pandemic lockdown.

The CVR became a partner in the HLI's -80°C freezer leasing program and consolidated two old freezers into one high-capacity freezer. The CVR has a completed inventory for all biobank samples, including formalin, flash-frozen, OCT-preserved, and RNAlater.

CVR PUBLICATIONS

The CVR has continued to foster research collaborations both nationally and internationally. The list of recent publications below includes the use of cardiovascular bio-specimens contributed by the CVR. Two of the publications (no. 1 and 3) were supported by work done by summer co-op students under the supervision of Drs. Bruce McManus and Paul Hanson. One of our recently published papers (no. 5) had significant implications related to the ongoing pandemic. The study investigated various pathological mechanisms of SARS-CoV-2 infection, providing vital cardiopulmonary research insights of importance for tackling COVID-19 .

Recent CVR-related Publications:

1. COVID-19 Positivity in a Heart Transplant Recipient – Antibody-Mediated Rejection or SARS-CoV-2-Associated Cardiac Injury? (2022). Oxford Medical Case Reports
2. The role of phosphorylation in atrial fibrillation: a focus on mass spectrometry approaches. (2022) Cardiovasc Res.
3. Advanced Detection Strategies for Cardiotropic Virus Infection in a Cohort Study of Heart Failure Patients (2021). Laboratory Investigation
4. Native Aortic Valve Disease Progression and Bioprosthetic Valve Degeneration in Patients with Transcatheter Aortic Valve Implantation (2021). Circulation
5. SARS-CoV-2 infection of human iPSC-derived cardiac cells reflects cytopathic features in hearts of patients with COVID-19 (2021). Sci Transl Med

Overall, the CVR has had a productive year and is looking forward to more collaborations, partnerships, and improvements in 2022-23.

HEALTH AND SAFETY

At the beginning of 2021, the HLI Safety Committee continued to focus on ensuring the health and safety of those performing essential laboratory work on site. Staffing in the first months of 2021 was limited to essential workers and those conducting urgent COVID-19 studies. Many additional hand sanitizer units by office spaces, lab areas and entrance doors played a role in keeping these people safe. In addition, surface sanitization helped curb the spread of COVID-19 in work areas, meeting rooms, lunchrooms, and photocopier areas. Sanitation stations at the HLI were created to include 70% ethanol spray bottles and disinfectant wipes to sanitize areas before and after use. These measures were in large part successful as no workplace COVID transmission amongst Staff and Faculty members have been reported to date.

Committee members continue to monitor sanitization stations and replenish when depleted. Meetings and orientations shifted to being conducted virtually. As the pandemic restrictions eased, more HLI personnel returned to the centre. Room occupancy limits were set to maximize physical distancing of occupants. In instances where physical distancing was not possible, PPE and medical masks were used. Mandatory COVID-19 safety training for all was provided, and all personnel were asked to complete UBC's COVID-19 vaccination status declaration. A COVID-19 Safety Plan document and video was created by the Operations team and posted on the HLI intranet. To date, daily self assessment health checks continue to be conducted as per WorkSafeBC requirements.

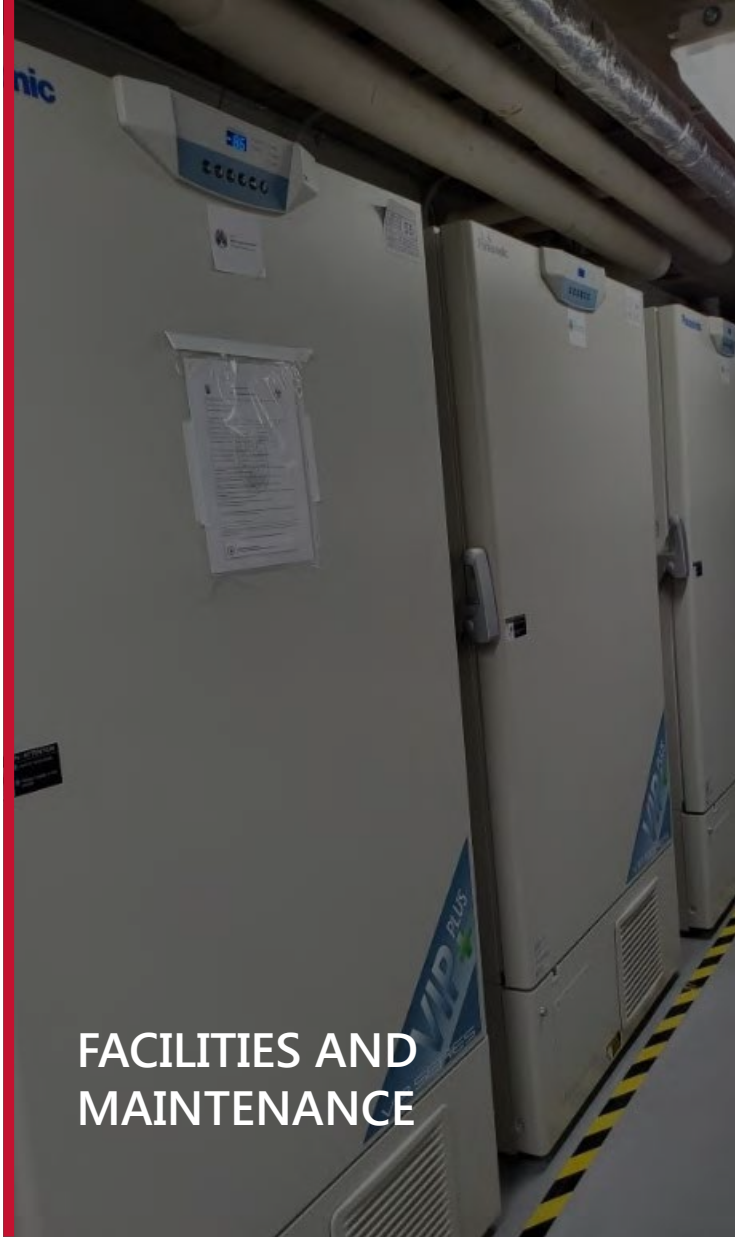
TISSUE CULTURE CORE

The Tissue Culture Core plays a vital role in HLI research activities, as many publications include cell culture work data. Throughout 2021, we continued to provide training and orientation to new students and staff to maintain safe, sterile, and well-managed TC facilities. The biosafety cabinets were certified by an accredited company after the annual inspection under the supervision of the HLI maintenance team.

With the ongoing pandemic, orientation and training sessions were all held via Zoom. This year, the TC core welcomed two new HLI PIs and created space for their tissue culture work and added two new incubators.

The TC core team oversaw long-term storage of cells in cryostorage duers, trained users to follow proper safety protocols and maintain updated cell stock inventories. The core supported ongoing cell biobanking throughout the year for two new HLI projects (COVID study and effect of Cannabis on lungs) and ongoing regular PI-grant funded projects.

The TC core had a productive year and is looking forward to an increase in collaborations and improvements in 2022-23. The TC core and manager are committed to providing an excellent cell culture facility available to all HLI users and ensuring a safe and sterile cell culture experience while supporting research. Help and training are available to anyone who needs guidance.



FACILITIES AND MAINTENANCE

During the COVID-19 pandemic, several HLI Principal Investigators initiated COVID-19 research studies and with that came the need to increase our biobanking capacity to store samples. This, along with our continued expansion with other research programs, necessitated the design and construction of an additional freezer storage room. With great support and effort from Providence Research and St Paul's Hospital, this additional space was completed in January 2021. This room has the capacity to store 10 ultra-low freezers (equates to storage space for 576,000 samples).

In 2021, we also initiated a freezer leasing program to create a more efficient, economical and space-saving freezer management system. This program will reduce space needs by encouraging the review and clean-up of old or damaged samples, providing PIs with shared space in HLI-managed freezers. HLI staff will monitor, defrost and advise of ongoing space use and needs, eliminating the need for PIs and research staff to monitor and maintain their own freezers.

Finally, the Facilities team continued to work closely with the Operations Director to provide timely and accurate information for the design of the future CSRC. Planning for the new St Paul's will be instrumental in ensuring our future lab space will be able to meet research demands.

PRECLINICAL SERVICES

The Genetically Engineered Models (GEM) Facility staff continued to work throughout the pandemic, and, through daily rotation and teamwork, were able to support and even start new projects. This was a fantastic accomplishment for the team and one to be proud of. The team contributed to a variety of research projects on Sepsis, Amyotrophic lateral sclerosis (ALS) Disease, Marfan's Syndrome, Muscular Dystrophy, Oncology and Myocarditis, ensuring animal welfare was maintained.

The team also said a fond farewell to our longtime team member, Lubos Bohunek, who retired in 2021.

HISTOLOGY CORE

The Histology Core was kept busy during 2021 with ongoing projects and the purchase of a new Tissue Micro Array. thanks to COVID-19 related St Paul's Foundation funding, this new addition represents a significant move towards the ability to provide an economical and consistent level of quality in immunohistochemistry. As many as a few hundred samples can be fit onto a single slide and all can be stained simultaneously. Paraffin blocks can be sectioned and stained homogeneously. The other exciting new technology we have is an upgrade to our existing BondRx which provides an easy way for labs to fully automate tests and accelerate their research programs. This upgrade also allows us to perform in situ hybridization. Leica Biosystems has also partnered with other companies which will allow us to expand with additional multiplexing options. Traditional immunohistochemistry (IHC) preserves spatial context but is limited to 2 to 3 biomarkers per sample. Next-generation sequencing (NGS) enables the analysis of multiple biomarkers but the spatial context of the tissue is lost. Spatial biology (multiplex IHC) addresses these limitations by enabling the analysis of multiple biomarkers in a tissue section while preserving their spatial context.

The Histology Core looks forward to further expansion of their technical capabilities and equipment catalogue in 2022.

INFORMATION TECHNOLOGY

2021 was a busy year, and the IT Services team worked hard to ensure the smooth operation of the centre. This included continuing to expand and support remote access, including data acquisition and analysis capabilities. All of this was completed while working to prevent ransom-ware and similar attacks.

The IT Team continued to upgrade workstations throughout the centre and has implemented the Zero Trust model which allows full auditing of user actions on Privileged Remote Access, database auditing and file level access auditing as well. The team helped get the new MRI machine up and running by installing data connections. Additional registries and databases were added throughout the year, though supply channel issues continued to delay equipment purchases.

PARTNERSHIPS AND ACKNOWLEDGEMENTS

The HLI is grateful to our funding partners: Canada Foundation for Innovation, British Columbia Knowledge Development Fund, Providence Health Care, PHCRI, 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: Katherine Adolphs, Vivienne Chan, Claire Smits, Chris Robinson, Gwen Sin, Ivan Leversage, Dr. Don Sin and all the HLI Principal investigators.

SUPPORT US

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.

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https://startanevolution.ubc.ca/category/projects-by-faculty/faculty-of-medicine

Appendix A

Grants, Contracts, Clinical Trials, Agreements, and Salary Awards

April 2021 - March 2022

Bernatchez, Pascal

- Activating the anti-atherosclerotic properties of endothelial function: from cells to humans. Heart and Stroke Foundation of Canada. Grant, $91,500.
- Optimization of angiotensin II receptor type 1 blockers (ARBs) in chronic obstructive pulmonary disease (COPD). Innovation, Science and Economic Development Canada. Grant, $31,667.
- The critical role of cholesterol in the pathogenesis of muscular dystrophy. Canadian Institutes of Health Research. Grant, $99,500.
- Endothelial function in the pathogenesis and management of Marfan syndrome-associated aortic root disease. Canadian Institutes of Health Research. Grant, $133,875.
- Targeting endothelial dystusfunction in a genetic mouse model of aortic aneurysm. NIH Subgrant. Grant, $45,000.
- MyoNEXT myology suite. Canada Foundation for Innovation Operating Funds. Grant, $12,500.
- Application of multi-omics and pharmacological studies to discover potential new therapeutics for COVID-19. MITACS Inc. Grant, $67,500.
- Cholesterol in Dysferlinopathy. Jain Foundation. Grant, $105,500.

Boyd, John

- Organ donation after cardiac death: optimizing the donor heart. Canadian Institutes of Health Research. Grant, $100,980.
- Team Grant: Sepsis Research Network. Canadian Institutes of Health Research (CIHR). Grant, $25,000.

Brunham, Liam

- Creation and implementation of a Registry for Familial Hypercholesterolemia. AMGEN Canada Inc. Grant, $16,083.
- Improving the identification and treatment of young adults with heart disease: the Study to avoid vascular events in British Columbia. Canadian Institutes of Health Research. Grant, $130,815.
- Investigating pharmacogenetic mechanisms of doxorubicin-induced cardiotoxicity in human pluripotent stem cell-serviced cardiomyocytes. Canadian Institutes of Health Research. Grant, $116,280.
- CETP inhibition as a novel treatment to remove pathogen lipids and improve survival in sepsis. Canadian Institutes of Health Research. Grant, $122,400.
- The advancing cardiac care unit-based rapid assessment and treatment of hypercholesterolemia (ACCURATE) study. Providence Health Care Research Institute. Grant, $37,500.
- Pipeline towards stem cell driven personalized medicine for atrial fibrillation. Stem Cell Network. Grant, $23,400.
- The Advancing Cardiac Care Unit-based Rapid Assessment and Treatment of hypErcholesterolemia (ACCURATE) study. Genome BC. Grant, $162,500.
- The Advancing Cardiac Care Unit-based Rapid Assessment and Treatment of hypErcholesterolemia (ACCURATE) study. Vancouver Coastal Health Research Institute – Innovation and Translational Research Award. Grant, $75,000.
- Canada Research Chair in Prevision Cardiovascular Disease Prevention. Canada Research Chair, Tier 2. Salary, $100,000.
- Cardiovascular genetics: phenotypes, genotypes and cellular mechanisms. Michael Smith Foundation for Health Research. Salary, $90,000.

Camp, Pat

- Rehabilitation service capacity for COVID-19 survivors. British Columbia Lung Foundation. Grant, $25,000.
- Chronic disease management for people with chronic lung disease. British Columbia Lung Foundation. Grant, $12,500.
- Niwh Yizt iyh Hilht iz Nets eelh iyh Strengthening our Bodies: A Community-based Research Project to Create Pulmonary Tele-Rehabilitation in Remote and Rural First Nations

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Communities in Northern British Columbia. Canadian Institutes of Health Research. Grant, $160,650.
- Bayis ll Tus a strong breath: a community-based research to identify the prevalence of and contributors to chronic obstructive pulmonary disease in remote and rural First Nations communities in British Columbia. Canadian Institutes of Health Research. Grant, $158,355.
- Wildfire smoke and emergency planning for First Nations people living with lung disease in remote and rural British Columbia. Canadian Institutes of Health Research. Grant, $164,047.

Carlsten, Christopher
- Infrastructure Operating Fund. Canada Foundation for Innovation. Grant, $5,559. Funding held at VCHRI.
- Does Traffic-Related Air Pollution Reduce the Effectiveness of Corticosteroids in Asthma. Grant. Canadian Institutes of Health Research, $134,640. Funding held at VCHRI.
- Relationship between external and internal microbiomes in normal and compromised airways. University of British Columbia Faculty of Medicine. Grant, $25,000. Funding held at VCHRI.
- Does air pollution reduce inhaled corticosteroid effectiveness through modulating epigenetics? Grant. BC Lung Association. Grant, $17,500. Funding held at VCHRI.
- A controlled dose-response study to identify a biosignature of diesel exhaust exposure. WorkSafe BC. Grant, $2,500. Funding held at VCHRI.
- Epigenetic Health Benefits of Budesonide. Genome BC and Johnson & Johnson Consumer Inc. Clinical Trial, $534,758. Funding held at VCHRI.
- Effect of Diesel Exhaust on the Respiratory Microbiome in COPD Airways. Michael Smith Foundation for Health Research. Grant, $24,083.33. Funding held at VCHRI.
- Development, Evaluation and Dissemination of Novel Clinical Tools for Predicting Occupational Asthma. Canadian Institutes of Health Research. Contract, $5,000. Funding held at VCHRI.
- Respiratory outcomes following COVID-19 infection in British Columbia: a prospective patient registry. Michael Smith Foundation for Health Research and BC SUPPORT Unit. Grant, $230,650. Funding held at VCHRI.
- A blood test to diagnose western red-cedar asthma. Innovation, Science and Economic Development Canada, PROOF Centre of Excellence, and Province of British Columbia. Grant, $30,000.
- Effect of diesel exhaust exposures on the respiratory microbiome in COPD airways. nnovation, Science and Economic Development Canada, British Columbia Lung Association, and Province of British Columbia. Grant, $15,000. Funding held at VCHRI.
- Lung health benefits of e-cigarette cessation. Grant. Canadian Institutes of Health Research, $99,000. Funding held at VCHRI.
- Occupational and Environmental Lung Disease. Canada Research Chair, Tier 2. Salary, $100,000. Funding held at VCHRI.

Daley, Denise
- Genetic buffering in cancer. Canadian Institutes of Health Research. Grant, $127,000.

DeMarco, Mari
- Advancing healthcare diagnostics for neurodegenerative disorders. Michael Smith Foundation for Health Research. Salary, $90,000.
- IMPACT-AD (Translating research into practice: Investigating the impact of Alzheimer's disease diagnostics in Canada. Brain Canada. Grant, $246,486.33.

Dorscheid, Delbert
- Investigating the role of Fc RI and CD23 in IgE mediated inflammation in the asthmatic airway epithelium. Canadian Society of Allergy and Clinical Immunology. Grant, $4,500.
- Dupilumab extension trial in severe asthma. British Columbia Lung Foundation. Grant, $18,000.

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- VAPING: the unknown perils of inhalation and epithelial injury. Canadian Institutes of Health Research (CIHR). Grant, $99,979.
- IgE-mediated inflammation generated by the airway epithelium is antigen independent – a cause of a novel asthma phenotype. Michael Smith Foundation for Health Research. Salary, $90,000.

Francis, Gordon

- Molecular and cellular phenotyping of smooth muscle cell foam cells for the prevention of atherosclerosis. Canadian Institutes of Health Research. Grant, $38,333.
- Relative deficiency of lysosomal acid lipase in arterial smooth muscle cells as a novel target for atherosclerosis treatment and prevention. Canadian Institutes of Health Research. Grant, $205,020.
- The unrecognized importance of smooth muscle foam cells in atherosclerosis development and treatment. Canadian Institutes of Health Research. Grant, $45,488.
- Non-HDL-cholesterol, macrophage, and lipid-lowering drug influences on smooth muscle foam cell formation and fate in atherosclerosis. Heart and Stroke Foundation of Canada. Grant, $54,612.
- The role of smooth muscle cell metabolism of amyloid beta in cerebral amyloid angiopathy. Alzheimer's Society of Canada. Grant, $75,000.
- Redefining atherosclerosis: Characterizing and targeting smooth muscle cell foam cells for the treatment and prevention of coronary heart disease and stroke. Michael Smith Foundation for Health Research. Salary, $90,000.

Granville, David

- Granzymes in Injury, Inflammation and Repair. Canadian Institues of Health Research. Grant, $250,000. Funding held at VCHRI.
- Profiling granzymes in inflammatory neuromuscular diseases. Muscular Dystrophy of Canada. Grant, $50,000. Funding held at VCHRI.
- An unbiased bioinformatic approach identifies sulfaphenazole as a promising neuroprotective therapy to improve motor and autonomic systems after spinal cord injury. Wings for Life. Grant, $150,000. Funding held at VCHRI.
- Defining novel roles for granzyme K in allergic airway inflammation. BC Lung Foundation. Grant, $30,000. Funding held at VCHRI.
- Granzyme B: A novel target for the treatment of dermatitis. Cancer Research Society. Grant, $60,000. Funding held at VCHRI.
- Targeting Granzyme B with a novel inhibitor of radiation dermatitis. Innovation, Science and Economic Development Canada. Grant, $93,333. Funding held at VCHRI.
- A Novel Therapeutic for Inflammatory Skin Diseases. Michael Smith Foundation for Health Research. Grant, $75,000. Funding held at VCHRI.
- Granzyme B: A Novel Therapeutic Target in Cutaneous Leishmaniasis. Leo Foundation. Grant, $133,333. Funding held at VCHRI.
- A novel topical gel formulation of clinically-approved sulfaphenazole for the treatment ofpressure injuries. ICORD/Rick Hansen Seed Grant. $10,000. Funding held at VCHRI.
- Novel mechanisms and therapeutic approach for aging-related pruritus. Canadian Institutes for Health Research. Grant, $100,000. Funding held at VCHRI.

Guenette, Jordan

- Investigating sex differences in dyspnea across the spectrum of chronic obstructive pulmonary disease severity. Michael Smith Health Research BC. Grant, $26,250.
- The effects of 60% oxygen during exercise training in patients with fibrotic interstitial lung disease. Michael Smith Health Research BC. Grant, $20,750.
- Sex-differences in respiratory sensation and muscle function during conditions of physiological stress. Natural Sciences and Engineering Research Council of Canada. Grant, $87,000.
- Research Start-up Funds from PHCRI, UBC Dept of Physical Therapy and JHRC. and Drs. Donald Sin, Peter Pare & Bruce McManus. Providence Health Care Research Institute. Grant, $3,400.

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- The effects of 60% oxygen during exercise training in patients with fibrotic interstitial lung disease. St. Paul's Foundation. Grant, $62,250.
- Mechanisms of dyspnea following COVID-19 recovery. British Columbia Lung Foundation. Grant, $25,000.
- High Oxygen delivery to Preserve Exercise capacity in IPF patients treated with nintedanib: The HOPE-IPF Study. Boehringer-Ingelheim. Clinical Trial, $394,013. (co-PI with Dr. Chris Ryerson)

Hackett, Tillie-Louise

- The contribution of sex differences to small airways disease in chronic obstructive pulmonary disease. Canadian Institutes of Health Research. Grant, $188,733.
- The Role of Small Airways Disease Heterogeneity in Asthma. Canadian Institutes of Health Research. Grant, $135,068.
- Airway-On-A-Chip: Development and in vitro validation of a microfluidic cell culture model for chronic obstructive pulmonary disease (COPD). Innovation, Science and Economic Development Canada, Providence Health Care and Province of British Columbia. Grant, $58,334.
- Assessing small airway disease heterogeneity in asthma to determine novel therapeutic targets. Michael Smith Health Research BC. Grant, $2,250.
- Exploring the biology of persistent type 2 airway niches in asthma. National Institutes of Health. Contract, $49,850.
- Single Cell Imaging Platform. Canada Foundation for Innovation. Grant, $900,000.
- Asthma and COPD Lung Pathobiology and Therapeutics. Canada Research Chair, Tier 1. Salary, $200,000.

Hogg, James

- Comprehensive multi-resolution investigation of IPF pathology. British Columbia Lung Foundation. Grant, $25,000.
- Comprehensive multi-resolution investigation of IPF pathology. Francis Family Foundation. Grant, $93,639.
- Novel quantitative emphysema subtypes in MESA and SPIROMICS. National Institutes of Health. Contract, $106,576.

Krahn, Andrew

- Hearts in Rhythm Organization (HiRO): Improving detection and treatment of inherited heart rhythm disorders to prevent sudden death. Canadian Institutes of Health Research. Grant, $540,386.
- Risk Prediction of Sudden Death in Arrhythmogenic Right Ventricular Cardiomyopathy: the Canadian ARVC Registry. Canadian Institutes of Health Research. Grant, $193,163.

Laksman, Zachary

- Research and administrative costs account. St. Paul's Foundation. Grant, $114,000.
- Single Cell transcriptomics of hypertrophic cardiomyopathy. CIHR - Hearts in Rhythm Organization. Grant, $25,000.
- DNA Nanoball sequencing technology competition. MGI Canada. Contract, $25,000.
- Morphological profiling of stem cell derived cardiomyocytes. Innovation, Science and Economic Development Canada. Grant, $6,000.
- Pipeline towards stem cell driven personalized medicine or atrial fibrillation. Stem Cell Network. Grant, $293,000.
- High throughput screening using stem cell derived cardiomyocytes. Canada Foundation for Innovation. Grant, $283,333.
- Mapping the phosphoproteome. Cardiology Academic Practice Plan. Grant, $30,000.
- Developing stem cell-based biological pacemakers. Stem Cell Network. Grant, $150,000.
- Developing personalized anti-arrhythmic drug therapy for atrial fibrillation. Michael Smith Foundation for Health Research. Salary, $90,000.

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Leipsic, Jonathon

- Structural valve degeneration in bioprosthetic heart valves. Canadian Institutes of Health Research. Grant, $15,000.
- Structural valve degeneration in bioprosthetic heart valves. Michael Smith Health Research BC. Grant, $1,458.

Leung, Janice

- Optical Coherence Tomography to Phenotype Small Airways in Chronic Obstructive Pulmonary Disease. British Columbia Knowledge Development Fund and Canada Foundation for Innovation. Grant, $248,764.
- Imaging, molecular, and clinical biomarkers of accelerated lung aging in people living with human immunodeficiency virus (AGE-HIV). Canadian Institutes of Health Research. Grant, $100,000.
- Canadian users of cannabis smoke study (CANUCKs): Impact on lung health via clinical, imaging, and biologic measures. Canadian Institutes of Health Research. Grant, $299,905.
- Understanding the link between lung genomics, transcriptomics, and sex differences in COPD. Michael Smith Health Research BC. Grant, $3,354.
- Optical Coherence Tomography to Phenotype Small Airways in Chronic Obstructive Pulmonary Disease. UBC Faculty of Medicine. Grant, $5,477.
- Primed for damage: Interactions between human immunodeficiency virus and the small airway epithelium. British Columbia Lung Foundation. Grant, $25,000.
- An 'Omics Approach to Understanding COPD Phenotypes and Endotypes. Canadian Institutes of Health Research. Salary, $86,072.
- Understanding the Aging HIV Lung: From Dysbiosis to Cell Injury. Michael Smith Foundation for Health Research. Salary, $90,000.
- Core service facilities grant. UBC VP Research and Innovation. Grant, $75,000.

Luo, Honglin

- Cytosolic DNA sensing in ALS-related neuroinflammation. Amyotrophic Lateral Sclerosis Society of Canada. Contract, $44,100.
- Repurposing an FDA-approved anti-gout drug for the treatment of COVID-19. Canadian Institutes of Health Research . Grant, $60,675.
- Enteroviral infection in the development of Amyotrophic Lateral Sclerosis. Canadian Institutes of Health Research. Grant, $35,000.
- Enterovirus subversion of the autophagy pathway. Canadian Institutes of Health Research. Grant, $146,880.
- Role of enteroviral infection in amyotrophic lateral sclerosis. Canadian Institutes of Health Research. Grant, $90,193.
- Novel oncolytic virus for lung cancer treatment. Cancer Research Society. Contract, $60,000.
- Autophagy mechanism of coronaviral infection: Lessons from enteroviruses. Natural Sciences and Engineering Research Council of Canada . Grant, $44,000.
- Development of coxsackievirus B3 as an oncolytic virus for KRAS-mutant lung cancer treatment. Innovation, Science and Economic Development Canada. Grant, $45,000.
- Enteroviral control of autophagy: relevance to heart failure. Heart and Stroke Foundation of Canada. Grant, $75,750.
- Engineering coxsackievirus for the treatment of KRAS-mutant lung adenocarcinoma. Providence Health Care Research Institute and Vancouver Coastal Health Research Institute. Grant, $25,000.
- Understanding the interplay between coxsackievirus and the host ubiquitin-proteasome system. Natural Sciences and Engineering Research Council of Canada. Grant, $66,000.

McManus, Bruce

- Characterization of the pathological hallmarks and mechanisms of COVID-19-associated cardiac injury via digital spatial profiling. American Society for Investigate Pathology. Grant, $5,071.
- Personalizing myocarditis diagnostics through novel biomarkers. Michael Smith Health

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Research BC. Grant, $17,292.
- Epigenome-wide Association of DNA Methylation Markers for Dilated Cardiomyopathy in Left Ventricular Heart Tissues. Nanyang Technological University. Contract, $12,601.

McNagny, Kelly
- Innate Lymphoid cells and RAR-related orphan receptor alpha (RORa) as therapeutic targets for gastrointestinal fibrosis and Crohn's disease. Canadian Institutes of Health Research. Grant, $152,900. Funding held at Biomedical Research Centre.
- Investigating mechanisms of disease and identifying diagnostic biomarkers in focal segmental glomerulosclerosis (FSGS) and nephrotic syndromes. Barbara Opperman Grant to the Faculty of Medicine. Grant, $75,000. Funding held at Biomedical Research Centre.
- Evaluation of Voclosporin Treatment in a Mouse Model of Proteinuric Kidney Disease (MAST). Aurinia Pharma. Contract, $47,125. Funding held at Biomedical Research Centre.
- Modulation of Innate Immune Responses as a Therapy for Muscular Dystrophy. Canadian Institutes of Health Research. Grant, $38,250. Funding held at Biomedical Research Centre.
- Maternal exposures during pregnancy as drivers of susceptibility to allergic asthma and Th2 inflammation. Canadian Institutes of Health Research. Grant, $237,150. Funding held at Biomedical Research Centre.

Quon, Bradley
- CFI Infrastructure Operating Fund. Canada Foundation for Innovation. Grant, $3,259.
- Comprehensive phenotyping of exacerbation in CF (CPEX-CF). Cystic Fibrosis Foundation (US). Grant, $163,273.
- C-reactive protein and calprotectin to diagnose CF pulmonary exacerbations. Cystic Fibrosis Foundation (US). Grant, $3,056.
- Identification of blood-based biomarkers predictive of pulmonary exacerbations in cystic fibrosis. Innovation, Science and Economic Development Canada, Province of British Columbia and PROOF Centre of Excellence. Grant, $45,000.
- Multi-OMIC biomarkers to predict neonatal vaccine response. Innovation, Science and Economic Development Canada, Province of British Columbia, and PROOF Centre of Excellence. Grant, $3,000.
- Refining the approach to cystic fibrosis pulmonary exacerbations - modeling data to improve assessment and predict etiology. Michael Smith Health Research BC. Grant, $49,500.
- The development of novel blood protein biomarkers to enable precision care in cystic fibrosis. Michael Smith Foundation for Health Research. Salary, $90,000.
- Canadian CF Clinical Trial Network. Cystic Fibrosis Canada. Grant, $50,000.
- Biological clustering of pulmonary exacerbations in CF (BIOPEX-CF). Gilead Sciences Research Scholars Program in Cystic Fibrosis. Grant, $65,000 USD.

Russell, James
- Host response mediators in coronavirus (COVID-19) infection. Canadian Institutes of Health Research. Grant, $127,985.
- Host response mediators in coronavirus (COVID-19) infection. St. Paul's Foundation. Grant, $30,000.
- Prediction of Long COVID-19 (Predict Long COVID). St. Paul's Foundation. Grant, $114,000.
- Host response mediators in coronavirus (COVID-19) infection – Is there a protective effect of ARBs on outcomes of coronavirus infection? (ARBs CORONA II). Canadian Institutes of Health Research. Grant, $1,728,270.
- Host response mediators in coronavirus (COVID-19) infection – Supplement for biological sex determinants of COVID-19 outcome. Canadian Institutes of Health Research. Grant, $24,966.

Ryerson, Chris
- A Randomized, Double-Blind, Placebo-Controlled Phase 2 Study of Safety, Tolerability and Efficacy of Pirfenidone in Patients with Rheumatoid Arthritis Interstitial Lung Disease. Brigham and Women's Hospital Inc.. Contract, $3,949.

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- Investigating differential gene expression profiles predictive of interstitial lung disease morphology, progressive phenotypes, and mortality. British Columbia Lung Foundation. Grant, $25,000.
- Long COVID, phenotypes, patient reported outcome measures, healthcare utilization and costs. Canadian Institutes of Health Research. Grant, $19,848.
- Genetic variant associations with radiology, histology and outcomes in interstitial lung disease. Canadian Pulmonary Fibrosis Foundation. Grant, $90,000.
- Connecting clinical research and economic evaluation by mapping lung function to EQ-SD-5L in patients with interstitial lung disease. Michael Smith Health Research BC. Grant, $24,750.
- High Oxygen delivery to Preserve Exercise capacity in IPF patients treated with nintedanib: The HOPE-IPF Study. Boehringer-Ingelheim. Clinical Trial, $394,013. (co-PI with Dr. Jordan Guenette)
- Identification of diagnostic biomarkers to differentiate subtypes of ILD. British Columbia Lung Foundation. Grant, $25,000.
- Canadian Registry for Pulmonary Fibrosis: CARE-PF. Boehringer-Ingelheim. Clinical Trial, $449,400.
- Respiratory outcomes following COVID-19 infection in British Columbia: A prospective patient registry. Vancouver Coastal Health Research Institute and Michael Smith Foundation for Health Research. Grant, $240,000.
- COVID-19 interdisciplinary clinical care network and research platform. UBC Faculty of Medicine Strategic Investment Fund. Grant, $300,000.
- Blood single-cell RNA sequencing of fibrotic interstitial lung disease subtypes. Genome BC. Grant, $122,819.

Sandford, Andrew

- The role of regulatory T cells in blood during acute heart transplant rejection. Innovation, Science and Economic Development Canada, PROOF Centre of Excellence, and Province of British Columbia. Grant, $15,000.
- Epigenetic markers in the Prediction of Long-term Adverse Complications in Patients with Sleep Apnea. British Columbia Lung Foundation. Grant, $25,000.

Sellers, Stephanie

- Understanding of BPHV use, define features of BPHV level, and begin to develop new imaging approaches for detecting valve degeneration and identifying therapeutic targets to improve valve durability.. Providence Health Care Research Institute. Grant, $35,000.

Seow, Chun

- Mechanisms underlying the bronchodilatory effect of deep inspiration in health and asthma: from airway smooth muscle to the whole lung. Canadian Institutes of Health Research. Grant, $132,345.
- Molecular mechanisms for length adaptation in smooth muscle cells. Natural Sciences and Engineering Research Council of Canada. Grant, $48,000.

Sin, Don

- Enabling precision health in COPD. Canada Foundation for Innovation and British Columbia Knowledge Development Fund. Grant, $371,868.
- Deep phenotyping in COPD: defining the distribution of human alveolar macrophages. British Columbia Lung Foundation. Grant, $25,000.
- CFI Infrastructure Operating Fund. Canada Foundation for Innovation. Grant, $106,000.
- Biomarker discovery for the post-COVID pulmonary syndrome. Canadian Institutes of Health Research (CIHR). Grant, $499,500.
- Using multi-omics to discover novel biomarkers and therapeutic targets fo chronic obstructive pulmonary disease. Canadian Institutes of Health Research.. Grant, $141,692.
- The Oral metagenome in COPD: Towards a biomarker of exacerbation risk. Chest Foundation. Contract, $36,000.
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- Endo-phenotyping of human alveolar macrophages from bronchoalveolar lavage (BAL). Genome British Columbia. Contract, $132,000.
- A novel treatment for emphysema by radiofrequency in rodents and large animals. Innovation, Science and Economic Development Canada and IKOMED Technologies Inc. Grant, $55,000
- Frequency Treatment for Emphysema Rat Model. IKOMED Technologies Inc. Contract, $61,741.
- Improved phenotyping of macrophages using cell line models, gene expression signatures, and protein secretion data. Innovation, Science and Economic Development Canada, Province of British Columbia, and Providence Health Care. Grant, $15,000.
- Platform development to assay immune cell chemotaxis in chronic obstructive pulmonary disease (COPD). Innovation, Science and Economic Development Canada, Providence Health Care, and Province of British Columbia. Grant, $63,333.
- Biomarker tests to diagnose and prognose acute exacerbations of chronic obstructive pulmonary disease. Michael Smith Health Research BC. Grant, $66,000.
- Ventilation heterogeneity in asthma, COPD, and asthma-COPD overlap: Oscillometry and pulmonary MRI. Michael Smith Health Research BC. Grant, $5,750.
- An approach to screening for SARS-CoV2 at YVR. YVR & WestJet. Contract, $392,000.
- Effects of ecigarettes on lung health: The VAPE Study (Vaping's Airway and Lung Parenchymal Effects). Canadian Institutes of Health Research. Grant, $100,000.
- UBC Airway Centre. University of British Columbia. Grant, $200,000.
- Machine learning methods for automatic diagnosis, severity assessment, prognosis, and disease understanding of COPD. Science and Economic Development Canada. Grant, $18,333.
- TORCH (Towards Omics and Imaging to Revolutionize COPD and Asthma Health) in Canada. Canada Foundation for Innovation. Grant, $606,153.
- Enabling Precision Health in COPD. Canadian Foundation for Innovation/BCKDF. Grant, $378,090.
- IMplementing Predictive Analytics towards efficient COPD Treatments (IMPACT). Canadian Institutes of Health Research. Grant, $190,485.
- Chronic Obstructive Pulmonary Disease. Canada Research Chair, Tier 1. Salary, $200,000.
- De Lazzari Family Chair, Centre for Heart Lung Innovation. St. Paul's Foundation. Salary, $300,000.

Tebbutt, Scott

- Understanding molecular responses of bronchial epithelium to plicatic acid exposure. British Columbia Lung Foundation. Grant, $25,000
- Identifying host molecular endotypes associated with diverse COVID-19 outcomes and new variants in a longitudinal multiomics cohort study of 1000 patients. Canadian Institutes of Health Research. Grant, $460,420.
- HEARTBiT: A novel multi-marker blood test for management of acute cardiac allograft rejection. Canadian Institutes of Health Research. Grant, $436,050.
- HEARTBIT: A novel multi-marker blood test for management of acute cardiac allograft rejection. Michael Smith Health Research BC. Grant, $41,500.
- Dengue Human Immunology Project Consortium (DHIPC) - Identification, standardization and dissemination of HIPC immune signatures (Project 1). National Institutes of Health. Contract, $16,864.
- Developing biomarkers for guiding immunosuppression strategy during cytomegalovirus infection in heart transplant patients. Providence Health Care Research Institute. Grant, $37,500.
- NanoString miRNA Fast Grant – neonatal vaccinology. NanoString Technologies (USA). Contract, $10,000.
- Knowledge translation and mobilization: reimagining graduate student education to create the next generation of health professionals, advocates and communicators. University of British Columbia. Grant, $50,000.
- Cellular and molecular biomarkers to predict vaccine responses in newborns. University of British Columbia. Grant, $15,200.

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- Developing biomarkers for guiding immunosuppression strategy during cytomegalovirus infection in heart transplant patients. Providence Health Care Research Institute and Vancouver Coastal Health Research Institute. Grant, $37,500.

Thamboo, Andrew

- Developing a surrogate marker to asthmatic tissue: the nasal cavity. Innovation, Science and Economic Development Canada and Providence Health Care. Grant, $15,000.
- Understanding a Potentially Common Upper Airway Disorder: Empty Nose Syndrome. Michael Smith Foundation for Health Research. Salary, $90,000.
- Comparison of Immune Profiles in CRS patients after Mepolizumab treatment. GlaxoSmithKline LLC. Clinical Trial, $124,121.

van Eeden, Stephan

- Ambulatory monitoring in COPD. Air Liquide. Contract, $150,000.
- Digital management of AECOPD. Spry Health. Contract, $50,000.
- Air pollution & COPD. Canadian Institutes of Health Research and GlaxoSmith Kline. Salary, $150,000.

Walley, Keith

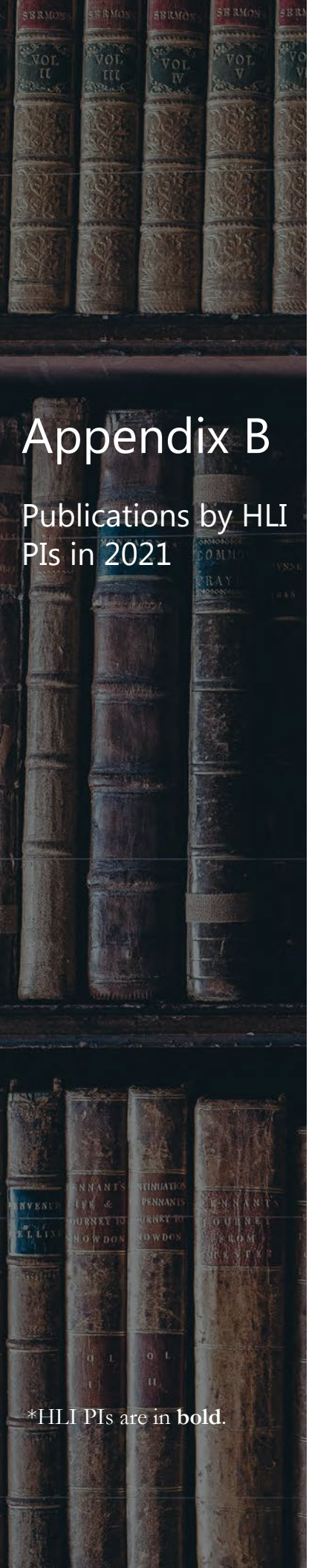
- Translational research to improve sepsis outcomes. Canadian Institutes of Health Research. Grant, $48,528.

Wang, Ying

- Beyond morphology: Convert disease-related gene networks to pixels in digital pathology to solve the puzzle of "vulnerable plaques" that lead to cardiovascular events. New Frontiers in Research Fund. Grant, $125,000.
- Targeting efferocytosis to reduce risk of cardiovascular events. University of British Columbia Faculty of Medicine. Grant, $10,000.
- Identifying somatic mutations/epigenetic modifications in vascular smooth muscle cell subpopulations and their relationship to plaque composition and phenotype. Leducq Foundation. Grant, $43,250.
- Identifying "atherogenic" somatic mutations/epigenetic modifications in vascular smooth muscle cells. Stanford Cardiovascular Institute. Grant, $10,000.

Yang, Decheng

- Role of transcription factor NFAT5 in viral myocarditis: a novel strategy for therapy. Canadian Institutes of Health Research. Grant, $120,870.
- Mechanisms of selective host gene translation regulation in picornavirus infection. Natural Sciences and Engineering Research Council of Canada. Grant, $34,000.



Appendix B

Publications by HLI PIs in 2021

*HLI PIs are in **bold**.

Adams CJ, Shapera S, **Ryerson CJ**, Assayag D, Johannson KA, Fell CD, Morisset J, Manganas H, Kolb M, Hambly N, Cox G, Khalil N, Marcoux V, Wilcox PG, To T, Sadatsafavi M, Halayko AJ, Gershon A, Garlick K, Fisher JH. Effect of continued antifibrotic therapy after forced vital capacity decline in patients with idiopathic pulmonary fibrosis; a real world multicenter cohort study. Respir Med. 2021 Dec 23;191:106722. doi: 10.1016/j.rmed.2021.106722. Epub ahead of print. PMID: 34959146.

Adegunsoye A, **Ryerson CJ**. Diagnostic Classification of Interstitial Lung Disease in Clinical Practice. Clin Chest Med. 2021 Jun;42(2):251-261. doi: 10.1016/j.ccm.2021.03.002. PMID: 34024401.

Aevermann BD, Shannon CP, Novotny M, Ben-Othman R, Cai B, Zhang Y, Ye JC, Kobor MS, Gladish N, Lee AH, Blimkie TM, Hancock RE, Llibre A, Duffy D, Koff WC, Sadarangani M, **Tebbutt SJ**, Kollmann TR, Scheuermann RH. Machine Learning-Based Single Cell and Integrative Analysis Reveals That Baseline mDC Predisposition Correlates With Hepatitis B Vaccine Antibody Response. Front Immunol. 2021 Oct 29;12:690470. doi: 10.3389/fimmu.2021.690470. PMID: 34777332; PMCID: PMC8588842.

Afonso MS, Sharma M, Schlegel M, van Solingen C, **Koelwyn GJ**, Shanley LC, Beckett L, Peled D, Rahman K, Giannarelli C, Li H, Brown EJ, Khodadadi-Jamayran A, Fisher EA, Moore KJ. miR-33 Silencing Reprograms the Immune Cell Landscape in Atherosclerotic Plaques. Circ Res. 2021 Apr 16;128(8):1122-1138. doi: 10.1161/CIRCRESAHA.120.317914. Epub 2021 Feb 17. PMID: 33593073; PMCID: PMC8049965.

Ahmadian S, **Sin DD**, Lynd L, Harrison M, Sadatsafavi M. Benefit-harm analysis of azithromycin for the prevention of acute exacerbations of chronic obstructive pulmonary disease. Thorax. 2021 Nov 26:thoraxjnl-2021-217962. doi: 10.1136/thoraxjnl-2021-217962. Epub ahead of print. PMID: 34836921.

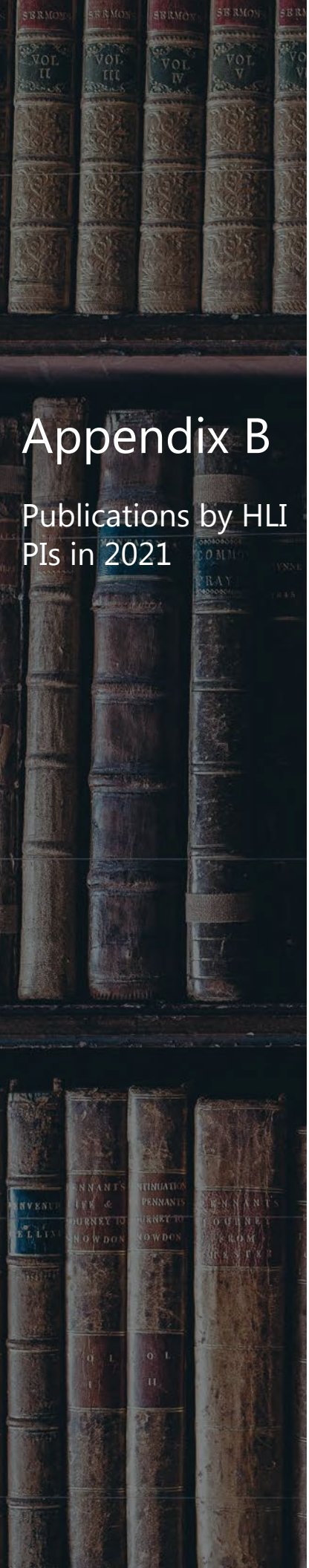
Ahmed FZ, Blomström-Lundqvist C, Bloom H, Cooper C, Ellis C, Goette A, Greenspon AJ, Love CJ, Johansen JB, Philippon F, Tarakji KG, Holbrook R, Sherfesee L, Xia Y, Seshadri S, Lexcen DR, **Krahn AD**. Use of healthcare claims to validate the Prevention of Arrhythmia Device Infection Trial cardiac implantable electronic device infection risk score. Europace. 2021 Sep 8;23(9):1446-1455. doi: 10.1093/europace/euab028. PMID: 33755136; PMCID: PMC8427456.

Akata K, **Leung JM**, Yamasaki K, Filho FSL, Yang J, Yang CX, Takiguchi H, Shaipanich T, Sahin B, Whalen BA, Yang CWT, **Sin DD**, **van Eeden SF**. Altered polarization and impaired phagocytic activity of lung macrophages in people with HIV and COPD. J Infect Dis. 2021 Oct 5:jiab506. doi: 10.1093/infdis/jiab506. Epub ahead of print. PMID: 34610114.

Akodad M, **Sellers S**, Gulsin GS, Tzimas G, Landes U, Chatfield AG, Chuang A, Meier D, **Leipsic J**, Blanke P, Ye J, Cheung A, Wood DA, Khan JM, Webb JG, Sathananthan J. Leaflet and Neoskirt Height in Transcatheter Heart Valves: Implications for Repeat Procedures and Coronary Access. JACC Cardiovasc Interv. 2021 Oct 25;14(20):2298-2300. doi: 10.1016/j.jcin.2021.07.034. Epub 2021 Sep 29. PMID: 34600879.

Al-Khayatt BM, Salciccioli JD, Marshall DC, **Krahn AD**, Shalhoub J, Sikkel MB. Paradoxical impact of socioeconomic factors on outcome of atrial fibrillation in Europe: trends in incidence and mortality from atrial fibrillation. Eur Heart J. 2021 Feb 21;42(8):847-857. doi: 10.1093/eurheartj/ehaa1077. PMID: 33495788.

Alotaibi NM, Filho FSL, Mattman A, Hollander Z, Chen V, **Ng R**, **Leung JM**, **Sin DD**. IgG Levels and Mortality in Chronic Obstructive Pulmonary Disease. Am J Respir Crit Care Med. 2021 Aug 1;204(3):362-365. doi: 10.1164/rccm.202102-0382LE. PMID: 33945775.



Appendix B

Publications by HLI PIs in 2021

Alothman L, Bélanger AM, Ruel I, **Brunham LR**, Hales L, Genest J, Akioyamen LE. Health-related quality of life in homozygous familial hypercholesterolemia: A systematic review and meta-analysis. J Clin Lipidol. 2021 Dec 6:S1933-2874(21)00345-7. doi: 10.1016/j.jacl.2021.11.014. Epub ahead of print. PMID: 35027327.

Alqarawi W, Dewidar O, Tadros R, Roberts JD, Steinberg C, MacIntyre CJ, **Laksman ZWM**, Green MS, Nair G, Wells G, **Krahn AD**. Defining idiopathic ventricular fibrillation: A systematic review of diagnostic testing yield in apparently unexplained cardiac arrest. Heart Rhythm. 2021 Jul;18(7):1178-1185. doi: 10.1016/j.hrthm.2021.03.030. Epub 2021 Mar 26. PMID: 33781978.

Amanian A, Hari K, Habib AR, Dholakia SS, Nayak J, **Thamboo A**. The empty nose syndrome 6-item questionnaire (ENS6Q): a diagnostic tool to distinguish empty nose syndrome from primary nasal obstruction. Int Forum Allergy Rhinol. 2021 Jul;11(7):1113-1115. doi: 10.1002/alr.22761. Epub 2021 Jan 18. PMID: 33460303.

Amenyogbe N, Dimitriu P, Smolen KK, Brown EM, Shannon CP, **Tebbutt SJ**, Cooper PJ, Marchant A, Goetghebuer T, Esser M, Finlay BB, Kollmann TR, Mohn WW. Biogeography of the Relationship between the Child Gut Microbiome and Innate Immune System. mBio. 2021 Jan 12;12(1):e03079-20. doi: 10.1128/mBio.03079-20. PMID: 33436437; PMCID: PMC7845628.

Annesi-Maesano I, Forastiere F, Balmes J, Garcia E, Harkema J, Holgate S, Kelly F, Khreis H, Hoffmann B, Maesano CN, McConnell R, Peden D, Pinkerton K, Schikowski T, Thurston G, Van Winkle LS, **Carlsten C**. The clear and persistent impact of air pollution on chronic respiratory diseases: a call for interventions. Eur Respir J. 2021 Mar 18;57(3):2002981. doi: 10.1183/13993003.02981-2020. PMID: 33737377.

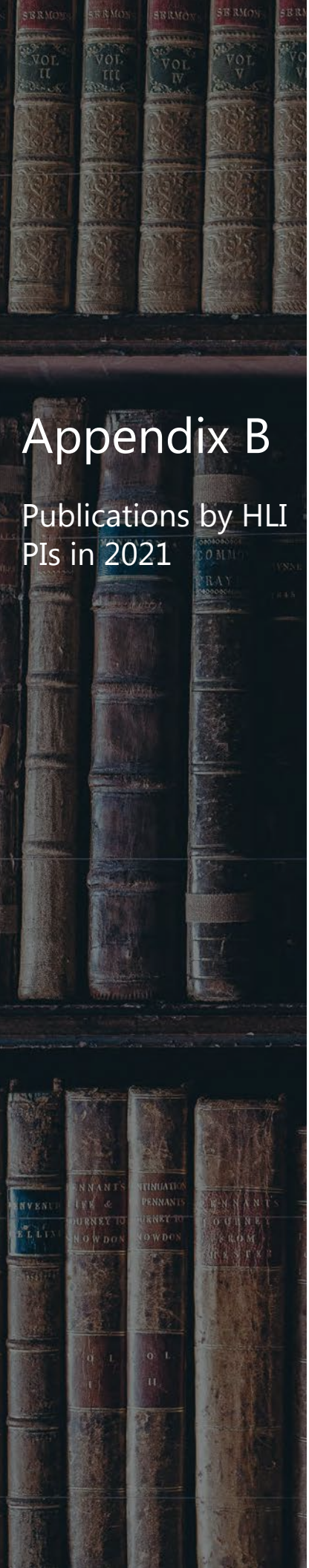
Arefi SMA, Yang CWT, **Sin DD**, Feng JJ. A mechanical test of the tenertaxis hypothesis for leukocyte diapedesis. Eur Phys J E Soft Matter. 2021 Jul 8;44(7):93. doi: 10.1140/epje/s10189-021-00096-9. Erratum in: Eur Phys J E Soft Matter. 2021 Sep 14;44(9):114. PMID: 34236552; PMCID: PMC8264968.

Arefi SMA, Yang CWT, **Sin DD**, Feng JJ. Correction to: A mechanical test of the tenertaxis hypothesis forleukocyte diapedesis. Eur Phys J E Soft Matter. 2021 Sep 14;44(9):114. doi: 10.1140/epje/s10189-021-00117-7. Erratum for: Eur Phys J E Soft Matter. 2021 Jul 8;44(7):93. PMID: 34519902; PMCID: PMC8587392.

Arif AA, Huang YH, Freeman SA, Atif J, Dean P, Lai JCY, Blanchet MR, Wiegand KC, McNagny KM, Underhill TM, Gold MR, Johnson P, Roskelley CD. Inflammation- Induced Metastatic Colonization of the Lung Is Facilitated by Hepatocyte Growth Factor-Secreting Monocyte-Derived Macrophages. Mol Cancer Res. 2021 Dec;19(12):2096-2109. doi: 10.1158/1541-7786.MCR-21-0009. Epub 2021 Sep 23. PMID: 34556524.

Aronson KI, Danoff SK, Russell AM, **Ryerson CJ**, Suzuki A, Wijsenbeek MS, Bajwah S, Bianchi P, Corte TJ, Lee JS, Lindell KO, Maher TM, Martinez FJ, Meek PM, Raghu G, Rouland G, Rudell R, Safford MM, Sheth JS, Swigris JJ. Patient- centered Outcomes Research in Interstitial Lung Disease: An Official American Thoracic Society Research Statement. Am J Respir Crit Care Med. 2021 Jul 15;204(2):e3-e23. doi: 10.1164/rccm.202105-1193ST. Erratum in: Am J Respir Crit Care Med. 2021 Sep 1;204(5):616. PMID: 34283696; PMCID: PMC8650796.

Asatryan B, Yee L, Ben-Haim Y, Dobner S, Servatius H, Roten L, Tanner H, Crotti L, Skinner JR, Remme CA, Chevalier P, Medeiros-Domingo A, Behr ER, Reichlin T, Odening KE, **Krahn AD**. Sex-Related Differences in Cardiac Channelopathies: Implications for Clinical Practice. Circulation. 2021 Feb 16;143(7):739-752. doi: 10.1161/CIRCULATIONAHA.120.048250. Epub 2021 Feb 15. Erratum in: Circulation. 2021 Jun 8;143(23):e1028. PMID: 33587657.



Appendix B

Publications by HLI PIs in 2021

Ashraf M, Khalilitousi M, **Laksman Z**. Applying Machine Learning to Stem Cell Culture and Differentiation. Curr Protoc. 2021 Sep;1(9):e261. doi: 10.1002/cpz1.261. PMID: 34529356.

Assayag D, Garlick K, Johannson KA, Fell CD, Kolb M, Cox G, Hambly N, Manganas H, Morisset J, Fisher JH, Shapera S, Gershon AS, To T, Sadatsafavi M, Wilcox PG, Halayko AJ, Khalil N, **Ryerson CJ**. Treatment Initiation in Patients with Interstitial Lung Disease in Canada. Ann Am Thorac Soc. 2021 Oct;18(10):1661-1668. doi: 10.1513/AnnalsATS.202009-1122OC. PMID: 33493425.

Au RC, **Tan WC**, Bourbeau J, **Hogg JC**, Kirby M. Impact of image pre-processing methods on computed tomography radiomics features in chronic obstructive pulmonary disease. Phys Med Biol. 2021 Dec 14;66(24). doi: 10.1088/1361-6560/ac3eac. PMID: 34847536.

Ayoub NF, Choby G, Turner JH, Abuzeid WM, Raviv JR, **Thamboo A**, Ma Y, Chandra RK, Chowdhury NI, Stokken JK, O'Brien EK, Shah S, Akbar N, Roozdar P, Nayak JV, Patel ZM, Hwang PH. Assessment of Opioid Use and Analgesic Requirements After Endoscopic Sinus Surgery: A Randomized Clinical Trial. JAMA Otolaryngol Head Neck Surg. 2021 Sep 1;147(9):811-819. doi: 10.1001/jamaoto.2021.1839. PMID: 34351376; PMCID: PMC8343514.

Badran M, Abuyassin B, Ayas N, **Sin DD**, Laher I. Vascular and renal telomere shortening in mice exposed to chronic intermittent hypoxia. Can J Physiol Pharmacol. 2021 Oct;99(10):1112-1113. doi: 10.1139/cjpp-2021-0143. Epub 2021 May 5. PMID: 33951396.

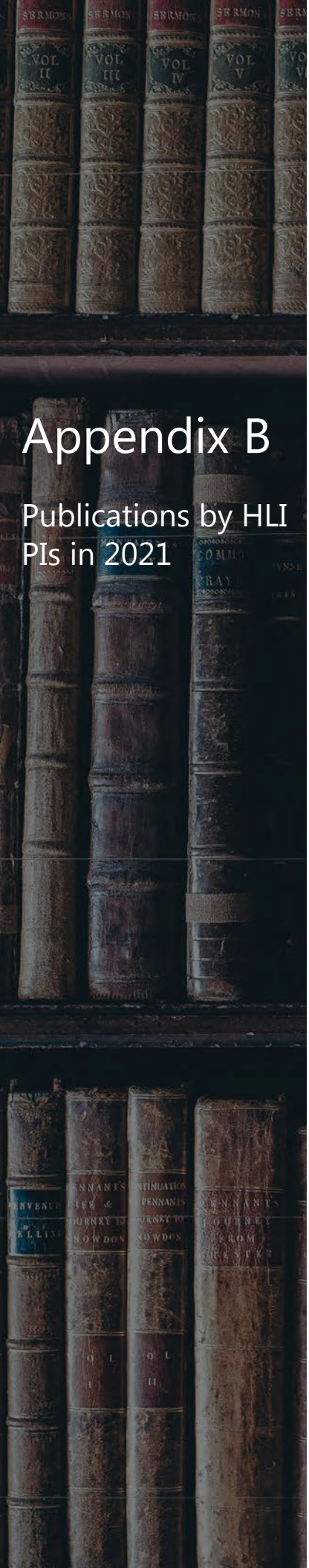
Bakker J, Kattan E, Annane D, Castro R, Cecconi M, De Backer D, Dubin A, Evans L, Gong MN, Hamzaoui O, Ince C, Levy B, Monnet X, Tascón GAO, Ostermann M, Pinsky MR, **Russell JA**, Saugel B, Scheeren TWL, Teboul JL, Baron AV, Vincent JL, Zampieri FG, Hernandez G. Current practice and evolving concepts in septic shock resuscitation. Intensive Care Med. 2021 Dec 15. doi: 10.1007/s00134-021-06595-9. Epub ahead of print. PMID: 34910228.

Barn P, Rideout KL, Lo W, Josey D, Vint Z, Sha C, Hamilton C, Hoens AM, Shellington EM, Joshi PB, **Carlsten C**. Better Together: Launching and Nurturing a Community Stakeholder Committee to Enhance Care and Research for Asthma and COPD. Chest. 2021 Nov 2:S0012-3692(21)04254-9. doi: 10.1016/j.chest.2021.10.028. Epub ahead of print. PMID: 34740590.

Barrett TJ, Corr EM, van Solingen C, Schlamp F, Brown EJ, **Koelwyn GJ**, Lee AH, Shanley LC, Spruill TM, Bozal F, de Jong A, Newman AAC, Drenkova K, Silvestro M, Ramkhelawon B, Reynolds HR, Hochman JS, Nahrendorf M, Swirski FK, Fisher EA, Berger JS, Moore KJ. Chronic stress primes innate immune responses in mice and humans. Cell Rep. 2021 Sep 7;36(10):109595. doi: 10.1016/j.celrep.2021.109595. PMID: 34496250; PMCID: PMC8493594.

Bashir J, Lee AJ, Philippon F, Mondesert B, **Krahn AD**, Sadek MM, Exner D, Pak M, Legare JF, Karim S, Fedoruk L, Peng D, Cusimano RJ, Parkash R, Tyers GFO, Andrade J. Predictors of perforation during lead extraction: Results of the Canadian Lead ExtrAction Risk (CLEAR) study. Heart Rhythm. 2021 Oct 22:S1547-5271(21)02310-9. doi: 10.1016/j.hrthm.2021.10.019. Epub ahead of print. PMID: 34695576.

Bax AM, van Rosendael AR, Ma X, van den Hoogen IJ, Gianni U, Tantawy SW, Hollenberg EJ, Andreini D, Al-Mallah MH, Budoff MJ, Cademartiri F, Chinnaiyan K, Choi JH, Conte E, Marques H, de Araújo Gonçalves P, Gottlieb I, Hadamitzky M, **Leipsic JA**, Maffei E, Pontone G, Shin S, Kim YJ, Lee BK, Chun EJ, Sung JM, Lee SE, Virmani R, Samady H, Stone PH, Berman DS, Min JK, Narula J, Lin FY, Chang HJ, Shaw LJ; PARADIGM Investigators. Comparative differences in the atherosclerotic disease burden between the epicardial coronary arteries: quantitative plaque analysis on coronary computed tomography angiography. Eur Heart J Cardiovasc Imaging. 2021 Feb 22;22(3):322-330. doi: 10.1093/ehjci/jeaa275. PMID: 33215192.



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Bax AM, Yoon YE, Gianni U, Ma X, Lu Y, Lee BC, Goebel B, Han D, Lee SE, Sung JM, Andreini D, Al-Mallah MH, Budoff MJ, Cademartiri F, Chinnaiyan K, Choi JH, Chun EJ, Conte E, Gottlieb I, Hadamitzky M, Kim YJ, Lee BK, **Leipsic JA**, Maffei E, Marques H, Gonçalves PA, Pontone G, Shin S, Narula J, Lin FY, Shaw LJ, Chang HJ. Plaque Character and Progression According to the Location of Coronary Atherosclerotic Plaque. Am J Cardiol. 2021 Nov 1;158:15-22. doi: 10.1016/j.amjcard.2021.07.040. Epub 2021 Aug 29. PMID: 34465463.

Behr ER, Ben-Haim Y, Ackerman MJ, **Krahn AD**, Wilde AAM. Brugada syndrome and reduced right ventricular outflow tract conduction reserve: a final common pathway? Eur Heart J. 2021 Mar 14;42(11):1073-1081. doi: 10.1093/eurheartj/ehaa1051. PMID: 33421051.

Ben Zekry S, Sreedharan S, Han D, **Sellers S**, Ahmadi AA, Blanke P, Hadamitzky M, Kim YJ, Conte E, Andreini D, Pontone G, Budoff MJ, Gottlieb I, Lee BK, Chun EJ, Cademartiri F, Maffei E, Marques H, Shin S, Choi JH, Virmani R, Samady H, Stone PH, Berman DS, Narula J, Shaw LJ, Bax JJ, **Leipsic J**, Chang HJ. Comparison of coronary atherosclerotic plaque progression in East Asians and Caucasians by serial coronary computed tomographic angiography: A PARADIGM substudy. J Cardiovasc Comput Tomogr. 2021 Oct 14:S1934-5925(21)00445-7. doi: 10.1016/j.jcct.2021.09.012. Epub ahead of print. PMID: 34736879.

Bernatchez PN, Tao B, Bradshaw RA, Eveleth D, Sessa WC. Characterization of a Novel Caveolin Modulator That Reduces Vascular Permeability and Ocular Inflammation. Transl Vis Sci Technol. 2021 May 3;10(6):21. doi: 10.1167/tvst.10.6.21. PMID: 34111267; PMCID: PMC8132009.

Bom MJ, Driessen RS, Kurata A, van Diemen PA, Everaars H, Schumacher SP, de Winter RW, van de Ven PM, van Rossum AC, Taylor CA, Min JK, **Leipsic JA**, Danad I, Knaapen P. Diagnostic value of comprehensive on-site and off-site coronary CT angiography for identifying hemodynamically obstructive coronary artery disease. J Cardiovasc Comput Tomogr. 2021 Jan-Feb;15(1):37-45. doi: 10.1016/j.jcct.2020.05.002. Epub 2020 Jun 9. PMID: 32540206.

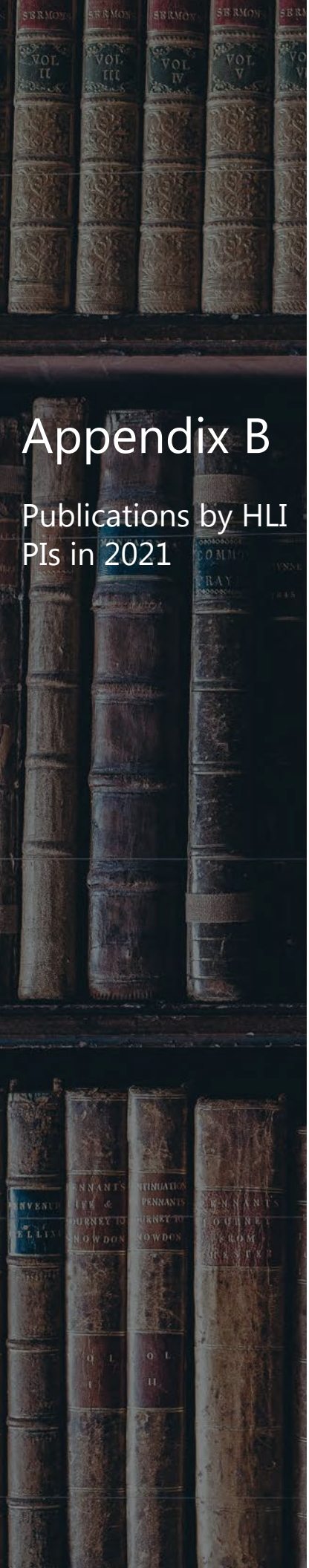
Bom MJ, Schumacher SP, Driessen RS, van Diemen PA, Everaars H, de Winter RW, van de Ven PM, van Rossum AC, Sprengers RW, Verouden NJW, Nap A, Opolski MP, **Leipsic JA**, Danad I, Taylor CA, Knaapen P. Non-invasive procedural planning using computed tomography-derived fractional flow reserve. Catheter Cardiovasc Interv. 2021 Mar;97(4):614-622. doi: 10.1002/ccd.29210. Epub 2020 Aug 26. PMID: 32845067; PMCID: PMC7984343.

Boutin RC, Petersen C, Woodward SE, Serapio-Palacios A, Bozorgmehr T, Loo R, Chalanuchpong A, Cirstea M, Lo B, Huus KE, Barcik W, Azad MB, Becker AB, Mandhane PJ, Moraes TJ, Sears MR, Subbarao P, **McNagny KM**, Turvey SE, Finlay BB. Bacterial-fungal interactions in the neonatal gut influence asthma outcomes later in life. Elife. 2021 Apr 20;10:e67740. doi: 10.7554/eLife.67740. PMID: 33876729; PMCID: PMC8075585.

Boyle KG, Napoleone G, Ramsook AH, Mitchell RA, **Guenette JA**. Effects of the Elevation Training Mask® 2.0 on dyspnea and respiratory muscle mechanics, electromyography, and fatigue during exhaustive cycling in healthy humans. J Sci Med Sport. 2021 Sep 3:S1440-2440(21)00233-4. doi: 10.1016/j.jsams.2021.08.022. Epub ahead of print. PMID: 34538564.

Brahmania M, Wiskar K, **Walley KR**, Celi LA, Rush B. Lower household income is associated with an increased risk of hospital readmission in patients with decompensated cirrhosis. J Gastroenterol Hepatol. 2021 Apr;36(4):1088-1094. doi: 10.1111/jgh.15153. Epub 2020 Jul 14. PMID: 32562577; PMCID: PMC8063220.

Brigham E, Harris D, **Carlsten C**, Redlich CA. Occupational health disparities: The pandemic as prism and prod. J Allergy Clin Immunol. 2021 Nov;148(5):1148-1150. doi: 10.1016/j.jaci.2021.09.007. Epub 2021 Sep 14. PMID: 34534567; PMCID: PMC8452464.



Appendix B

Publications by HLI PIs in 2021

Brockman MA, Mwimanzi F, Lapointe HR, Sang Y, Agafitei O, Cheung P, Ennis S, Ng K, Basra S, Lim LY, Yaseen F, Young L, Umviligihozo G, Omondi FH, Kalikawe R, Burns L, Brumme CJ, Leung V, Montaner JSG, Holmes D, **DeMarco ML**, Simons J, Pantophlet R, Niikura M, Romney MG, Brumme ZL. Reduced magnitude and durability of humoral immune responses to COVID-19 mRNA vaccines among older adults. J Infect Dis. 2021 Dec 9:jiab592. doi: 10.1093/infdis/jiab592. Epub ahead of print. PMID: 34888688; PMCID: PMC8689804.

Brockman MA, Mwimanzi F, Sang Y, Ng K, Agafitei O, Ennis S, Lapointe H, Young L, Umviligihozo G, Burns L, Brumme C, Leung V, Montaner JSG, Holmes D, **DeMarco M**, Simons J, Niikura M, Pantophlet R, Romney MG, Brumme ZL. Weak humoral immune reactivity among residents of long-term care facilities following one dose of the BNT162b2 mRNA COVID-19 vaccine. medRxiv [Preprint]. 2021 Mar 24:2021.03.17.21253773. doi: 10.1101/2021.03.17.21253773. PMID: 33791737; PMCID: PMC8010769.

Brumme ZL, Mwimanzi F, Lapointe HR, Cheung P, Sang Y, Duncan MC, Yaseen F, Agafitei O, Ennis S, Ng K, Basra S, Lim LY, Kalikawe R, Speckmaier S, Moran- Garcia N, Young L, Ali H, Ganase B, Umviligihozo G, Omondi FH, Atkinson K, Sudderuddin H, Toy J, Sereda P, Burns L, Costiniuk CT, Cooper C, Anis AH, Leung V, Holmes D, **DeMarco ML**, Simons J, Hedgcock M, Romney MG, Barrios R, Guillemi S, Brumme CJ, Pantophlet R, Montaner JSG, Niikura M, Harris M, Hull M, Brockman MA. Humoral immune responses to COVID-19 vaccination in people living with HIV receiving suppressive antiretroviral therapy. medRxiv [Preprint]. 2021 Oct 15:2021.10.03.21264320. doi: 10.1101/2021.10.03.21264320. PMID: 34671779; PMCID: PMC8528088.

Brunham LR, Hegele RA. What Is the Prevalence of Familial Hypercholesterolemia? Arterioscler Thromb Vasc Biol. 2021 Oct;41(10):2629-2631. doi: 10.1161/ATVBAHA.121.316862. Epub 2021 Aug 26. PMID: 34433299.

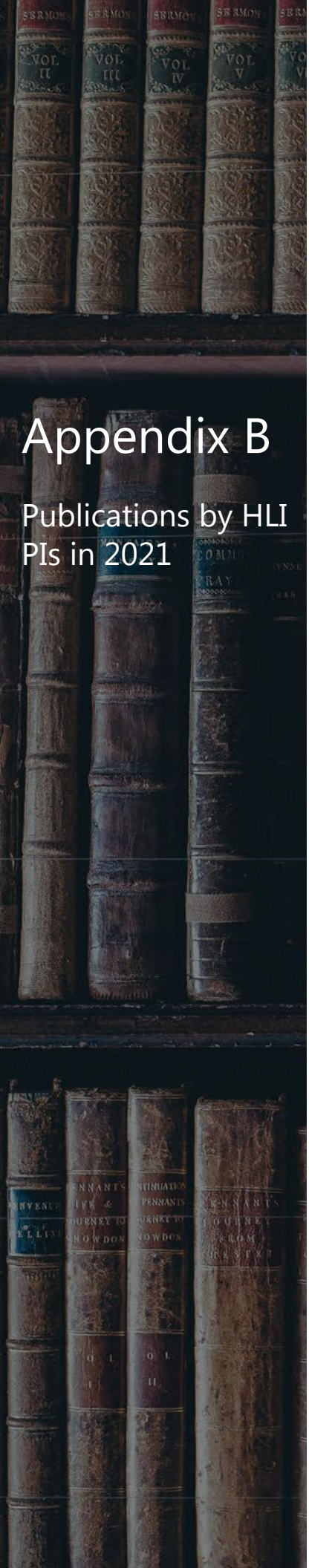
Brunham LR, Mancini GBJ. Editorial Commentary: What Determines the Risk of Cardiovascular Disease in Familial Hypercholesterolemia? Trends Cardiovasc Med. 2021 May;31(4):216-217. doi: 10.1016/j.tcm.2020.04.001. Epub 2020 May 11. PMID: 32407995.

Brunham LR, Trinder M, Rensen PCN, **Boyd J**. Response by Brunham et al to Letter Regarding Article, "Inhibition of Cholesteryl Ester Transfer Protein Preserves High-Density Lipoprotein Cholesterol and Improves Survival in Sepsis". Circulation. 2021 Aug 10;144(6):e122. doi: 10.1161/CIRCULATIONAHA.121.055698. Epub 2021 Aug 9. PMID: 34370547.

Bui KL, Maia N, Saey D, Dechman G, Maltais F, **Camp PG**, Mathur S. Reliability of quadriceps muscle power and explosive force, and relationship to physical function in people with chronic obstructive pulmonary disease: an observational prospective multicenter study. Physiother Theory Pract. 2021 Aug;37(8):945-953. doi: 10.1080/09593985.2019.1669233. Epub 2019 Sep 19. PMID: 31537146.

Cadrin-Tourigny J, Bosman LP, Wang W, Tadros R, Bhonsale A, Bourfiss M, Lie ØH, Saguner AM, Svensson A, Andorin A, Tichnell C, Murray B, Zeppenfeld K, van den Berg MP, Asselbergs FW, Wilde AAM, **Krahn AD**, Talajic M, Rivard L, Chelko S, Zimmerman SL, Kamel IR, Crosson JE, Judge DP, Yap SC, Van der Heijden JF, Tandri H, Jongbloed JDH, van Tintelen JP, Platonov PG, Duru F, Haugaa KH, Khairy P, Hauer RNW, Calkins H, Te Riele ASJM, James CA. Sudden Cardiac Death Prediction in Arrhythmogenic Right Ventricular Cardiomyopathy: A Multinational Collaboration. Circ Arrhythm Electrophysiol. 2021 Jan;14(1):e008509. doi: 10.1161/CIRCEP.120.008509. Epub 2020 Dec 9. PMID: 33296238; PMCID: PMC7834666.

Cait A, Messing M, Cait J, Canals Hernaez D, **McNagny KM**. Antibiotic Treatment in an Animal Model of Inflammatory Lung Disease. Methods Mol Biol. 2021;2223:281-293. doi: 10.1007/978-1-0716-1001-5_19. PMID: 33226601.



Appendix B

Publications by HLI PIs in 2021

Camp PG, Benari O, Dechman G, Kirkham A, Campbell K, Black A, Chung F, Dajee P, Ellis A, Hoens AM, Jones R, Parappilly B, Singh C, Sweeney P, Woo E. Implementation of an Acute Care COPD Exacerbation Patient Mobilization Tool. A Mixed-Methods Study. ATS Sch. 2021 May 4;2(2):249-264. doi: 10.34197/ats-scholar.2020-0129OC. PMID: 34409419; PMCID: PMC8362741.

Carlsten C, Gulati M, Hines S, Rose C, Scott K, Tarlo SM, Torén K, Sood A, de la Hoz RE. COVID-19 as an occupational disease. Am J Ind Med. 2021 Apr;64(4):227-237. doi: 10.1002/ajim.23222. Epub 2021 Jan 24. PMID: 33491195; PMCID: PMC8014565.

Castillo Saldana D, Coxson HO, **Ryerson CJ**. Reply: Quantitative Computed Tomography in Systemic Sclerosis-Interstitial Lung Disease: Are We Ready to Go beyond Standard Assessment? Ann Am Thorac Soc. 2021 Jan;18(1):184. doi: 10.1513/AnnalsATS.202009-1184LE. PMID: 33074707; PMCID: PMC7780978.

Cau A, Cheng MP, Lee T, Levin A, Lee TC, Vinh DC, Lamontagne F, Singer J, **Walley KR**, Murthy S, Patrick D, Rewa O, Winston B, Marshall J, **Boyd J**, **Russell JA**. Acute Kidney Injury and Renal Replacement Therapy in COVID-19 Versus Other Respiratory Viruses: A Systematic Review and Meta-Analysis. Can J Kidney Health Dis. 2021 Oct 30;8:20543581211052185. doi: 10.1177/20543581211052185. PMID: 34733538; PMCID: PMC8558598.

Chakrabarti S, Gibson JA, Bennett MT, Toma M, Verma AT, Chow R, Plewes L, Redpath CJ, Mondésert B, Sterns L, **Krahn AD**. Cardiac Implantable Devices Management in Medical Assistance in Dying (MAiD): Review and Recommendations for Cardiac Device Clinics. Can J Cardiol. 2021 Oct;37(10):1648-1650. doi: 10.1016/j.cjca.2021.05.004. Epub 2021 May 16. PMID: 34010633.

Chang Liu M, Tester MA, Franciosi S, **Krahn AD**, Gardner MJ, Roberts JD, Sanatani S. Potential Role of Life Stress in Unexplained Sudden Cardiac Arrest. CJC Open. 2020 Nov 10;3(3):285-291. doi: 10.1016/j.cjco.2020.10.016. PMID: 33778445; PMCID: PMC7984995.

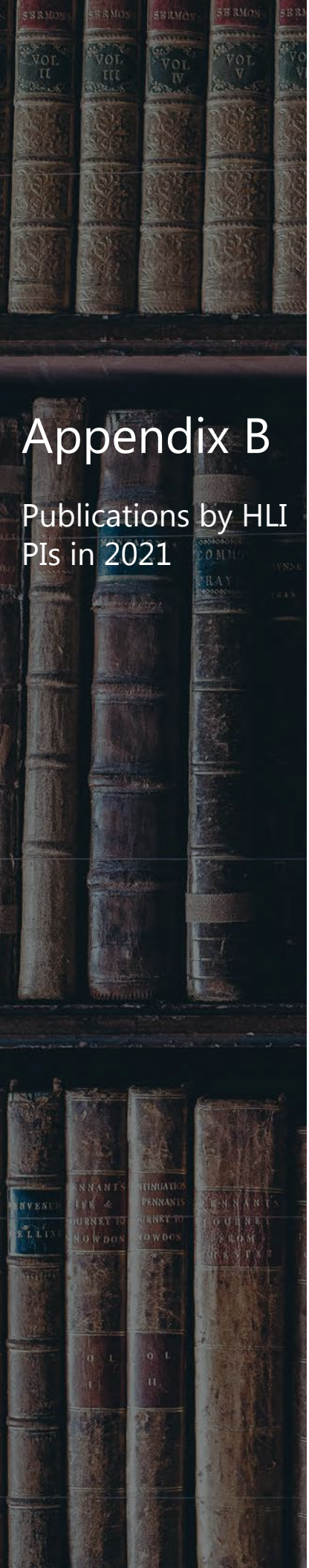
Chatfield AG, Cheung A, Akodad M, Chuang A, Besola L, **Sellers S**, Wood DA, Sathananthan J, Webb J. Transcatheter solutions for transcatheter aortic valve replacement dysfunction: is redo transcatheter aortic valve replacement a durable option? Ann Cardiothorac Surg. 2021 Sep;10(5):571-584. doi: 10.21037/acs-2021-tviv-85. PMID: 34733686; PMCID: PMC8505912.

Che H, Brown LG, Foran DJ, Nosher JL, **Hacihaliloglu I**. Liver disease classification from ultrasound using multi-scale CNN. Int J Comput Assist Radiol Surg. 2021 Sep;16(9):1537-1548. doi: 10.1007/s11548-021-02414-0. Epub 2021 Jun 7. PMID: 34097226.

Che H, Radbel J, Sunderram J, Nosher JL, Patel VM, **Hacihaliloglu I**. Multi-feature Multi-Scale CNN-Derived COVID-19 Classification from Lung Ultrasound Data. Annu Int Conf IEEE Eng Med Biol Soc. 2021 Nov;2021:2618-2621. doi: 10.1109/EMBC46164.2021.9631069. PMID: 34891790.

Chee JN, Simpson C, Sheldon RS, Dorian P, Dow J, Guzman J, Raj SR, Sandhu RK, Thiruganasambandamoorthy V, Green MS, **Krahn AD**, Plonka S, Rapoport MJ. A Systematic Review of the Risk of Motor Vehicle Collision in Patients With Syncope. Can J Cardiol. 2021 Jan;37(1):151-161. doi: 10.1016/j.cjca.2020.02.070. Epub 2020 Feb 14. PMID: 32504546.

Chen T, Tsai APY, Hur SA, Wong AW, Sadatsafavi M, Fisher JH, Johannson KA, Assayag D, Morisset J, Shapera S, Khalil N, Fell CD, Manganas H, Cox G, To T, Gershon AS, Hambly N, Halayko AJ, Wilcox PG, Kolb M, **Ryerson CJ**. Validation and minimum important difference of the UCSD Shortness of Breath Questionnaire in fibrotic interstitial lung disease. Respir Res. 2021 Jul 8;22(1):202. doi: 10.1186/s12931-021-01790-0. PMID: 34238283; PMCID: PMC8265065.



Appendix B

Publications by HLI PIs in 2021

Chen W, Sadatsafavi M, FitzGerald JM, Lynd LD, **Sin DD**. Gender modifies the effect of body mass index on lung function decline in mild-to-moderate COPD patients: a pooled analysis. Respir Res. 2021 Feb 18;22(1):59. doi: 10.1186/s12931-021-01656-5. PMID: 33602241; PMCID: PMC7891012.

Cheng MP, Cau A, Lee TC, Brodie D, Slutsky A, Marshall J, Murthy S, Lee T, Singer J, Demir KK, **Boyd J**, Ohm H, Maslove D, Goffi A, Bogoch II, Sweet DD, **Walley KR**, **Russell JA**; Angiotensin Receptor Blocker Coronavirus Study (ARBs) CORONA I. Acute Cardiac Injury in Coronavirus Disease 2019 and Other Viral Infections-A Systematic Review and Meta-Analysis. Crit Care Med. 2021 Sep 1;49(9):1558-1566. doi: 10.1097/CCM.0000000000005026. PMID: 33870918.

Cherian M, Jensen D, **Tan WC**, Mursleen S, Goodall EC, Nadeau GA, Awan AM, Marciniuk DD, Walker BL, Aaron SD, O'Donnell DE, Chapman KR, Maltais F, Hernandez P, **Sin DD**, Benedetti A, Bourbeau J. Dyspnoea and symptom burden in mild-moderate COPD: the Canadian Cohort Obstructive Lung Disease Study. ERJ Open Res. 2021 Apr 19;7(2):00960-2020. doi: 10.1183/23120541.00960-2020. PMID: 33898621; PMCID: PMC8053913.

Cheung CC, Davies B, Gibbs K, **Laksman ZW**, **Krahn AD**. Patch monitors for arrhythmia monitoring in patients for suspected inherited arrhythmia syndrome. J Cardiovasc Electrophysiol. 2021 Mar;32(3):856-859. doi: 10.1111/jce.14917. Epub 2021 Feb 15. PMID: 33512057.

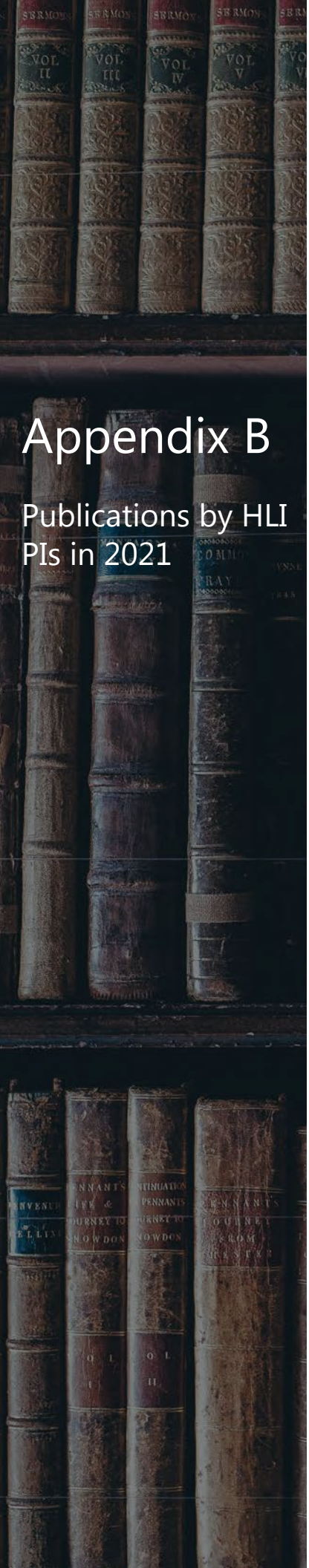
Cheung CC, Roston TM, Davies B, Grewal J, **Laksman ZW**, **Krahn AD**. Process of Care and a Practical Toolkit for Evaluating and Managing Arrhythmic Risk in the Cardiogenetic Pregnant Patient. Can J Cardiol. 2021 Dec;37(12):2001-2013. doi: 10.1016/j.cjca.2021.08.004. Epub 2021 Aug 17. PMID: 34416260.

Choi AD, Thomas DM, Lee J, Abbara S, Cury RC, **Leipsic JA**, Maroules C, Nagpal P, Steigner ML, Wang DD, Williams MC, Zeb I, Villines TC, Blankstein R. 2020 SCCT Guideline for Training Cardiology and Radiology Trainees as Independent Practitioners (Level II) and Advanced Practitioners (Level III) in Cardiovascular Computed Tomography: A Statement from the Society of Cardiovascular Computed Tomography. JACC Cardiovasc Imaging. 2021 Jan;14(1):272-287. doi: 10.1016/j.jcmg.2020.09.004. Epub 2020 Nov 6. PMID: 33168479.

Choi AD, Thomas DM, Lee J, Abbara S, Cury RC, **Leipsic JA**, Maroules C, Nagpal P, Steigner ML, Wang DD, Williams MC, Zeb I, Villines TC, Blankstein R. 2020 SCCT Guideline for Training Cardiology and Radiology Trainees as Independent Practitioners (Level II) and Advanced Practitioners (Level III) in Cardiovascular Computed Tomography: A Statement from the Society of Cardiovascular Computed Tomography. J Cardiovasc Comput Tomogr. 2021 Jan-Feb;15(1):2-15. doi: 10.1016/j.jcct.2020.08.003. Epub 2020 Aug 14. PMID: 33032977; PMCID: PMC7427549.

Chora JR, Iacocca MA, Tichý L, Wand H, Kurtz CL, Zimmermann H, Leon A, Williams M, Humphries SE, Hooper AJ, Trinder M, **Brunham LR**, Costa Pereira A, Jannes CE, Chen M, Chonis J, Wang J, Kim S, Johnston T, Soucek P, Kramarek M, Leigh SE, Carrié A, Sijbrands EJ, Hegele RA, Freiberger T, Knowles JW, Bourbon M; ClinGen Familial Hypercholesterolemia Expert Panel. The Clinical Genome Resource (ClinGen) Familial Hypercholesterolemia Variant Curation Expert Panel consensus guidelines for LDLR variant classification. Genet Med. 2021 Nov 18:S1098-3600(21)04140-X. doi: 10.1016/j.gim.2021.09.012. Epub ahead of print. PMID: 34906454.

Christidi E, **Brunham LR**. Regulated cell death pathways in doxorubicin-induced cardiotoxicity. Cell Death Dis. 2021 Apr 1;12(4):339. doi: 10.1038/s41419-021-03614-x. PMID: 33795647; PMCID: PMC8017015.



Appendix B

Publications by HLI PIs in 2021

Chuang MA, Akodad M, Chatfield AG, Wood D, Sathananthan J, **Leipsic JA**, Blanke P, Cheung A, Webb JG, Ye J. Stent Frame Fracture and Late Atrial Migration of a Mitral SAPIEN 3 Transcatheter Valve. JACC Cardiovasc Interv. 2021 Jul 26;14(14):1610-1612. doi: 10.1016/j.jcin.2021.05.031. Epub 2021 Jun 30. PMID: 34217626.

Churg A, **Ryerson CJ**, Wright JL. Fibroblast Foci and Patchy Fibrosis Do Not Separate Usual Interstitial Pneumonia From Fibrotic Hypersensitivity Pneumonitis in Transbronchial Cryobiopsies. Arch Pathol Lab Med. 2021 Nov 1;145(11):1325-1326. doi: 10.5858/arpa.2021-0234-LE. PMID: 34673908.

Cojocaru R, Yaseen I, Unrau PJ, Lowe CF, Ritchie G, Romney MG, **Sin DD**, Gill S, Slyadnev M. Microchip RT-PCR Detection of Nasopharyngeal SARS-CoV-2 Samples. J Mol Diagn. 2021 Jun;23(6):683-690. doi: 10.1016/j.jmoldx.2021.02.009. Epub 2021 Mar 9. PMID: 33706009; PMCID: PMC7939975.

Colvert GM, Manohar A, Contijoch FJ, Yang J, Glynn J, Blanke P, **Leipsic JA**, McVeigh ER. Novel 4DCT Method to Measure Regional Left Ventricular Endocardial Shortening Before and After Transcatheter Mitral Valve Implantation. Struct Heart. 2021;5(4):410-419. doi: 10.1080/24748706.2021.1934617. Epub 2021 Jul 15. PMID: 34541443; PMCID: PMC8445197.

Comber DA, Davies B, Roberts JD, Tadros R, Green MS, Healey JS, Simpson CS, Sanatani S, Steinberg C, MacIntyre C, Angaran P, Duff H, Hamilton R, Arbour L, Leather R, Seifer C, Fournier A, Atallah J, Kimber S, Makanjee B, Alqarawi W, Cadrin-Tourigny J, Joza J, Gibbs K, Robb L, Zahavich L, Gardner M, Talajic M, Virani A, **Krahn AD**, Lehman A, **Laksman ZWM**. Return of Results Policies for Genomic Research: Current Practices & The Hearts in Rhythm Organization Approach. Can J Cardiol. 2021 Oct 26:S0828-282X(21)00807-2. doi: 10.1016/j.cjca.2021.10.006. Epub ahead of print. PMID: 34715283.

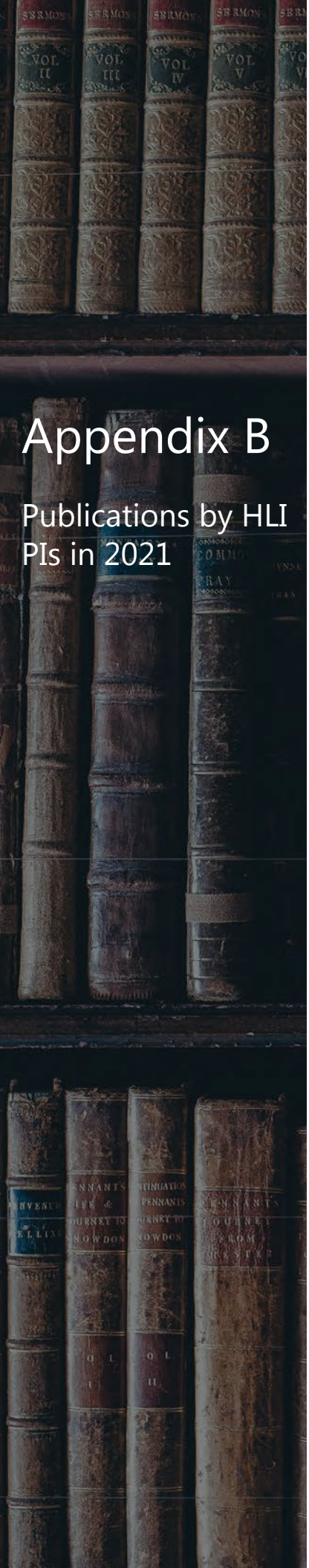
Comber DA, DeGraaf A, Human D, Barlow A, Indraratna P, Sathananthan G, **Laksman Z**. Arrhythmic Mitral Valve Prolapse and Mitral Annulus Disjunction in Heritable Aortic Disease. CJC Open. 2021 Jul 1;3(11):1396-1399. doi: 10.1016/j.cjco.2021.06.013. PMID: 34901810; PMCID: PMC8640620.

Comes A, Wong AW, Fisher JH, Morisset J, Johannson KA, Farrand E, Fell CD, Kolb M, Manganas H, Cox G, Gershon AS, Halayko AJ, Hambly N, Khalil N, Sadatsafavi M, Shapera S, To T, Wilcox PG, Collard HR, **Ryerson CJ**. Association of Body Mass Index and Change in Weight with Mortality in Patients with Fibrotic Interstitial Lung Disease. Chest. 2021 Nov 14:S0012-3692(21)04292-6. doi: 10.1016/j.chest.2021.11.008. Epub ahead of print. PMID: 34788669.

Cortés-Telles A, López-Romero S, Figueroa-Hurtado E, Pou-Aguilar YN, Wong AW, Milne KM, **Ryerson CJ**, **Guenette JA**. Pulmonary function and functional capacity in COVID-19 survivors with persistent dyspnoea. Respir Physiol Neurobiol. 2021 Jun;288:103644. doi: 10.1016/j.resp.2021.103644. Epub 2021 Feb 27. PMID: 33647535; PMCID: PMC7910142.

COVID-19 Host Genetics Initiative. Mapping the human genetic architecture of COVID-19. Nature. 2021 Dec;600(7889):472-477. doi: 10.1038/s41586-021-03767-x. Epub 2021 Jul 8. PMID: 34237774; PMCID: PMC8674144.

Cui JZ, Harris KC, Raedschelders K, Hollander Z, Potts JE, De Souza A, Kiess M, **McManus BM**, **Bernatchez P**, Raffin LA, Paine H, van Breemen C, Sandor GGS, Esfandiarei M. Aortic Dimensions, Biophysical Properties, and Plasma Biomarkers in Children and Adults with Marfan or Loeys-Dietz Syndrome. CJC Open. 2020 Dec 28;3(5):585-594. doi: 10.1016/j.cjco.2020.12.018. PMID: 34027363; PMCID: PMC8134910.



Appendix B

Publications by HLI PIs in 2021

Dadgostar A, Nassiri S, **Quon BS**, Manji J, Alsalihi S, Javer A. Effect of endoscopic sinus surgery on clinical outcomes in DeltaF508 cystic fibrosis patients. Clin Otolaryngol. 2021 Sep;46(5):941-947. doi: 10.1111/coa.13751. Epub 2021 Mar 13. PMID: 33686728.

Davies B, Bartels K, Hathaway J, Xu F, Roberts JD, Tadros R, Green MS, Healey JS, Simpson CS, Sanatani S, Steinberg C, Gardner M, Angaran P, Talajic M, Hamilton R, Arbour L, Seifer C, Fournier A, Joza J, **Krahn AD**, Lehman A, **Laksman ZWM**. Variant Reinterpretation in Survivors of Cardiac Arrest With Preserved Ejection Fraction (the Cardiac Arrest Survivors With Preserved Ejection Fraction Registry) by Clinicians and Clinical Commercial Laboratories. Circ Genom Precis Med. 2021 Jun;14(3):e003235. doi: 10.1161/CIRCGEN.120.003235. Epub 2021 May 7. PMID: 33960826.

Davis J, Thibault B, Mangat I, Coutu B, Bennett M, Philippon F, Sandhu R, Sterns L, Essebag V, Nery P, Wells G, Yee R, Exner D, **Krahn A**, Parkash R. Canadian Registry of Electronic Device Outcomes (CREDO): The Abbott ICD Premature Battery Depletion Advisory, a Multicentre Cohort Study. CJC Open. 2020 Sep 12;3(1):48-53. doi: 10.1016/j.cjco.2020.09.008. PMID: 33458632; PMCID: PMC7801196.

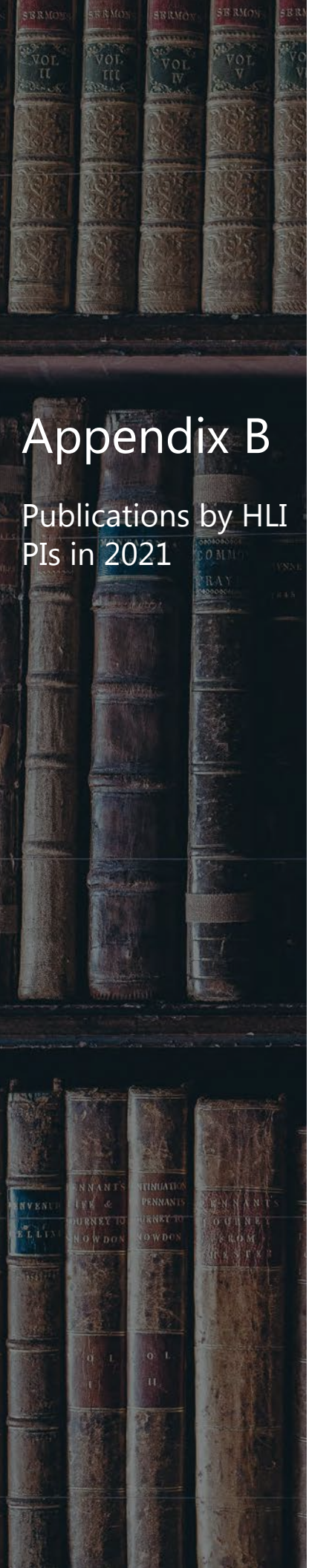
Delaby C, Teunissen CE, Blennow K, Alcolea D, Arisi I, Amar EB, Beaume A, Bedel A, Bellomo G, Bigot-Corbel E, Bjerke M, Blanc-Quintin MC, Boada M, Bousiges O, Chapman MD, **DeMarco ML**, D'Onofrio M, Dumurgier J, Dufour-Rainfray D, Engelborghs S, Esselmann H, Fogli A, Gabelle A, Galloni E, Gondolf C, Grandhomme F, Grau-Rivera O, Hart M, Ikeuchi T, Jeromin A, Kasuga K, Keshavan A, Khalil M, Körtvelyessy P, Kulczynska-Przybik A, Laplanche JL, Lewczuk P, Li QX, Lleó A, Malaplate C, Marquié M, Masters CL, Mroczko B, Nogueira L, Orellana A, Otto M, Oudart JB, Paquet C, Paoletti FP, Parnetti L, Perret-Liaudet A, Peoc'h K, Poesen K, Puig-Pijoan A, Quadrio I, Quillard-Muraine M, Rucheton B, Schraen S, Schott JM, Shaw LM, Suárez-Calvet M, Tsolaki M, Tumani H, Udeh-Momoh CT, Vaudran L, Verbeek MM, Verde F, Vermunt L, Vogelgsang J, Wiltfang J, Zetterberg H, Lehmann S. Clinical reporting following the quantification of cerebrospinal fluid biomarkers in Alzheimer's disease: An international overview. Alzheimers Dement. 2021 Dec 22. doi: 10.1002/alz.12545. Epub ahead of print. PMID: 34936194.

Desai S, Stanojevic S, Lam GY, Stephenson AL, **Quon BS**. Clinical Characteristics Associated With Lung Function Decline in Individuals With Adult-Diagnosed Cystic Fibrosis: Contemporary Analysis of the Canadian CF Registry. Chest. 2021 Jul;160(1):65-73. doi: 10.1016/j.chest.2021.02.015. Epub 2021 Feb 19. PMID: 33617807.

Dong SJ, Wang L, Chitano P, Coxson HO, **Paré PD**, **Seow CY**. Airway diameter at different transpulmonary pressures in ex vivo sheep lungs: implications for deep inspiration-induced bronchodilation and bronchoprotection. Am J Physiol Lung Cell Mol Physiol. 2021 Oct 1;321(4):L663-L674. doi: 10.1152/ajplung.00208.2021. Epub 2021 Jul 21. PMID: 34287071.

Dubland JA, Allahverdian S, Besler KJ, Ortega C, **Wang Y**, Pryma CS, Boukais K, Chan T, Seidman MA, **Francis GA**. Low LAL (Lysosomal Acid Lipase) Expression by Smooth Muscle Cells Relative to Macrophages as a Mechanism for Arterial Foam Cell Formation. Arterioscler Thromb Vasc Biol. 2021 Jun;41(6):e354-e368. doi: 10.1161/ATVBAHA.120.316063. Epub 2021 Apr 1. PMID: 33792344.

Eapen MS, Lu W, **Hackett TL**, Singhera GK, Mahmood MQ, Hardikar A, Ward C, Walters EH, Sohal SS. Increased myofibroblasts in the small airways, and relationship to remodelling and functional changes in smokers and COPD patients: potential role of epithelial-mesenchymal transition. ERJ Open Res. 2021 Jun 7;7(2):00876-2020. doi: 10.1183/23120541.00876-2020. PMID: 34109247; PMCID: PMC8181830.



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Eapen MS, Lu W, **Hackett TL**, Singhera GK, Thompson IE, McAlinden KD, Hardikar A, Weber HC, Haug G, Wark PAB, Chia C, Sohal SS. Dysregulation of endocytic machinery and ACE2 in small airways of smokers and COPD patients can augment their susceptibility to SARS-CoV-2 (COVID-19) infections. Am J Physiol Lung Cell Mol Physiol. 2021 Jan 1;320(1):L158-L163. doi: 10.1152/ajplung.00437.2020. Epub 2020 Nov 11. PMID: 33174446; PMCID: PMC7869956.

EAS Familial Hypercholesterolaemia Studies Collaboration (FHSC). Global perspective of familial hypercholesterolaemia: a cross-sectional study from the EAS Familial Hypercholesterolaemia Studies Collaboration (FHSC). Lancet. 2021 Nov 6;398(10312):1713-1725. doi: 10.1016/S0140-6736(21)01122-3. Epub 2021 Sep 7. PMID: 34506743. **Brunham LR** is part of the EAS Familial Hypercholesterolaemia Studies Collaboration.

Ellis AK, Murrieta-Aguttes M, Furey S, Picard P, **Carlsten C**. Effect of fexofenadine hydrochloride on allergic rhinitis aggravated by air pollutants. ERJ Open Res. 2021 Apr 6;7(2):00806-2020. doi: 10.1183/23120541.00806-2020. PMID: 33834054; PMCID: PMC8021806.

Farooqi MAM, O'Hoski S, Goodwin S, Makhdami N, Aziz A, Cox G, Wald J, **Ryerson CJ**, Beauchamp MK, Hambly N, Kolb M. Prevalence and prognostic impact of physical frailty in interstitial lung disease: A prospective cohort study. Respirology. 2021 Jul;26(7):683-689. doi: 10.1111/resp.14066. Epub 2021 Apr 19. PMID: 33876511.

Fawcett KA, Obeidat M, Melbourne C, Shrine N, Guyatt AL, John C, Luan J, Richmond A, Moksnes MR, Granell R, Weiss S, Imboden M, May-Wilson S, Hysi P, Boutin TS, Portas L, Flexeder C, Harris SE, Wang CA, Lyytikäinen LP, Palviainen T, Foong RE, Keidel D, Minelli C, Langenberg C, Bossé Y, Van den Berge M, **Sin DD**, Hao K, Campbell A, Porteous D, Padmanabhan S, Smith BH, Evans DM, Ring S, Langhammer A, Hveem K, Willer C, Ewert R, Stubbe B, Pirastu N, Klaric L, Joshi PK, Patasova K, Massimo M, Polasek O, Starr JM, Karrasch S, Strauch K, Meitinger T, Rudan I, Rantanen T, Pietiläinen K, Kähönen M, Raitakari OT, Hall GL, Sly PD, Pennell CE, Kaprio J, Lehtimäki T, Vitart V, Deary IJ, Jarvis D, Wilson JF, Spector T, Probst-Hensch N, Wareham NJ, Völzke H, Henderson J, Strachan DP, Brumpton BM, Hayward C, Hall IP, Tobin MD, Wain LV. Variants associated with HHIP expression have sex-differential effects on lung function. Wellcome Open Res. 2021 May 24;5:111. doi: 10.12688/wellcomeopenres.15846.2. PMID: 33728380; PMCID: PMC7938335.

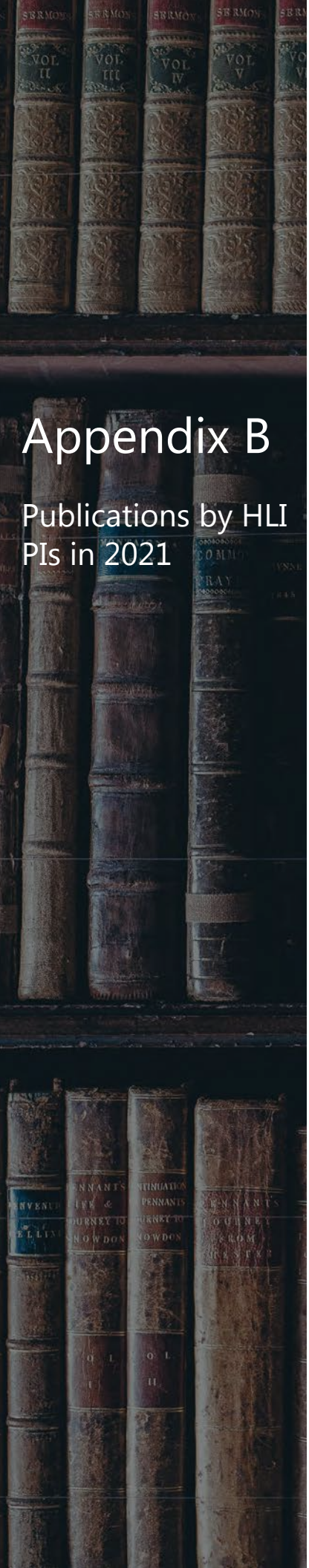
Fletcher AJ, **Sellers SL**. Aortic Stenosis: Is Extracellular Matrix the Answer? JACC Basic Transl Sci. 2021 Jan 25;6(1):40-41. doi: 10.1016/j.jacbts.2020.12.002. PMID: 33533758; PMCID: PMC7838044.

Forgrave LM, van der Gugten JG, Nguyen Q, **DeMarco ML**. Establishing pre-analytical requirements and maximizing peptide recovery in the analytical phase for mass spectrometric quantification of amyloid-β peptides 1-42 and 1-40 in CSF. Clin Chem Lab Med. 2021 Dec 7;60(2):198-206. doi: 10.1515/cclm-2021-0549. PMID: 34881836.

Forgrave LM, Wang M, Yang D, **DeMarco ML**. Proteoforms and their expanding role in laboratory medicine. Pract Lab Med. 2021 Nov 27;28:e00260. doi: 10.1016/j.plabm.2021.e00260. PMID: 34950758; PMCID: PMC8672040.

Franciosi AN, **Quon BS**. TeleHealth or TeleWealth? Equity challenges for the future of cystic fibrosis care (Commentary). J Cyst Fibros. 2021 Dec;20 Suppl 3:55-56. doi: 10.1016/j.jcf.2021.08.025. Epub 2021 Sep 8. PMID: 34507897; PMCID: PMC8442253.

Franciosi AN, Wilcox PG, **Quon BS**. Cystic Fibrosis Respiratory Microbiology Monitoring during a Global Pandemic: Lessons Learned from a Shift to Telehealth. Ann Am Thorac Soc. 2021 Aug 18. doi: 10.1513/AnnalsATS.202101-087RL. Epub ahead of print. PMID: 34406918.



Appendix B

Publications by HLI PIs in 2021

Gapud EJ, Trejo-Zambrano MI, Gomez-Banuelos E, Tiniakou E, Antiochos B, **Granville DJ**, Andrade F, Casciola-Rosen L, Rosen A. Granzyme B Induces IRF-3 Phosphorylation through a Perforin-Independent Proteolysis-Dependent Signaling Cascade without Inducing Cell Death. J Immunol. 2021 Jan 15;206(2):335-344. doi: 10.4049/jimmunol.2000546. Epub 2020 Dec 7. PMID: 33288544; PMCID: PMC7785649.

Gelb AF, Yamamoto A, Verbeken EK, **Hogg JC**, Tashkin DP, Tran DNT, Moridzadeh RM, Fraser C, Schein MJ, Decramer M, Glassy EF, Nadel JA. Normal Routine Spirometry Can Mask COPD/Emphysema in Symptomatic Smokers. Chronic Obstr Pulm Dis. 2021 Jan;8(1):124–34. doi: 10.15326/jcopdf.2020.0176. PMID: 33513660; PMCID: PMC8047618.

Gerayeli FV, Milne S, Cheung C, Li X, Yang CWT, Tam A, Choi LH, Bae A, **Sin DD**. COPD and the risk of poor outcomes in COVID-19: A systematic review and meta-analysis. EClinicalMedicine. 2021 Mar;33:100789. doi: 10.1016/j.eclinm.2021.100789. Epub 2021 Mar 18. PMID: 33758801; PMCID: PMC7971471.

Gershon AS, Pequeno P, Alberga Machado A, Aaron SD, Kendzerska T, Luo J, Stanbrook MB, **Tan WC**, Porter J, To T. Factors Associated With Nonreceipt of Recommended COPD Medications: A Population Study. Chest. 2021 Nov;160(5):1670-1680. doi: 10.1016/j.chest.2021.05.067. Epub 2021 Jun 16. PMID: 34144022; PMCID: PMC8628171.

Gharanei M, Shafaattalab S, Sangha S, Gunawan M, **Laksman Z**, Hove-Madsen L, Tibbits GF. Atrial-specific hiPSC-derived cardiomyocytes in drug discovery and disease modeling. Methods. 2021 Jun 16:S1046-2023(21)00161-4. doi: 10.1016/j.ymeth.2021.06.009. Epub ahead of print. PMID: 34144175.

Giles LV, Koehle MS, Saelens BE, Sbihi H, **Carlsten C**. When physical activity meets the physical environment: precision health insights from the intersection. Environ Health Prev Med. 2021 Jun 30;26(1):68. doi: 10.1186/s12199-021-00990-w. PMID: 34193051; PMCID: PMC8247190.

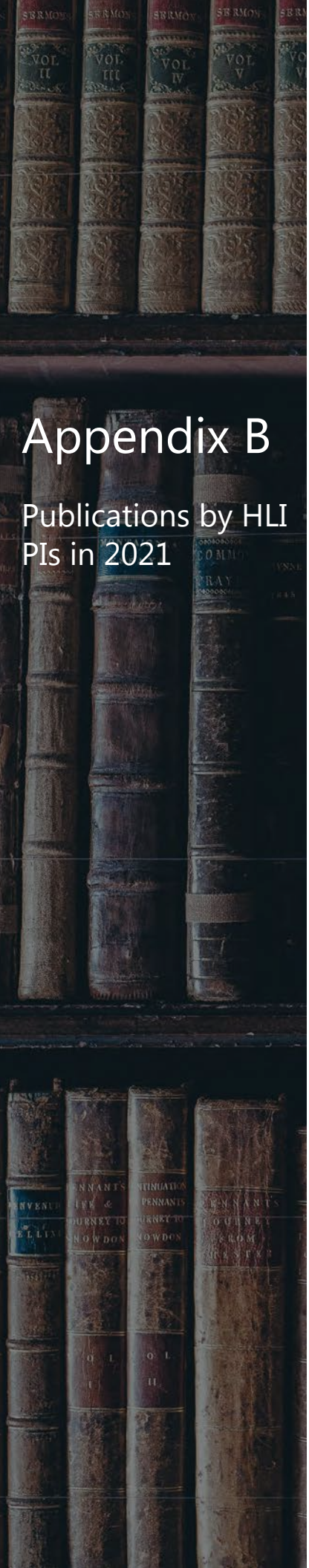
Goobie GC, Rice MB, **Carlsten C**. The Environmental Protection Agency's "Strengthening Transparency in Pivotal Science" Rule: Don't Let History Repeat Itself. Ann Am Thorac Soc. 2021 Oct;18(10):1614-1617. doi: 10.1513/AnnalsATS.202103-259VP. PMID: 33752570; PMCID: PMC8522296.

Goobie GC, **Ryerson CJ**, Johannson KA, Schikowski E, Zou RH, Khalil N, Marcoux V, Assayag D, Manganas H, Fisher JH, Kolb MR, Gibson KF, Kass DJ, Zhang Y, Lindell KO, Nouraie SM. Neighborhood-level Disadvantage Impacts on Patients with Fibrotic Interstitial Lung Disease. Am J Respir Crit Care Med. 2021 Nov 24. doi: 10.1164/rccm.202109-2065OC. Epub ahead of print. PMID: 34818133.

Grewal JS, Fisher JH, **Ryerson CJ**. An Updated Assessment of Online Information on Idiopathic Pulmonary Fibrosis. Ann Am Thorac Soc. 2021 Aug;18(8):1421-1423. doi: 10.1513/AnnalsATS.202012-1479RL. PMID: 33567231.

Grewal JS, Kawano-Dourado L, **Ryerson CJ**. The opportunities and challenges of social media in interstitial lung disease: a viewpoint. Respir Res. 2021 Sep 17;22(1):247. doi: 10.1186/s12931-021-01843-4. PMID: 34535127; PMCID: PMC8448389.

Grewal JS, **Ryerson CJ**. A closer look at the multidisciplinary interstitial lung disease clinic: Who, what and how. Respirology. 2021 Jan;26(1):12-13. doi: 10.1111/resp.13936. Epub 2020 Sep 3. PMID: 32882745.



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Griese M, Costa S, Linnemann RW, Mall MA, McKone EF, Polineni D, **Quon BS**, Ringshausen FC, Taylor-Cousar JL, Withers NJ, Moskowitz SM, Daines CL. Safety and Efficacy of Elexacaftor/Tezacaftor/Ivacaftor for 24 Weeks or Longer in People with Cystic Fibrosis and One or More F508delAlleles: Interim Results of an Open-Label Phase 3 Clinical Trial. Am J Respir Crit Care Med. 2021 Feb 1;203(3):381-385. doi: 10.1164/rccm.202008-3176LE. PMID: 32969708; PMCID: PMC8020728.

Guerrina N, Traboulsi H, Rico de Souza A, Bossé Y, Thatcher TH, Robichaud A, Ding J, Li PZ, Simon L, Pareek S, Bourbeau J, **Tan WC**, Benedetti A, Obeidat M, **Sin DD**, Brandsma CA, Nickle DC, Sime PJ, Phipps RP, Nair P, Zago M, Hamid Q, Smith BM, Eidelman DH, Baglole CJ. Aryl hydrocarbon receptor deficiency causes the development of chronic obstructive pulmonary disease through the integration of multiple pathogenic mechanisms. FASEB J. 2021 Mar;35(3):e21376. doi: 10.1096/fj.202002350R. PMID: 33605487

Guler SA, Hur SA, Stickland MK, Brun P, Bovet L, Holland AE, Bondarenko J, Hambly N, Wald J, Makhdami N, Kreuter M, Gloeckl R, Jarosch I, Tan B, Johannson KA, McBride SA, De Boer K, Sandoz JS, Sun K, Assayag D, Bhatt SP, Morisset J, Ferraro V, Garvey C, **Camp PG**, **Ryerson CJ**. Survival after inpatient or outpatient pulmonary rehabilitation in patients with fibrotic interstitial lung disease: a multicentre retrospective cohort study. Thorax. 2021 Aug 30:thoraxjnl-2021-217361. doi: 10.1136/thoraxjnl-2021-217361. Epub ahead of print. PMID: 34462346.

Guler SA, Lindell KO, Swigris J, **Ryerson CJ**. Medications for Idiopathic Pulmonary Fibrosis: IPF Part 2. Am J Respir Crit Care Med. 2021 Feb 1;203(3):P7-P8. doi: 10.1164/rccm.2033P7. PMID: 33522880.

Guler SA, Lindell KO, Swigris J, **Ryerson CJ**. Nondrug Treatments for Idiopathic Pulmonary Fibrosis: IPF Part 3. Am J Respir Crit Care Med. 2021 Feb 15;203(4):P10-P11. doi: 10.1164/rccm.2034P10. PMID: 33576729.

Guler SA, Lindell KO, Swigris J, **Ryerson CJ**. What Is Idiopathic Pulmonary Fibrosis? IPF Part 1. Am J Respir Crit Care Med. 2021 Jan 15;203(2):P5-P6. doi: 10.1164/rccm.2032P5. PMID: 33448890.

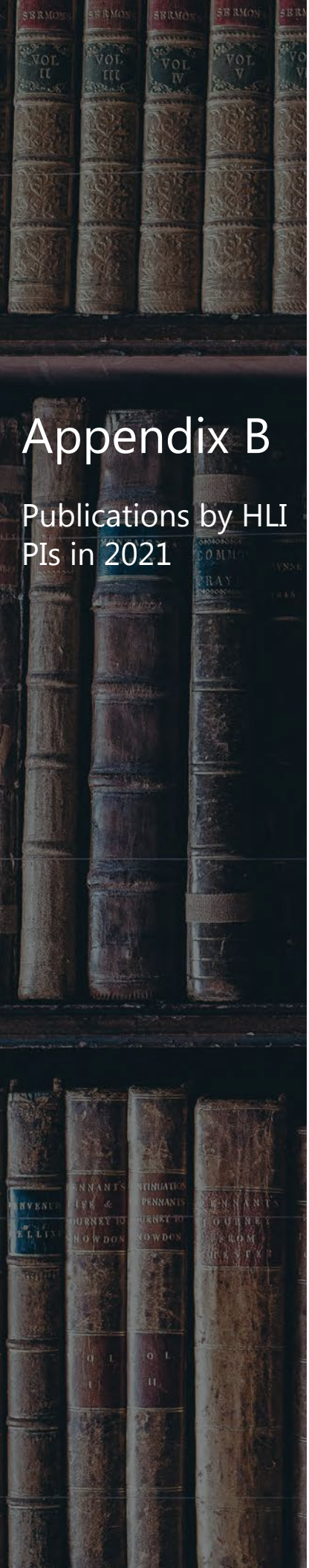
Gulsin GS, McVeigh N, **Leipsic JA**, Dodd JD. Cardiovascular CT and MRI in 2020: Review of Key Articles. Radiology. 2021 Nov;301(2):263-277. doi: 10.1148/radiol.2021211002. Epub 2021 Sep 7. PMID: 34491130.

Gunawan MG, Sangha SS, Shafaattalab S, Lin E, Heims-Waldron DA, Bezzerides VJ, **Laksman Z**, Tibbits GF. Drug screening platform using human induced pluripotent stem cell-derived atrial cardiomyocytes and optical mapping. Stem Cells Transl Med. 2021 Jan;10(1):68-82. doi: 10.1002/sctm.19-0440. Epub 2020 Sep 14. PMID: 32927497; PMCID: PMC7780813.

Hackett TL, Osei ET. Modeling Extracellular Matrix-Cell Interactions in Lung Repair and Chronic Disease. Cells. 2021 Aug 20;10(8):2145. doi: 10.3390/cells10082145. PMID: 34440917; PMCID: PMC8394761.

Halperin LF, **Krahn AD**, **Laksman ZW**. Documenting the descent - remote monitoring and adult-onset Catecholaminergic Polymorphic Ventricular Tachycardia associated with ventricular fibrillation and bradycardia. Cardiol Young. 2021 Aug;31(8):1330-1332. doi: 10.1017/S1047951121002377. Epub 2021 Jun 21. PMID: 34162453.

Halperin LF, Lee MK, Liew J, Lauck S, Kong D, **Krahn AD**, Deyell MW, Andrade JG, Hawkins NM, Chakrabarti S, John Yeung-Lai-Wah AF, Bennett MT, Cheung C, Levin A, Schwartz DI, **Laksman ZW**. Anticoagulation for Patients With Atrial Fibrillation and End-Stage Renal Disease on Dialysis: A National Survey. Can J Cardiol. 2021 Jun;37(6):924-928. doi: 10.1016/j.cjca.2020.12.005. Epub 2020 Dec 10. PMID: 33310141.



Appendix B

Publications by HLI PIs in 2021

Hamidou Soumana I, **Carlsten C**. Air pollution and the respiratory microbiome. J Allergy Clin Immunol. 2021 Jul;148(1):67-69. doi: 10.1016/j.jaci.2021.05.013. Epub 2021 May 26. PMID: 34048853.

Han HC, Hawkins NM, Pearman CM, Birnie DH, **Krahn AD**. Epidemiology of cardiac implantable electronic device infections: incidence and risk factors. Europace. 2021 Jun 23;23(23 Suppl 4):iv3-iv10. doi: 10.1093/europace/euab042. PMID: 34051086; PMCID: PMC8221051.

Hanson PJ, Liu-Fei F, Minato TA, Hossain AR, Rai H, Chen VA, Ng C, Ask K, Hirota JA, **McManus BM**. Advanced detection strategies for cardiotropic virus infection in a cohort study of heart failure patients. Lab Invest. 2022 Jan;102(1):14-24. doi: 10.1038/s41374-021-00669-4. Epub 2021 Oct 4. PMID: 34608239; PMCID: PMC8488924.

Harrison TW, Chanez P, Menzella F, Canonica GW, Louis R, Cosio BG, Lugogo NL, Mohan A, Burden A, McDermott L, Garcia Gil E, Zangrilli JG; ANDHI study investigators. Onset of effect and impact on health-related quality of life, exacerbation rate, lung function, and nasal polyposis symptoms for patients with severe eosinophilic asthma treated with benralizumab (ANDHI): a randomised, controlled, phase 3b trial. Lancet Respir Med. 2021 Mar;9(3):260-274. doi: 10.1016/S2213-2600(20)30414-8. Epub 2020 Dec 22. Erratum in: Lancet Respir Med. 2021 Jan 25;: PMID: 33357499. D Dorscheid is an ANDHI Study Investigator.

Hartley A, Shalhoub J, Ng FS, **Krahn AD**, **Laksman Z**, Andrade JG, Deyell MW, Kanagaratnam P, Sikkel MB. Size matters in atrial fibrillation: the underestimated importance of reduction of contiguous electrical mass underlying the effectiveness of catheter ablation. Europace. 2021 Nov 8;23(11):1698-1707. doi: 10.1093/europace/euab078. PMID: 33948648; PMCID: PMC8576280.

Hatoum H, Gooden SCM, Sathananthan J, **Sellers S**, Kutting M, Marx P, Lilly SM, Ihdayhid AR, Thourani VH, Dasi LP. Neosinus and Sinus Flow After Self-Expanding and Balloon-Expandable Transcatheter Aortic Valve Replacement. JACC Cardiovasc Interv. 2021 Dec 27;14(24):2657-2666. doi: 10.1016/j.jcin.2021.09.013. Epub 2021 Nov 24. PMID: 34838462.

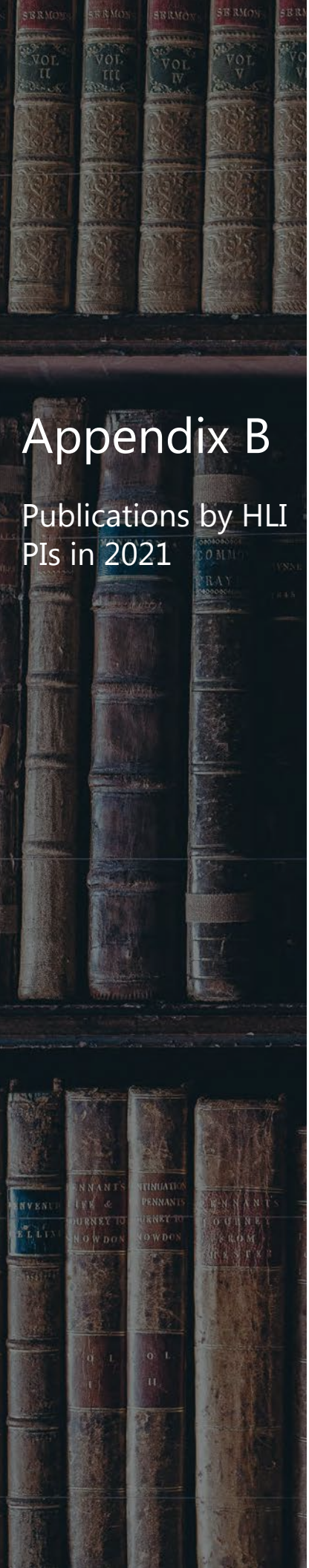
Hayes BD, Fossey MPM, Poormasjedi-Meibod MS, Erskine E, Soriano JE, Scott B, Rosentreter R, **Granville DJ**, Phillips AA, West CR. Experimental high thoracic spinal cord injury impairs the cardiac and cerebrovascular response to orthostatic challenge in rats. Am J Physiol Heart Circ Physiol. 2021 Oct 1;321(4):H716-H727. doi: 10.1152/ajpheart.00239.2021. Epub 2021 Aug 27. PMID: 34448635.

Heijink IH, **Hackett TL**, Pouwels SD. Effects of cigarette smoking on SARS- CoV-2 receptor ACE2 expression in the respiratory epithelium†. J Pathol. 2021 Apr;253(4):351-354. doi: 10.1002/path.5607. Epub 2021 Jan 26. PMID: 33368245; PMCID: PMC7986690.

Hernández Cordero AI, Li X, Milne S, Yang CX, Bossé Y, Joubert P, Timens W, van den Berge M, Nickle D, Hao K, **Sin DD**. Multi-omics highlights ABO plasma protein as a causal risk factor for COVID-19. Hum Genet. 2021 Jun;140(6):969-979. doi: 10.1007/s00439-021-02264-5. Epub 2021 Feb 19. PMID: 33604698; PMCID: PMC7892327.

Hernandez Cordero AI, **Sin DD**. Clotting in COVID-19: Is It All in the Genes? Am J Respir Cell Mol Biol. 2021 Jun;64(6):647-649. doi: 10.1165/rcmb.2021-0134ED. PMID: 33784208; PMCID: PMC8456887.

Hernández Cordero AI, Yang CX, Li X, Milne S, Chen V, Hollander Z, **Ng R**, Criner GJ, Woodruff PG, Lazarus SC, Connett JE, Han MK, Martinez FJ, Reed RM, **Man SFP**, **Leung JM**, **Sin DD**. Epigenetic marker of telomeric age is associated with exacerbations and hospitalizations in chronic obstructive pulmonary disease. Respir Res. 2021 Dec 22;22(1):316. doi: 10.1186/s12931-021-01911-9. PMID: 34937547; PMCID: PMC8693486.



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Hernandez Cordero AI, Yang CX, Milne S, Li X, Hollander Z, Chen V, **Ng R**, **Tebbutt SJ**, **Leung JM**, **Sin DD**. Epigenetic blood biomarkers of ageing and mortality in COPD. Eur Respir J. 2021 Dec 16;58(6):2101890. doi: 10.1183/13993003.01890-2021. PMID: 34561282.

Hernandez Cordero AI, Yang CX, Obeidat M, Yang J, MacIsaac J, McEwen L, Lin D, Kobor M, Novak R, Hudson F, Klinker H, Dharan N, **Man SP**, **Sin DD**, Kunisaki K, Leung J; INSIGHT START Pulmonary and Genomic Substudy Groups. DNA methylation is associated with airflow obstruction in patients living with HIV. Thorax. 2021 May;76(5):448-455. doi: 10.1136/thoraxjnl-2020-215866. Epub 2020 Dec 18. PMID: 33443234; PMCID: PMC8070606.

Hiroyasu S, Hiroyasu A, **Granville DJ**, Tsuruta D. Pathological functions of granzyme B in inflammatory skin diseases. J Dermatol Sci. 2021 Nov;104(2):76-82. doi: 10.1016/j.jdermsci.2021.10.006. Epub 2021 Oct 27. PMID: 34772583.

Hiroyasu S, Zeglinski MR, Zhao H, Pawluk MA, Turner CT, Kasprick A, Tateishi C, Nishie W, Burleigh A, Lennox PA, Van Laeken N, Carr NJ, Petersen F, Crawford RI, Shimizu H, Tsuruta D, Ludwig RJ, **Granville DJ**. Granzyme B inhibition reduces disease severity in autoimmune blistering diseases. Nat Commun. 2021 Jan 12;12(1):302. doi: 10.1038/s41467-020-20604-3. PMID: 33436591; PMCID: PMC7804321.

Hong G, Desai S, Moss RB, Eschenhagen P, **Quon BS**, Schwarz C. Clinician variability in the diagnosis and treatment of aspergillus fumigatus-related conditions in cystic fibrosis: An international survey. J Cyst Fibros. 2021 Jul 28:S1569-1993(21)01306-0. doi: 10.1016/j.jcf.2021.07.008. Epub ahead of print. PMID: 34332906.

Hopkins SR, Dominelli PB, Davis CK, **Guenette JA**, Luks AM, Molgat-Seon Y, Sá RC, Sheel AW, Swenson ER, Stickland MK. Face Masks and the Cardiorespiratory Response to Physical Activity in Health and Disease. Ann Am Thorac Soc. 2021 Mar;18(3):399-407. doi: 10.1513/AnnalsATS.202008-990CME. PMID: 33196294; PMCID: PMC7919154.

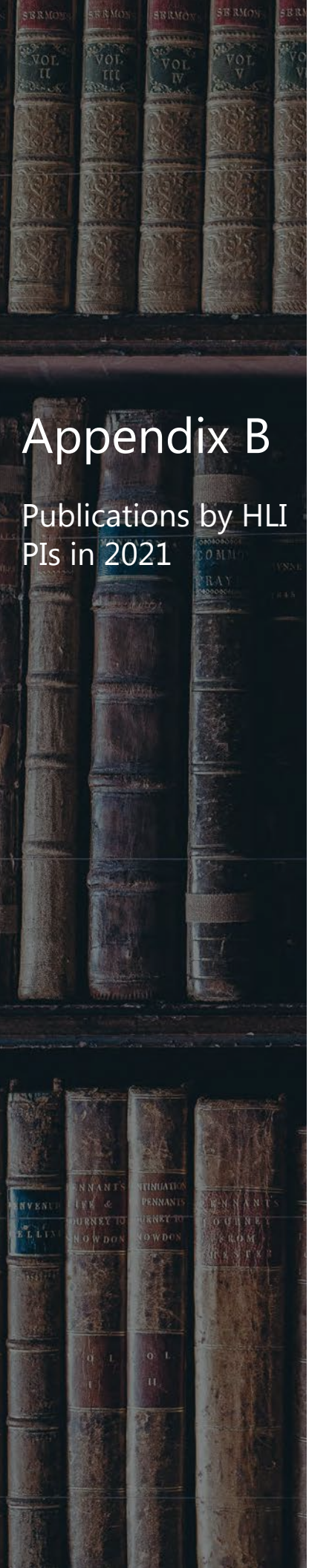
Howlett J, Hamilton S, Ye A, Jewett D, Riou-Green B, Prisman E, **Thamboo A**. Treatment and outcomes of nasopharyngeal carcinoma in a unique non-endemic population. Oral Oncol. 2021 Mar;114:105182. doi: 10.1016/j.oraloncology.2021.105182. Epub 2021 Jan 24. PMID: 33503570.

Hu MD, Golovchenko NB, Burns GL, Nair PM, Kelly TJ 4th, Agos J, Irani MZ, Soh WS, Zeglinski MR, Lemenze A, Bonder EM, Sandrock I, Prinz I, **Granville DJ**, Keely S, Watson AJM, Edelblum KL. γδ Intraepithelial Lymphocytes Facilitate Pathological Epithelial Cell Shedding Via CD103-Mediated Granzyme Release. Gastroenterology. 2021 Dec 1:S0016-5085(21)03804-X. doi: 10.1053/j.gastro.2021.11.028. Epub ahead of print. PMID: 34861219.

Huang AL, **Leipsic JA**, Zekry SB, **Sellers S**, Ahmadi AA, Blanke P, Hadamitzky M, Kim YJ, Conte E, Andreini D, Pontone G, Budoff MJ, Gottlieb I, Lee BK, Chun EJ, Cademartiri F, Maffei E, Marques H, Shin S, Choi JH, Virmani R, Samady H, Stone PH, Berman DS, Narula J, Shaw LJ, Bax JJ, Chang HJ. Effects of chronic kidney disease and declining renal function on coronary atherosclerotic plaque progression: a PARADIGM substudy. Eur Heart J Cardiovasc Imaging. 2021 Aug 14;22(9):1072-1082. doi: 10.1093/ehjci/jeab029. PMID: 33709096.

Huang K, Trinder M, Roston TM, **Laksman ZW**, **Brunham LR**. The Interplay Between Titin, Polygenic Risk, and Modifiable Cardiovascular Risk Factors in Atrial Fibrillation. Can J Cardiol. 2021 Jun;37(6):848-856. doi: 10.1016/j.cjca.2020.12.024. Epub 2020 Dec 26. PMID: 33373724.

Huang X, Shao X, Xing L, Hu Y, **Sin DD**, Zhang X. The impact of lockdown timing on COVID-19 transmission across US counties. EClinicalMedicine. 2021 Aug;38:101035. doi: 10.1016/j.eclinm.2021.101035. Epub 2021 Jul 16. PMID: 34308301; PMCID: PMC8283304.



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Hwang D, Kim HJ, Lee SP, Lim S, Koo BK, Kim YJ, Kook W, Andreini D, Al- Mallah MH, Budoff MJ, Cademartiri F, Chinnaiyan K, Choi JH, Conte E, Marques H, de Araújo Gonçalves P, Gottlieb I, Hadamitzky M, **Leipsic JA**, Maffei E, Pontone G, Raff GL, Shin S, Lee BK, Chun EJ, Sung JM, Lee SE, Berman DS, Lin FY, Virmani R, Samady H, Stone PH, Narula J, Bax JJ, Shaw LJ, Min JK, Chang HJ. Topological Data Analysis of Coronary Plaques Demonstrates the Natural History of Coronary Atherosclerosis. JACC Cardiovasc Imaging. 2021 Jul;14(7):1410-1421. doi: 10.1016/j.jcmg.2020.11.009. Epub 2021 Jan 13. PMID: 33454260.

Ihdayhid AR, Fairbairn TA, Gulsin GS, Tzimas G, Danehy E, Updegrove A, Jensen JM, Taylor CA, Bax JJ, **Sellers SL**, **Leipsic JA**, Nørgaard BL. Cardiac computed tomography-derived coronary artery volume to myocardial mass. J Cardiovasc Comput Tomogr. 2021 Oct 29:S1934-5925(21)00452-4. doi: 10.1016/j.jcct.2021.10.007. Epub ahead of print. PMID: 34740557.

Ikezoe K, **Hackett TL**, Peterson S, Prins D, Hague CJ, Murphy D, LeDoux S, Chu F, Xu F, Cooper JD, Tanabe N, **Ryerson CJ**, **Paré PD**, Coxson HO, Colby TV, **Hogg JC**, Vasilescu DM. Small Airway Reduction and Fibrosis Is an Early Pathologic Feature of Idiopathic Pulmonary Fibrosis. Am J Respir Crit Care Med. 2021 Nov 1;204(9):1048-1059. doi: 10.1164/rccm.202103-0585OC. PMID: 34343057.

Iskander A, Bilgi C, Naftalovich R, **Hacihaliloglu I**, Berkman T, Naftalovich D, Pahlevan N. The Rheology of the Carotid Sinus: A Path Toward Bioinspired Intervention. Front Bioeng Biotechnol. 2021 Jun 10;9:678048. doi: 10.3389/fbioe.2021.678048. PMID: 34178967; PMCID: PMC8222608.

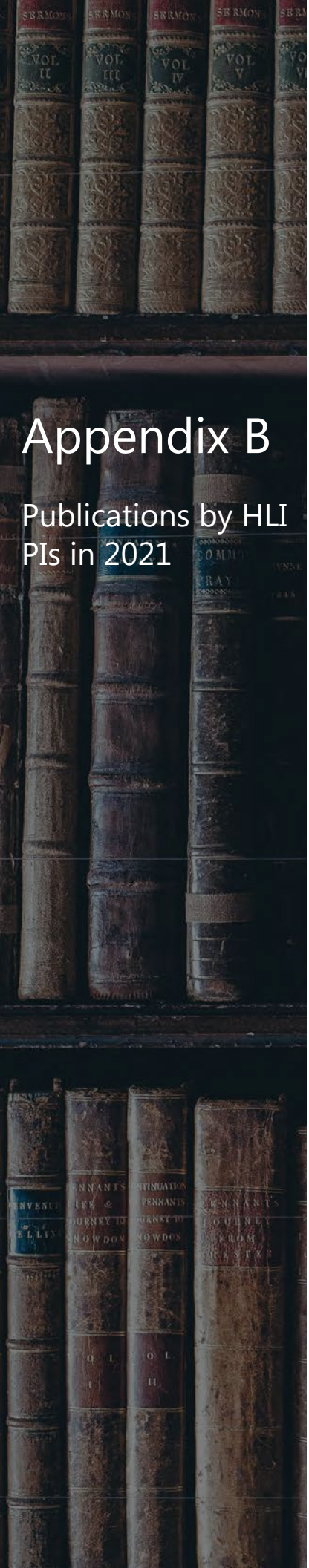
Jangalee JV, Ghasvareh P, **Guenette JA**, Road J. Incorporating remote patient monitoring in virtual pulmonary rehabilitation programs. Can J Respir Ther. 2021 Jul 22;57:83-89. doi: 10.29390/cjrt-2021-015. PMID: 34345655; PMCID: PMC8297692.

Ji G, Zhang M, Liu Q, Wu S, Wang Y, Chen G, **Sandford AJ**, He JQ. Functional Polymorphism in the NFE2L2 Gene Associated With Tuberculosis Susceptibility. Front Immunol. 2021 May 24;12:660384. doi: 10.3389/fimmu.2021.660384. PMID: 34108963; PMCID: PMC8181729.

Jin BT, Xu F, **Ng RT**, **Hogg JC**. Mian: Interactive Web-Based Microbiome Data Table Visualization and Machine Learning Platform. Bioinformatics. 2021 Nov 12:btab754. doi: 10.1093/bioinformatics/btab754. Epub ahead of print. PMID: 34788784.

Jin HY, Weir-McCall JR, **Leipsic JA**, Son JW, **Sellers SL**, Shao M, Blanke P, Ahmadi A, Hadamitzky M, Kim YJ, Conte E, Andreini D, Pontone G, Budoff MJ, Gottlieb I, Lee BK, Chun EJ, Cademartiri F, Maffei E, Marques H, de Araujo Goncalves P, Shin S, Choi JH, Virmani R, Samady H, Stone PH, Berman DS, Narula J, Shaw LJ, Bax JJ, Chinnaiyan K, Raff G, Al-Mallah MH, Lin FY, Min JK, Sung JM, Lee SE, Chang HJ. The Relationship Between Coronary Calcification and the Natural History of Coronary Artery Disease. JACC Cardiovasc Imaging. 2021 Jan;14(1):233-242. doi: 10.1016/j.jcmg.2020.08.036. Epub 2020 Nov 18. PMID: 33221216.

Johkoh T, Lee KS, Nishino M, Travis WD, Ryu JH, Lee HY, **Ryerson CJ**, Franquet T, Bankier AA, Brown KK, Goo JM, Kauczor HU, Lynch DA, Nicholson AG, Richeldi L, Schaefer-Prokop CM, Verschakelen J, Raoof S, Rubin GD, Powell C, Inoue Y, Hatabu H. Chest CT Diagnosis and Clinical Management of Drug-Related Pneumonitis in Patients Receiving Molecular Targeting Agents and Immune Checkpoint Inhibitors: A Position Paper From the Fleischner Society. Chest. 2021 Mar;159(3):1107-1125. doi: 10.1016/j.chest.2020.11.027. Epub 2021 Jan 12. PMID: 33450293.



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Johkoh T, Lee KS, Nishino M, Travis WD, Ryu JH, Lee HY, **Ryerson CJ**, Franquet T, Bankier AA, Brown KK, Goo JM, Kauczor HU, Lynch DA, Nicholson AG, Richeldi L, Schaefer-Prokop CM, Verschakelen J, Raoof S, Rubin GD, Powell C, Inoue Y, Hatabu H. Chest CT Diagnosis and Clinical Management of Drug-related Pneumonitis in Patients Receiving Molecular Targeting Agents and Immune Checkpoint Inhibitors: A Position Paper from the Fleischner Society. Radiology. 2021 Mar;298(3):550-566. doi: 10.1148/radiol.2021203427. Epub 2021 Jan 12. PMID: 33434111.

Johnson KM, Sadatsafavi M, Adibi A, Lynd L, Harrison M, Tavakoli H, **Sin DD**, Bryan S. Cost Effectiveness of Case Detection Strategies for the Early Detection of COPD. Appl Health Econ Health Policy. 2021 Mar;19(2):203-215. doi: 10.1007/s40258-020-00616-2. Epub 2020 Nov 2. PMID: 33135094.

Jung D, Dong K, Jang J, Lam GY, Wilcox PG, **Quon BS**. Circulating CRP and calprotectin to diagnose CF pulmonary exacerbations. J Cyst Fibros. 2021 Jan;20(1):46-49. doi: 10.1016/j.jcf.2020.04.016. Epub 2020 May 29. PMID: 32475777.

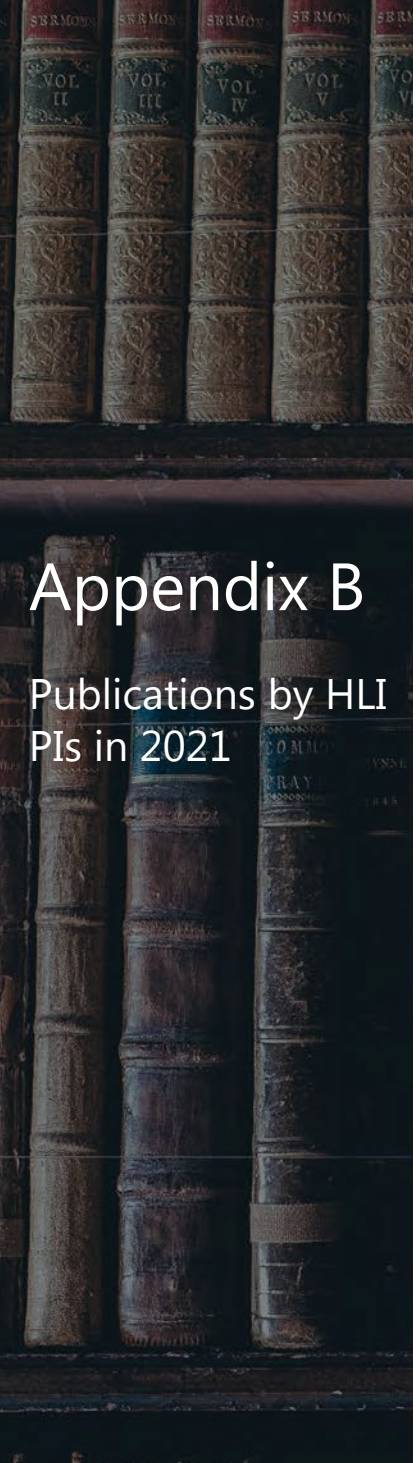
Kallas D, Roston TM, Franciosi S, Brett L, Lieve KVV, Kwok SY, Kannankeril PJ, **Krahn AD**, LaPage MJ, Etheridge S, Hill A, Johnsrude C, Perry J, Knight L, Fischbach P, Balaji S, Tisma-Dupanovic S, Law I, Atallah J, Backhoff D, Kamp A, Kubus P, Kean A, Aziz PF, Kovach J, Lau Y, Kron J, Clur SA, Sarquella-Brugada G, Wilde AAM, Sanatani S. Evaluation of age at symptom onset, proband status, and sex as predictors of disease severity in pediatric catecholaminergic polymorphic ventricular tachycardia. Heart Rhythm. 2021 Nov;18(11):1825-1832. doi: 10.1016/j.hrthm.2021.07.061. Epub 2021 Jul 29. PMID: 34333088.

Kaufman ES, Eckhardt LL, Ackerman MJ, Aziz PF, Behr ER, Cerrone M, Chung MK, Cutler MJ, Etheridge SP, **Krahn AD**, Lubitz SA, Perez MV, Priori SG, Roberts JD, Roden DM, Schulze-Bahr E, Schwartz PJ, Shimizu W, Shoemaker MB, Sy RW, Towbin JA, Viskin S, A M Wilde A, Zareba W. Management of Congenital Long-QT Syndrome: Commentary From the Experts. Circ Arrhythm Electrophysiol. 2021 Jul;14(7):e009726. doi: 10.1161/CIRCEP.120.009726. Epub 2021 Jul 9. PMID: 34238011; PMCID: PMC8301722.

Kendzerska T, Aaron SD, To T, Licskai C, Stanbrook MB, Hogan ME, **Tan WC**, Bourbeau J, Gershon AS; Canadian Respiratory Research Network and CanBREATHE (the Canadian Best Respiratory Research Evaluation and Analyst Team of Health Experts). Effect of type and dosage of newly prescribed inhaled corticosteroids on obstructive lung disease and pneumonia hospitalisations in older individuals with asthma, COPD or both: a retrospective study of health administrative data. Eur Respir J. 2021 Jan 14;57(1):2002585. doi: 10.1183/13993003.02585-2020. PMID: 32703774.

Ketelaar ME, Portelli MA, Dijk FN, Shrine N, Faiz A, Vermeulen CJ, Xu CJ, Hankinson J, Bhaker S, Henry AP, Billington CK, Shaw DE, Johnson SR, Benest AV, Pang V, Bates DO, Pogson ZEK, Fogarty A, McKeever TM, Singapuri A, Heaney LG, Mansur AH, Chaudhuri R, Thomson NC, Holloway JW, Lockett GA, Howarth PH, Niven R, Simpson A, Tobin MD, Hall IP, Wain LV, Blakey JD, Brightling CE, Obeidat M, **Sin DD**, Nickle DC, Bossé Y, Vonk JM, van den Berge M, Koppelman GH, Sayers I, Nawijn MC. Phenotypic and functional translation of IL33 genetics in asthma. J Allergy Clin Immunol. 2021 Jan;147(1):144-157. doi: 10.1016/j.jaci.2020.04.051. Epub 2020 May 19. PMID: 32442646.

Khodaei S, Henstock A, Sadeghi R, **Sellers S**, Blanke P, **Leipsic J**, Emadi A, Keshavarz-Motamed Z. Personalized intervention cardiology with transcatheter aortic valve replacement made possible with a non-invasive monitoring and diagnostic framework. Sci Rep. 2021 May 25;11(1):10888. doi: 10.1038/s41598-021-85500-2. PMID: 34035325; PMCID: PMC8149684.



Appendix B

Publications by HLI PIs in 2021

Khor YH, Gutman L, Abu Hussein N, Johannson KA, Glaspole IN, Guler SA, Funke-Chambour M, Geiser T, Goh NSL, **Ryerson CJ**. Incidence and Prognostic Significance of Hypoxemia in Fibrotic Interstitial Lung Disease: An International Cohort Study. Chest. 2021 Sep;160(3):994-1005. doi: 10.1016/j.chest.2021.04.037. Epub 2021 Apr 24. PMID: 33905679.

Khor YH, Ng Y, Sweeney D, **Ryerson CJ**. Nocturnal hypoxaemia in interstitial lung disease: a systematic review. Thorax. 2021 Dec;76(12):1200-1208. doi: 10.1136/thoraxjnl-2020-216749. Epub 2021 Apr 29. PMID: 33927018.

Khor YH, **Ryerson CJ**, Landry SA, Howard ME, Churchward TJ, Edwards BA, Hamilton GS, Joosten SA. Interstitial lung disease and obstructive sleep apnea. Sleep Med Rev. 2021 Aug;58:101442. doi: 10.1016/j.smrv.2021.101442. Epub 2021 Jan 22. PMID: 33561604.

Khor YH, Saravanan K, Holland AE, Lee JYT, **Ryerson CJ**, McDonald CF, Goh NSL. A mixed-methods pilot study of handheld fan for breathlessness in interstitial lung disease. Sci Rep. 2021 Mar 25;11(1):6874. doi: 10.1038/s41598-021-86326-8. PMID: 33767311; PMCID: PMC7994303.

Kim M, Lee SP, Kwak S, Yang S, Kim YJ, Andreini D, Al-Mallah MH, Budoff MJ, Cademartiri F, Chinnaiyan K, Choi JH, Conte E, Marques H, de Araújo Gonçalves P, Gottlieb I, Hadamitzky M, **Leipsic JA**, Maffei E, Pontone G, Raff GL, Shin S, Lee BK, Chun EJ, Sung JM, Lee SE, Berman DS, Lin FY, Virmani R, Samady H, Stone PH, Narula J, Bax JJ, Shaw LJ, Min JK, Chang HJ. Impact of age on coronary artery plaque progression and clinical outcome: A PARADIGM substudy. J Cardiovasc Comput Tomogr. 2021 May-Jun;15(3):232-239. doi: 10.1016/j.jcct.2020.09.009. Epub 2020 Oct 1. PMID: 33032975.

Kim YW, Tonti E, Hickey P, Ellis AK, Neighbour H, Larché M, **Tebbutt SJ**. Immunological changes in peripheral blood following nasal allergen challenge in subjects with allergic rhinitis pre- and post-peptide immunotherapy: An open-label clinical study. Allergy. 2021 Jun;76(6):1907-1911. doi: 10.1111/all.14710. Epub 2020 Dec 24. PMID: 33320968.

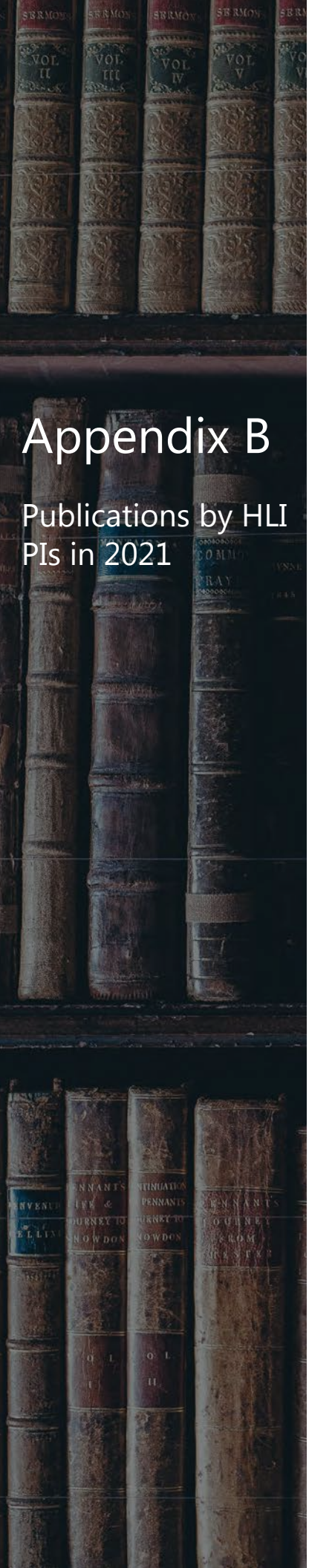
Kirby M, Smith BM, Tanabe N, **Hogg JC**, Coxson HO, **Sin DD**, Bourbeau J, **Tan WC**. Computed tomography total airway count predicts progression to COPD in at-risk smokers. ERJ Open Res. 2021 Oct 25;7(4):00307-2021. doi: 10.1183/23120541.00307-2021. PMID: 34708120; PMCID: PMC8542990.

Koch S, Welch JF, Tran R, Ramsook AH, Hung A, **Carlsten C**, **Guenette JA**, Koehle MS. Ventilatory responses to constant load exercise following the inhalation of a short-acting ß2-agonist in a laboratory-controlled diesel exhaust exposure study in individuals with exercise-induced bronchoconstriction. Environ Int. 2021 Jan;146:106182. doi: 10.1016/j.envint.2020.106182. Epub 2020 Dec 4. PMID: 33395924.

Kochan A, Ong S, Guler S, Johannson KA, **Ryerson CJ**, Goobie GC. Social Media Content of Idiopathic Pulmonary Fibrosis Groups and Pages on Facebook: Cross-sectional Analysis. JMIR Public Health Surveill. 2021 May 31;7(5):e24199. doi: 10.2196/24199. PMID: 34057425; PMCID: PMC8204239.

Koelwyn GJ, Aboumsallem JP, Moore KJ, de Boer RA. Reverse cardio-oncology: Exploring the effects of cardiovascular disease on cancer pathogenesis. J MolCell Cardiol. 2021 Sep 25;163:1-8. doi: 10.1016/j.yjmcc.2021.09.008. Epub ahead of print. PMID: 34582824.

Konwar C, Asiimwe R, Inkster AM, Merrill SM, Negri GL, Aristizabal MJ, Rider CF, MacIsaac JL, **Carlsten C**, Kobor MS. Risk-focused differences in molecular processes implicated in SARS-CoV-2 infection: corollaries in DNA methylation and gene expression. Epigenetics Chromatin. 2021 Dec 11;14(1):54. doi: 10.1186/s13072-021-00428-1. PMID: 34895312; PMCID: PMC8665859.



Appendix B

Publications by HLI PIs in 2021

Kramer AI, Akioyamen LE, Lee S, Bélanger A, Ruel I, Hales L, Genest J, **Brunham LR**. Major adverse cardiovascular events in homozygous familial hypercholesterolaemia: a systematic review and meta-analysis. Eur J Prev Cardiol. 2021 Dec 27:zwab224. doi: 10.1093/eurjpc/zwab224. Epub ahead of print. PMID: 34957506.

Kumar S, Davis J, Thibault B, Mangat I, Coutu B, Bennett M, Philippon F, Sandhu R, Sterns L, Essebag V, Nery P, Wells G, Yee R, Exner D, **Krahn A**, Parkash R. Canadian Registry of Electronic Device Outcomes: remote monitoring outcomes in the Abbott battery performance alert-a multicentre cohort. Europace. 2021 Aug 6;23(8):1319-1323. doi: 10.1093/europace/euab025. PMID: 33608700.

Kunisaki KM, **Sin DD**. Methylxanthines in COPD: yes to caffeine, no to theophylline. Eur Respir J. 2021 Jun 10;57(6):2004564. doi: 10.1183/13993003.04564-2020. PMID: 34112714.

Kwiecinski J, Tzolos E, Cartlidge TRG, Fletcher A, Doris MK, Bing R, Tarkin JM, Seidman MA, Gulsin GS, Cruden NL, Barton AK, Uren NG, Williams MC, van Beek EJR, **Leipsic J**, Dey D, Makkar RR, Slomka PJ, Rudd JHF, Newby DE, Sellers SL, Berman DS, Dweck MR. Native Aortic Valve Disease Progression and Bioprosthetic Valve Degeneration in Patients With Transcatheter Aortic Valve Implantation. Circulation. 2021 Oct 26;144(17):1396-1408. doi: 10.1161/CIRCULATIONAHA.121.056891. Epub 2021 Aug 29. PMID: 34455857; PMCID: PMC8542078.

La Vieille S, Gillespie Z, Bonvalot Y, Benkhedda K, Grinberg N, Rotstein J, Barber J, **Krahn AD**. Caffeinated energy drinks in the Canadian context: health risk assessment with a focus on cardiovascular effects. Appl Physiol Nutr Metab. 2021 Sep;46(9):1019-1028. doi: 10.1139/apnm-2021-0245. Epub 2021 May 17. PMID: 34000209.

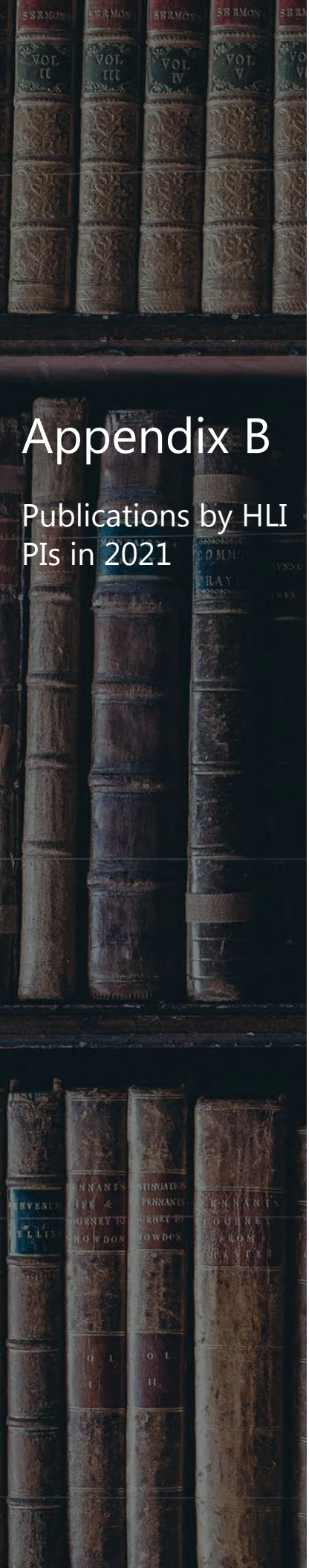
Lam GY, Desai S, Fu J, Hu XY, Jang J, Goshtasebi A, Kalyan S, **Quon BS**. IL-8 correlates with reduced baseline femoral neck bone mineral density in adults with cystic fibrosis: a single center retrospective study. Sci Rep. 2021 Jul 28;11(1):15405. doi: 10.1038/s41598-021-94883-1. PMID: 34321599; PMCID: PMC8319414.

Lam GY, Goodwin J, Wilcox PG, **Quon BS**. Sex disparities in cystic fibrosis: review on the effect of female sex hormones on lung pathophysiology and outcomes. ERJ Open Res. 2021 Jan 18;7(1):00475-2020. doi: 10.1183/23120541.00475-2020. PMID: 33532475; PMCID: PMC7836644.

Laumbach RJ, Cromar KR, Adamkiewicz G, **Carlsten C**, Charpin D, Chan WR, de Nazelle A, Forastiere F, Goldstein J, Gumy S, Hallman WK, Jerrett M, Kipen HM, Pirozzi CS, Polivka BJ, Radbel J, Shaffer RE, Sin DD, Viegi G. Personal Interventions for Reducing Exposure and Risk for Outdoor Air Pollution: An Official American Thoracic Society Workshop Report. Ann Am Thorac Soc. 2021 Sep;18(9):1435-1443. doi: 10.1513/AnnalsATS.202104-421ST. PMID: 34468284; PMCID: PMC8489863.

Lazarte J, Dron JS, McIntyre AD, Skanes AC, Gula LJ, Tang AS, Tadros R, **Laksman ZW**, Hegele RA, Roberts JD. Evaluating Polygenic Risk Scores in "Lone" Atrial Fibrillation. CJC Open. 2021 Feb 6;3(6):751-757. doi: 10.1016/j.cjco.2021.02.001. PMID: 34169254; PMCID: PMC8209371.

Lazarte J, Dron JS, McIntyre AD, Skanes AC, Gula LJ, Tang AS, Tadros R, **Laksman ZW**, Hegele RA, Roberts JD. Role of Common Genetic Variation in Lone Atrial Fibrillation. Circ Genom Precis Med. 2021 Feb;14(1):e003179. doi: 10.1161/CIRCGEN.120.003179. Epub 2021 Feb 1. PMID: 33517663.



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Lazarte J, **Laksman ZW**, Wang J, Robinson JF, Dron JS, Leach E, Liew J, McIntyre AD, Skanes AC, Gula LJ, Leong-Sit P, Cao H, Trost B, Scherer SW, Hegele RA, Roberts JD. Enrichment of loss-of-function and copy number variants in ventricular cardiomyopathy genes in 'lone' atrial fibrillation. Europace. 2021 Jun 7;23(6):844-850. doi: 10.1093/europace/euaa421. PMID: 33682005; PMCID: PMC8184224.

Lee M, Hu XY, Desai S, Kwong E, Fu J, Flores E, Lazosky L, Wilcox PG, McIlwaine M, Chilvers M, Yang C, Rayment JH, **Quon BS**. Factors influencing clinical trial participation for adult and pediatric patients with cystic fibrosis. J Cyst Fibros. 2021 Jan;20(1):57-60. doi: 10.1016/j.jcf.2020.08.019. Epub 2020 Sep 6. PMID: 32900673.

Lee SE, Sung JM, Andreini D, Al-Mallah MH, Budoff MJ, Cademartiri F, Chinnaiyan K, Choi JH, Chun EJ, Conte E, Gottlieb I, Hadamitzky M, Kim YJ, Lee BK, **Leipsic JA**, Maffei E, Marques H, de Araújo Gonçalves P, Pontone G, Shin S, Stone PH, Samady H, Virmani R, Narula J, Berman DS, Shaw LJ, Bax JJ, Lin FY, Min JK, Chang HJ. Association between Aortic Valve Calcification Progression and Coronary Atherosclerotic Plaque Volume Progression in the PARADIGM Registry. Radiology. 2021 Jul;300(1):79-86. doi: 10.1148/radiol.2021202630. Epub 2021 May 11. PMID: 33973837.

Lee T, Cau A, Cheng MP, Levin A, Lee TC, Vinh DC, Lamontagne F, Singer J, **Walley KR**, Murthy S, Patrick D, Rewa OG, Winston BW, Marshall J, **Boyd J**, Tran K, Kalil AC, Mcculoh R, Fowler R, Luther JM, **Russell JA**; ARBs CORONA. Angiotensin Receptor Blockers and Angiotensin-Converting Enzyme Inhibitors in COVID-19: Meta-analysis/Meta-regression Adjusted for Confounding Factors. CJC Open. 2021 Jul;3(7):965-975. doi: 10.1016/j.cjco.2021.03.001. Epub 2021 Apr 6. PMID: 33842874; PMCID: PMC8023793.

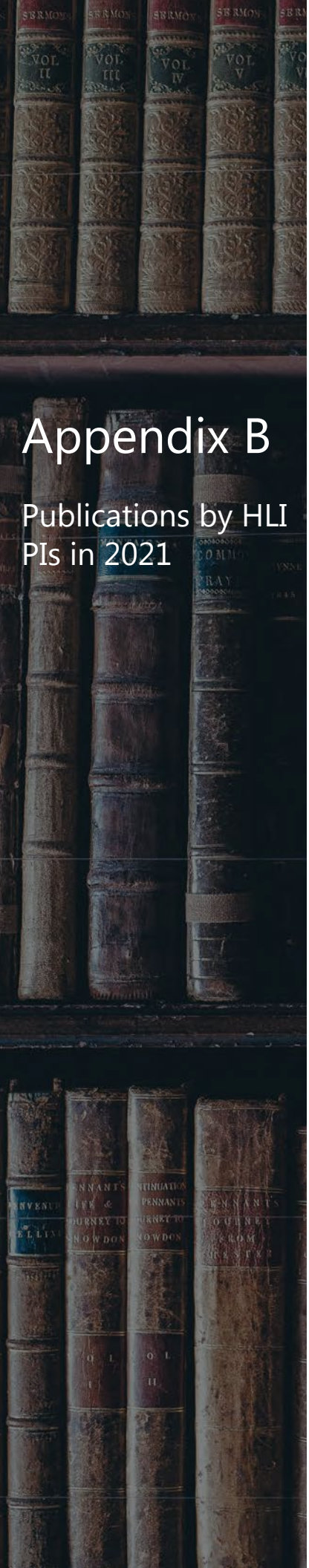
Leitao Filho FS, Choi L, **Sin DD**. Beta-blockers in chronic obstructive pulmonary disease: the good, the bad and the ugly. Curr Opin Pulm Med. 2021 Mar 1;27(2):125-131. doi: 10.1097/MCP.0000000000000748. PMID: 33332878.

Leitao Filho FS, Takiguchi H, Akata K, Ra SW, Moon JY, Kim HK, Cho Y, Yamasaki K, Milne S, Yang J, Yang CWT, Li X, Nislow C, **van Eeden SF**, Shaipanich T, Lam S, **Leung JM**, **Sin DD**. Effects of Inhaled Corticosteroid/Long-Acting β2-Agonist Combination on the Airway Microbiome of Patients with Chronic Obstructive Pulmonary Disease: A Randomized Controlled Clinical Trial (DISARM). Am J Respir Crit Care Med. 2021 Nov 15;204(10):1143-1152. doi: 10.1164/rccm.202102-0289OC. PMID: 34464242.

Leon MB, Mack MJ, Hahn RT, Thourani VH, Makkar R, Kodali SK, Alu MC, Madhavan MV, Chau KH, Russo M, Kapadia SR, Malaisrie SC, Cohen DJ, Blanke P, **Leipsic JA**, Williams MR, McCabe JM, Brown DL, Babaliaros V, Goldman S, Herrmann HC, Szeto WY, Genereux P, Pershad A, Lu M, Webb JG, Smith CR, Pibarot P; PARTNER 3 Investigators. Outcomes 2 Years After Transcatheter Aortic Valve Replacement in Patients at Low Surgical Risk. J Am Coll Cardiol. 2021 Mar 9;77(9):1149-1161. doi: 10.1016/j.jacc.2020.12.052. PMID: 33663731.

Leung C, Bourbeau J, **Sin DD**, Aaron SD, FitzGerald JM, Maltais F, Marciniuk DD, O'Donnell D, Hernandez P, Chapman KR, Walker B, Road JD, Zheng L, Zou C, Hogg JC, **Tan WC**; CanCOLD Collaborative Research Group. The Prevalence of Chronic Obstructive Pulmonary Disease (COPD) and the Heterogeneity of Risk Factors in the Canadian Population: Results from the Canadian Obstructive Lung Disease (COLD) Study. Int J Chron Obstruct Pulmon Dis. 2021 Feb 12;16:305-320. doi: 10.2147/COPD.S285338. PMID: 33603357; PMCID: PMC7886112.

Leung C, **Sin DD**. Asthma-COPD Overlap: What Are the Important Questions? Chest. 2021 Oct 6:S0012-3692(21)04078-2. doi: 10.1016/j.chest.2021.09.036. Epub ahead of print. PMID: 34626594.



Appendix B

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Lewthwaite H, Elsewify O, Niro F, Bourbeau J, **Guenette JA**, Maltais F, Marciniuk DD, O'Donnell DE, Smith BM, Stickland MK, **Tan WC**, Jensen D; CanCOLD Collaborative Research Group; Canadian Respiratory Research Network. Normative Cardiopulmonary Exercise Test Responses at the Ventilatory Threshold in Canadian Adults 40 to 80 Years of Age. Chest. 2021 May;159(5):1922-1933. doi: 10.1016/j.chest.2020.11.009. Epub 2020 Nov 18. PMID: 33217419; PMCID: PMC8579317.

Li BCM, Huh SM, Prieto MD, Hong G, Schwarz C, Moss RB, **Quon BS**. Biomarkers for the Diagnosis of Allergic Bronchopulmonary Aspergillosis in Cystic Fibrosis: A Systematic Review and Meta-Analysis. J Allergy Clin Immunol Pract. 2021 May;9(5):1909-1930.e4. doi: 10.1016/j.jaip.2020.12.064. Epub 2021 Jan 14. PMID: 33454395.

Link MS, Sullivan RM, Olshansky B, Cannom D, Berul CI, Hauser RG, Heidbuchel H, Jordaens L, **Krahn AD**, Morgan J, Patton KK, Saarel EV, Wilkoff BL, Li F, Dziura J, Brandt C, Barth C, Lampert R. Implantable Cardioverter Defibrillator Lead Survival in Athletic Patients. Circ Arrhythm Electrophysiol. 2021 Mar;14(3):e009344. doi: 10.1161/CIRCEP.120.009344. Epub 2021 Mar 16. PMID: 33724879.

Liu H, **Luo H**. Development of Group B Coxsackievirus as an Oncolytic Virus: Opportunities and Challenges. Viruses. 2021 Jun 5;13(6):1082. doi: 10.3390/v13061082. PMID: 34198859; PMCID: PMC8227215.

Lok SD, Wong AW, Khor YH, **Ryerson CJ**, Johannson KA; CARE-PF Investigators. Malignancy Risk Associated with Mycophenolate Mofetil or Azathioprine in Patients with Fibrotic Interstitial Lung Disease. Chest. 2021 Dec 15:S0012-3692(21)05085-6. doi: 10.1016/j.chest.2021.12.636. Epub ahead of print. PMID: 34921905.

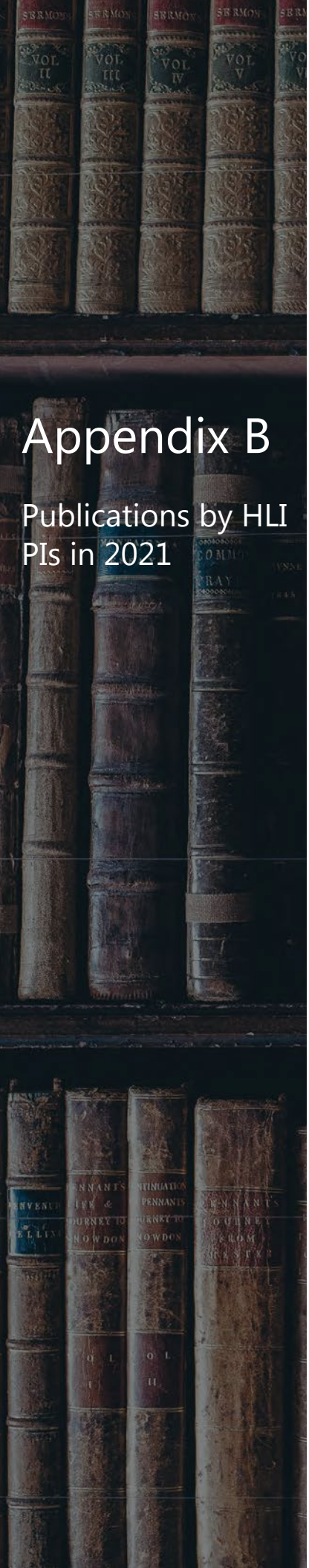
Longtin Y, Gervais P, Birnie DH, Wang J, Alings M, Philippon F, Parkash R, Manlucu J, Angaran P, Rinne C, Coutu B, Low RA, Essebag V, Morillo C, Redfearn D, Toal S, Becker G, Degrâce M, Thibault B, Crystal E, Tung S, LeMaitre J, Sultan O, Bennett M, Bashir J, Ayala-Paredes F, Rioux L, Hemels MEW, Bouwels LHR, Exner DV, Dorian P, Connolly SJ, **Krahn AD**. Impact of Choice of Prophylaxis on the Microbiology of Cardiac Implantable Electronic Device Infections: Insights From the Prevention of Arrhythmia Device Infection Trial (PADIT). Open Forum Infect Dis. 2021 Oct 14;8(11):ofab513. doi: 10.1093/ofid/ofab513. PMID: 34859113; PMCID: PMC8632784.

Lu HY, Sertori R, Contreras AV, Hamer M, Messing M, Del Bel KL, Lopez-Rangel E, Chan ES, Rehmus W, Milner JD, **McNagny KM**, Lehman A, Wiest DL, Turvey SE. A Novel Germline Heterozygous BCL11B Variant Causing Severe Atopic Disease and Immune Dysregulation. Front Immunol. 2021 Nov 23;12:788278. doi: 10.3389/fimmu.2021.788278. PMID: 34887873; PMCID: PMC8650153.

Lu N, MacGillivray J, Andrade JG, Krahn AD, Hawkins NM, **Laksman Z**, Deyell MW, Chakrabarti S, Yeung-Lai-Wah JA, Bennett MT. Effectiveness of a simple medication adjustment protocol for optimizing peri-cardioversion rate control: A derivation and validation cohort study. Heart Rhythm O2. 2021 Jan 12;2(1):46-52. doi: 10.1016/j.hroo.2021.01.002. PMID: 34113904; PMCID: PMC8183961.

Luk A, Clarke B, Dahdah N, Ducharme A, **Krahn A**, McCrindle B, Mizzi T, Naus M, Udell JA, Virani S, Zieroth S, McDonald M. Myocarditis and Pericarditis After COVID-19 mRNA Vaccination: Practical Considerations for Care Providers. Can J Cardiol. 2021 Oct;37(10):1629-1634. doi: 10.1016/j.cjca.2021.08.001. Epub 2021 Aug 8. PMID: 34375696; PMCID: PMC8349442.

Marchand M, Chen V, Trinder M, Cermakova L, **Brunham LR**. Patient Perspectives Regarding Genetic Testing for Familial Hypercholesterolemia. CJC Open. 2021 Apr 8;3(5):557-564. doi: 10.1016/j.cjco.2020.12.006. PMID: 34027362; PMCID: PMC8134866.



Appendix B

Publications by HLI PIs in 2021

Marinescu DC, English J, Sedlic T, Kliber A, **Ryerson CJ**, Wong AW. Pulmonary Apical Cap as a Potential Risk Factor for Pleuroparenchymal Fibroelastosis. Chest. 2021 Jun;159(6):e365-e370. doi: 10.1016/j.chest.2021.01.011. PMID: 34099151.

Marinescu DC, **Ryerson CJ**. Endobronchial Optical Coherence Tomography for the Diagnosis of Fibrotic Interstitial Lung Disease: A Light at the End of the Tunnel? Am J Respir Crit Care Med. 2021 Nov 15;204(10):1122-1124. doi: 10.1164/rccm.202108-1899ED. PMID: 34473937; PMCID: PMC8759298.

Maul X, Dincer BC, Wu AW, **Thamboo AV**, Higgins TS, Scangas GA, Oliveira K, Ho AS, Mallen-St Clair J, Walgama E. A Clinical Decision Analysis for Use of Antibiotic Prophylaxis for Nonabsorbable Nasal Packing. Otolaryngol Head Neck Surg. 2021 Nov;165(5):647-654. doi: 10.1177/0194599820988740. Epub 2021 Feb 16. PMID: 33588621.

Maul X, **Thamboo A**. The clinical effect of psychosomatic interventions on empty nose syndrome secondary to turbinate-sparing techniques: A prospective self-controlled study. Int Forum Allergy Rhinol. 2021 May;11(5):955-956. doi: 10.1002/alr.22724. Epub 2020 Nov 5. PMID: 33151623.

McNagny KM, Hughes MR, Brassard J. Molecular Teflon and fertility: an old adhesion regulator takes center stage. Fertil Steril. 2021 Nov;116(5):1402-1403. doi: 10.1016/j.fertnstert.2021.09.021. Epub 2021 Oct 1. PMID: 34602258.

Mekov E, Nuñez A, **Sin DD**, Ichinose M, Rhee CK, Maselli DJ, Coté A, Suppli Ulrik C, Maltais F, Anzueto A, Miravitlles M. Update on Asthma-COPD Overlap (ACO): A Narrative Review. Int J Chron Obstruct Pulmon Dis. 2021 Jun 17;16:1783-1799. doi: 10.2147/COPD.S312560. PMID: 34168440; PMCID: PMC8216660.

Mellor GJ, Blom LJ, Groeneveld SA, Winkel BG, Ensam B, Bargehr J, van Rees B, Scrocco C, Krapels IPC, Volders PGA, Tfelt-Hansen J, **Krahn AD**, Hassink RJ, Behr ER. Familial Evaluation in Idiopathic Ventricular Fibrillation: Diagnostic Yield and Significance of J Wave Syndromes. Circ Arrhythm Electrophysiol. 2021 Mar;14(3):e009089. doi: 10.1161/CIRCEP.120.009089. Epub 2021 Feb 7. PMID: 33550818.

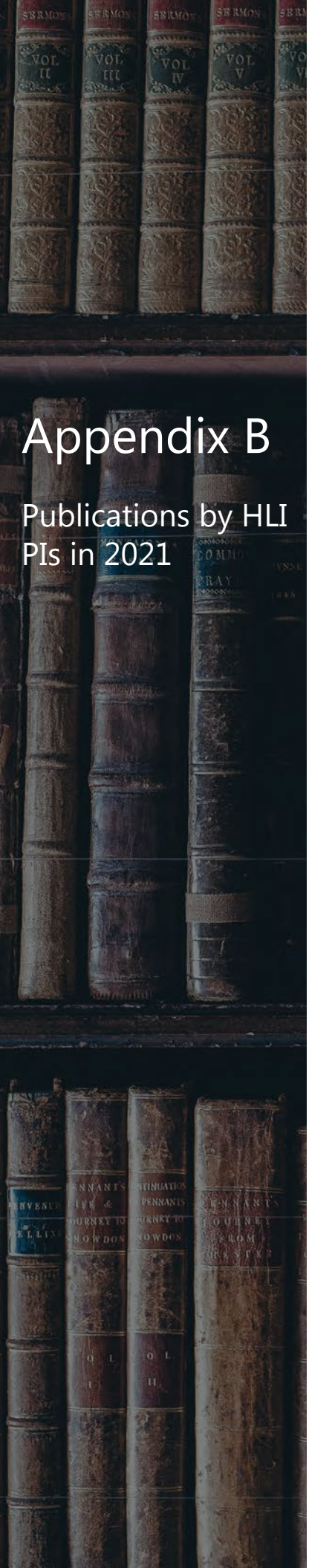
Mikacenic C, Bhatraju P, Robinson-Cohen C, Kosamo S, Fohner AE, Dmyterko V, Long SA, Cerosaletti K, Calfee CS, Matthay MA, **Walley KR**, **Russell JA**, Christie JD, Meyer NJ, Christiani DC, Wurfel MM. Single Nucleotide Variant in FAS Associates With Organ Failure and Soluble Fas Cell Surface Death Receptor in Critical Illness. Crit Care Med. 2021 Sep 29. doi: 10.1097/CCM.0000000000005333. Epub ahead of print. PMID: 34593707.

Milne S, Eddy RL, **Sin DD**. Disease activity in COPD: time to make imaging biomarkers a PET project? ERJ Open Res. 2021 Aug 31;7(3):00445-2021. doi: 10.1183/23120541.00445-2021. PMID: 34476244; PMCID: PMC8405865.

Milne S, Li X, Yang CX, Leitao Filho FS, Hernández Cordero AI, Yang CWT, Shaipanich T, **van Eeden SF**, **Leung JM**, Lam S, **Sin DD**. Inhaled corticosteroids downregulate SARS-CoV-2-related genes in COPD: results from a randomised controlled trial. Eur Respir J. 2021 Jul 29;58(1):2100130. doi: 10.1183/13993003.00130-2021. PMID: 33795322; PMCID: PMC8015643.

Mirsadraee S, **Sellers S**, Duncan A, Hamadanchi A, Gorog DA. Bioprosthetic valve thrombosis and degeneration following transcatheter aortic valve implantation (TAVI). Clin Radiol. 2021 Jan;76(1):73.e39-73.e47. doi: 10.1016/j.crad.2020.08.015. Epub 2020 Sep 9. PMID: 32919757.

Mitchell RA, Apperley ST, Dhillon SS, Zhang J, Boyle KG, Ramsook AH, Schaeffer MR, Milne KM, Molgat-Seon Y, Sheel AW, **Guenette JA**. Case Studies in Physiology: Cardiopulmonary exercise testing and inspiratory muscle training in a 59-year-old, 4 years after an extrapleural pneumonectomy. J Appl Physiol (1985). 2021 Dec 1;131(6):1701-1707. doi: 10.1152/japplphysiol.00506.2021. Epub 2021 Oct 28. PMID: 34709069.



Appendix B

Publications by HLI PIs in 2021

Mohammadi T, Sadatsafavi M, **Carlsten C**. The economics of precision health: preventing air pollution-induced exacerbation in asthma. ERJ Open Res. 2021 Mar 22;7(1):00790-2020. doi: 10.1183/23120541.00790-2020. PMID: 33778052; PMCID: PMC7983226.

Mohamud Y, Tang H, Xue YC, Liu H, Ng CS, Bahreyni A, **Luo H**. Coxsackievirus B3 targets TFEB to disrupt lysosomal function. Autophagy. 2021 Dec;17(12):3924-3938. doi: 10.1080/15548627.2021.1896925. Epub 2021 Mar 10. PMID: 33691586; PMCID: PMC8726691.

Mohamud Y, Xue YC, Liu H, Ng CS, Bahreyni A, Jan E, **Luo H**. The papain-like protease of coronaviruses cleaves ULK1 to disrupt host autophagy. Biochem Biophys Res Commun. 2021 Feb 12;540:75-82. doi: 10.1016/j.bbrc.2020.12.091. Epub 2021 Jan 8. PMID: 33450483; PMCID: PMC7836930.

Mohamud Y, Xue YC, Liu H, Ng CS, Bahreyni A, **Luo H**. Autophagy Receptor Protein Tax1-Binding Protein 1/TRAF6-Binding Protein Is a Cellular Substrate of Enteroviral Proteinase. Front Microbiol. 2021 Jun 4;12:647410. doi: 10.3389/fmicb.2021.647410. PMID: 34149637; PMCID: PMC8213198.

Molgat-Seon Y, Guler SA, Peters CM, Vasilescu DM, Puyat JH, Coxson HO, **Ryerson CJ**, **Guenette JA**. Pectoralis muscle area and its association with indices of disease severity in interstitial lung disease. Respir Med. 2021 Sep;186:106539. doi: 10.1016/j.rmed.2021.106539. Epub 2021 Jul 8. PMID: 34271524.

Montgomery A, Tam F, Gursche C, Cheneval C, Besler K, Enns W, Manku S, Rey K, Hanson PJ, Rose-John S, **McManus BM**, Choy JC. Overlapping and distinct biological effects of IL-6 classic and trans-signaling in vascular endothelial cells. Am J Physiol Cell Physiol. 2021 Apr 1;320(4):C554-C565. doi: 10.1152/ajpcell.00323.2020. Epub 2021 Jan 20. PMID: 33471622.

Mostaco-Guidolin LB, Loube J, Barlow A, Osei ET, Vasilescu DM, Hsieh A, Fouadi M, Young C, Scott AL, Mitzner W, **Hackett TL**. Second harmonic generation imaging of collagen scaffolds within the alveolar ducts of healthy and emphysematous mouse lungs. Histochem Cell Biol. 2021 Feb;155(2):279-289. doi: 10.1007/s00418-020-01959-6. Epub 2021 Jan 30. PMID: 33515079.

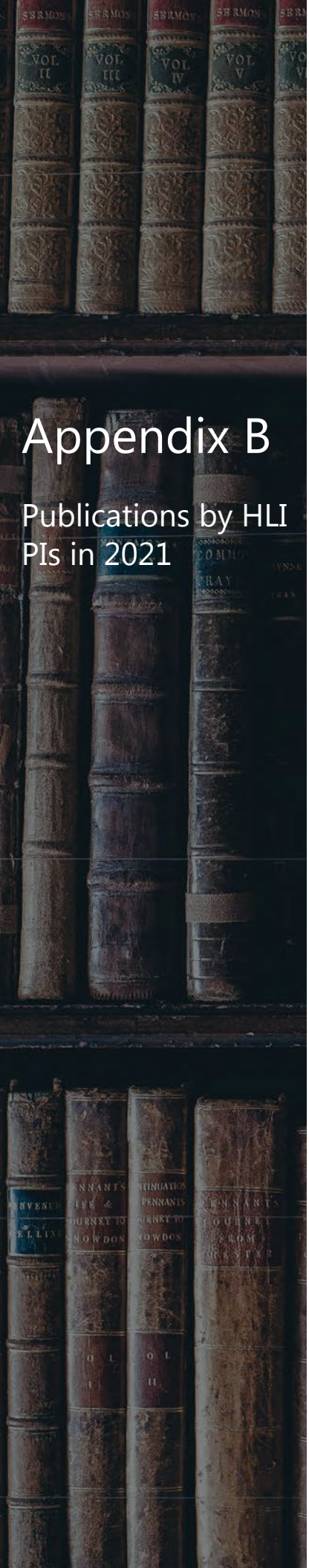
Mostaço-Guidolin LB, Yang CX, **Hackett TL**. Pulmonary Vascular Remodeling Is an Early Feature of Fatal and Nonfatal Asthma. Am J Respir Cell Mol Biol. 2021 Jul;65(1):114-118. doi: 10.1165/rcmb.2020-0339LE. PMID: 34241585; PMCID: PMC8662529.

Mwikirize C, Kimbowa AB, Imanirakiza S, Katumba A, Nosher JL, **Hacihaliloglu I**. Time-aware deep neural networks for needle tip localization in 2D ultrasound. Int J Comput Assist Radiol Surg. 2021 May;16(5):819-827. doi: 10.1007/s11548-021-02361-w. Epub 2021 Apr 11. PMID: 33840037.

Nair GM, Birnie DH, Sumner GL, **Krahn AD**, Healey JS, Nery PB, Kalfon E, Verma A, Ayala-Paredes F, Coutu B, Becker G, Philippon F, Eikelboom J, Sandhu RK, Sapp J, Leather R, Yung D, Thibault B, Simpson CS, Ahmad K, Sturmer M, Kavanagh K, Crystal E, Wells GA, Essebag V; BRUISE CONTROL Investigators. Post-operative pain following cardiac implantable electronic device implantation: insights from the BRUISE CONTROL trials. Europace. 2021 May 21;23(5):748-756. doi: 10.1093/europace/euaa349. PMID: 33367623; PMCID: PMC8139821.

Newton E, Valenzuela D, Foley J, **Thamboo A**, Prisman E. Outcomes for the treatment of locoregional recurrent nasopharyngeal cancer: Systematic review and pooled analysis. Head Neck. 2021 Dec;43(12):3979-3995. doi: 10.1002/hed.26836. Epub 2021 Aug 17. PMID: 34403174.

Ng CS, Stobart CC, **Luo H**. Innate immune evasion mediated by picornaviral 3C protease: Possible lessons for coronaviral 3C-like protease? Rev Med Virol. 2021 Sep;31(5):1-22. doi: 10.1002/rmv.2206. Epub 2021 Jan 7. PMID: 33624382; PMCID: PMC7883238.



Appendix B

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Ng TP, Gao Q, Gwee X, Chua DQL, **Tan WC**. Tea Consumption and Risk of Chronic Obstructive Pulmonary Disease in Middle-Aged and Older Singaporean Adults. Int J Chron Obstruct Pulmon Dis. 2021 Jan 7;16:13-23. doi: 10.2147/COPD.S273406. PMID: 33442245; PMCID: PMC7800434.

Nguyen JP, Huff RD, Cao QT, Tiessen N, **Carlsten C**, Hirota JA. Effects of environmental air pollutants on CFTR expression and function in human airway epithelial cells. Toxicol In Vitro. 2021 Dec;77:105253. doi: 10.1016/j.tiv.2021.105253. Epub 2021 Sep 30. PMID: 34601066.

Nørgaard BL, Gaur S, Fairbairn TA, Douglas PS, Jensen JM, Patel MR, Ihdayhid AR, Ko BSH, **Sellers SL**, Weir-McCall J, Matsuo H, Sand NPR, Øvrehus KA, Rogers C, Mullen S, Nieman K, Parner E, Leipsic J, Abdulla J. Prognostic value of coronary computed tomography angiographic derived fractional flow reserve: a systematic review and meta-analysis. Heart. 2022 Feb;108(3):194-202. doi: 10.1136/heartjnl-2021-319773. Epub 2021 Oct 22. PMID: 34686567.

Nouraei H, Ostry A, **Leipsic JA**, **Laksman Z**. A Case of Lymphocytic Myocarditis With Complete Heart Block Requiring Permanent Pacemaker Implantation. Can J Cardiol. 2021 Oct;37(10):1657-1658. doi: 10.1016/j.cjca.2021.06.010. Epub 2021 Jun 17. PMID: 34147623.

Nunez JJ, Nguyen TT, Zhou Y, Cao B, **Ng RT**, Chen J, Frey BN, Milev R, Müller DJ, Rotzinger S, Soares CN, Uher R, Kennedy SH, Lam RW. Replication of machine learning methods to predict treatment outcome with antidepressant medications in patients with major depressive disorder from STAR*D and CAN-BIND-1. PLoS One. 2021 Jun 28;16(6):e0253023. doi: 10.1371/journal.pone.0253023. PMID: 34181661; PMCID: PMC8238228.

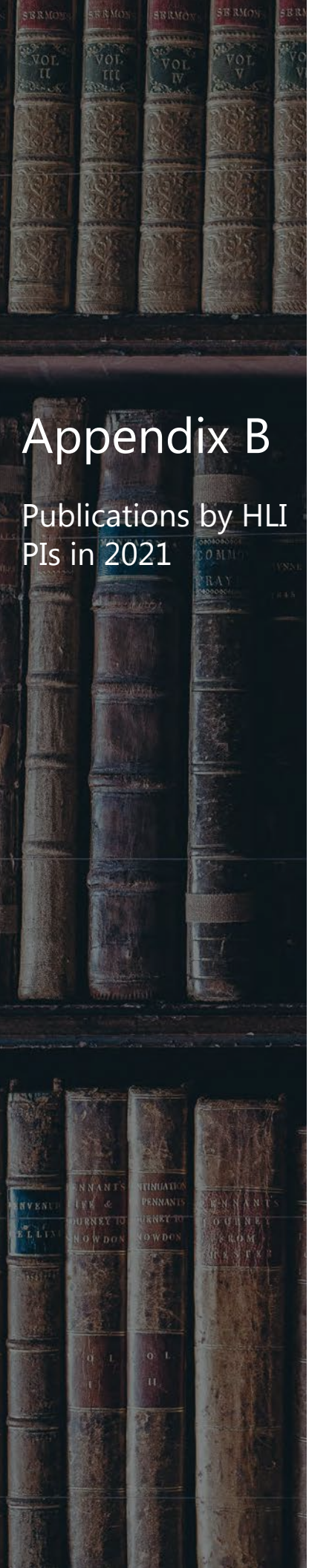
Orach J, Rider CF, **Carlsten C**. Concentration-dependent health effects of air pollution in controlled human exposures. Environ Int. 2021 May;150:106424. doi: 10.1016/j.envint.2021.106424. Epub 2021 Feb 15. PMID: 33596522.

Pablos I, Machado Y, de Jesus HCR, Mohamud Y, Kappelhoff R, Lindskog C, Vlok M, Bell PA, Butler GS, Grin PM, Cao QT, Nguyen JP, Solis N, Abbina S, Rut W, Vederas JC, Szekely L, Szakos A, Drag M, Kizhakkedathu JN, Mossman K, Hirota JA, Jan E, **Luo H**, Banerjee A, Overall CM. Mechanistic insights into COVID-19 by global analysis of the SARS-CoV-2 3CLpro substrate degradome. Cell Rep. 2021 Oct 26;37(4):109892. doi: 10.1016/j.celrep.2021.109892. Epub 2021 Oct 9. PMID: 34672947; PMCID: PMC8501228.

Paquette M, Bernard S, Cariou B, Hegele RA, Genest J, Trinder M, **Brunham LR**, Béliard S, Baass A. Familial Hypercholesterolemia-Risk-Score: A New Score Predicting Cardiovascular Events and Cardiovascular Mortality in Familial Hypercholesterolemia. Arterioscler Thromb Vasc Biol. 2021 Oct;41(10):2632-2640. doi: 10.1161/ATVBAHA.121.316106. Epub 2021 Aug 26. PMID: 34433300.

Park HY, Lee H, Kang D, Choi HS, Ryu YH, Jung KS, **Sin DD**, Cho J, Yoo KH. Understanding racial differences of COPD patients with an ecological model: two large cohort studies in the US and Korea. Ther Adv Chronic Dis. 2021 Jan 22;12:2040622320982455. doi: 10.1177/2040622320982455. PMID: 33613934; PMCID: PMC7841674.

Paterson I, Ramanathan K, Aurora R, Bewick D, Chow CM, Clarke B, Cowan S, Ducharme A, Gin K, Graham M, Gupta A, Jassal DS, Kazmi M, **Krahn A**, Lamarche Y, Marelli A, Roifman I, Ruel M, Singh G, Sterns L, Turgeon R, Virani S, Wong KK, Zieroth S. Long COVID-19: A Primer for Cardiovascular Health Professionals, on Behalf of the CCS Rapid Response Team. Can J Cardiol. 2021 Aug;37(8):1260-1262. doi: 10.1016/j.cjca.2021.05.011. Epub 2021 Jun 6. PMID: 34090980; PMCID: PMC8180343.



Appendix B

Publications by HLI PIs in 2021

Pearman CM, Walia J, Alqarawi W, Larsen JM, Leach E, **Krahn AD**, **Laksman Z**. The clinical utility of procainamide-induced late potentials on the signal averaged ECG. Pacing Clin Electrophysiol. 2021 Dec;44(12):2046-2053. doi: 10.1111/pace.14379. Epub 2021 Oct 26. PMID: 34648655.

Pearson GJ, Thanassoulis G, Anderson TJ, Barry AR, Couture P, Dayan N, **Francis GA**, Genest J, Grégoire J, Grover SA, Gupta M, Hegele RA, Lau D, Leiter LA, Leung AA, Lonn E, Mancini GBJ, Manjoo P, McPherson R, Ngui D, Piché ME, Poirier P, Sievenpiper J, Stone J, Ward R, Wray W. 2021 Canadian Cardiovascular Society Guidelines for the Management of Dyslipidemia for the Prevention of Cardiovascular Disease in Adults. Can J Cardiol. 2021 Aug;37(8):1129-1150. doi: 10.1016/j.cjca.2021.03.016. Epub 2021 Mar 26. PMID: 33781847.

Peltenburg PJ, Kallas D, Bos JM, Lieve KVV, Franciosi S, Roston TM, Denjoy I, Sorensen KB, Ohno S, Roses-Noguer F, Aiba T, Maltret A, LaPage MJ, Atallah J, Giudicessi JR, Clur SB, Blom NA, Tanck M, Extramiana F, Kato K, Barc J, Borggrefe M, Behr ER, Sarquella-Brugada G, Tfelt-Hansen J, Zorio E, Swan H, Kammeraad JAE, **Krahn AD**, Davis A, Sacher F, Schwartz PJ, Roberts JD, Skinner JR, van den Berg MP, Kannankeril PJ, Drago F, Robyns T, Haugaa KH, Tavacova T, Semsarian C, Till J, Probst V, Brugada R, Shimizu W, Horie M, Leenhardt A, Ackerman MJ, Sanatani S, van der Werf C, Wilde AAM. An International Multi-Center Cohort Study on β-blockers for the Treatment of Symptomatic Children with Catecholaminergic Polymorphic Ventricular Tachycardia. Circulation. 2021 Dec 7. doi: 10.1161/CIRCULATIONAHA.121.056018. Epub ahead of print. PMID: 34874747.

Peres BU, Hirsch Allen AJ, Daniele P, Humphries KH, Taylor C, Laher I, Almeida F, Jen R, **Sandford AJ**, **van Eeden SF**, Ayas NT. Circulating levels of cell adhesion molecules and risk of cardiovascular events in obstructive sleep apnea. PLoS One. 2021 Jul 30;16(7):e0255306. doi: 10.1371/journal.pone.0255306. PMID: 34329349; PMCID: PMC8323915.

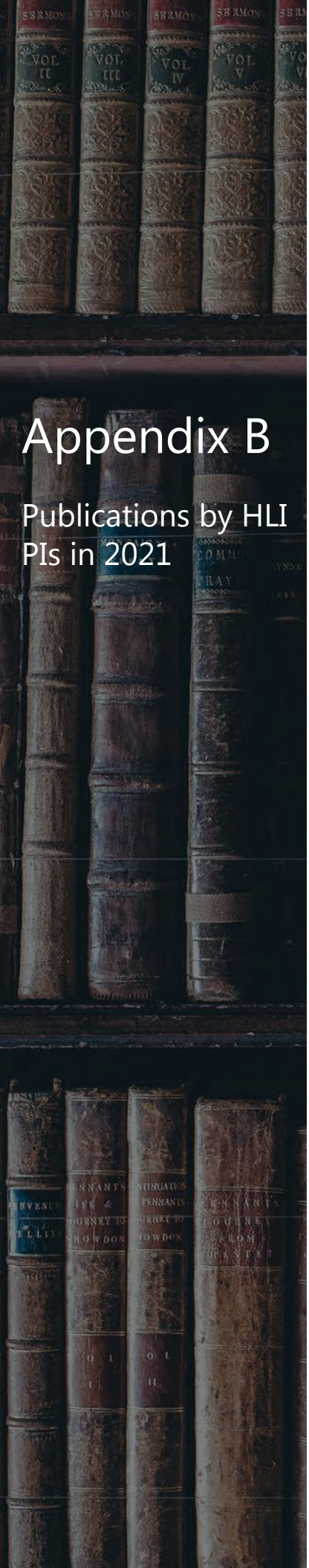
Perez-Bermejo JA, Kang S, Rockwood SJ, Simoneau CR, Joy DA, Silva AC, Ramadoss GN, Flanigan WR, Fozouni P, Li H, Chen PY, Nakamura K, Whitman JD, Hanson PJ, **McManus BM**, Ott M, Conklin BR, McDevitt TC. SARS-CoV-2 infection of human iPSC-derived cardiac cells reflects cytopathic features in hearts of patients with COVID-19. Sci Transl Med. 2021 Apr 21;13(590):eabf7872. doi: 10.1126/scitranslmed.abf7872. Epub 2021 Mar 15. PMID: 33723017; PMCID: PMC8128284.

Peters CM, Leahy MG, Hohert G, Lane P, Lam S, **Sin DD**, McKenzie DC, Sheel AW. Airway luminal area and the resistive work of breathing during exercise in healthy young females and males. J Appl Physiol (1985). 2021 Dec 1;131(6):1750-1761. doi: 10.1152/japplphysiol.00418.2021. Epub 2021 Oct 28. PMID: 34709072.

Piemontesi J, **Thamboo A**, Abdalkhani A. Endoscopic complete ethmoidectomy: How I do it (with video). Eur Ann Otorhinolaryngol Head Neck Dis. 2021 Nov;138 Suppl 4:109-110. doi: 10.1016/j.anorl.2021.05.018. Epub 2021 Jun 14. PMID: 34140267.

Pobran TD, Yang D, Mackenzie IRA, **DeMarco ML**. Aptamer-based enrichment of TDP-43 from human cells and tissues with quantification by HPLC-MS/MS. J Neurosci Methods. 2021 Nov 1;363:109344. doi: 10.1016/j.jneumeth.2021.109344. Epub 2021 Aug 29. PMID: 34469713.

Podolanczuk AJ, Wong AW, Saito S, Lasky JA, **Ryerson CJ**, Eickelberg O. Update in Interstitial Lung Disease 2020. Am J Respir Crit Care Med. 2021 Jun 1;203(11):1343-1352. doi: 10.1164/rccm.202103-0559UP. PMID: 33835899; PMCID: PMC8759209.



Appendix B

Publications by HLI PIs in 2021

Qahtani MA, Yang CWT, Lazosky L, Li X, D'Cruz J, Romney MG, **Sin DD**. SARS-CoV-2 rapid antigen testing for departing passengers at Vancouver International Airport. J Travel Med. 2021 Oct 11;28(7):taab085. doi: 10.1093/jtm/taab085. PMID: 34046663; PMCID: PMC8194614.

Qi X, Brown LG, Foran DJ, Nosher J, **Hacihaliloglu I**. Chest X-ray image phase features for improved diagnosis of COVID-19 using convolutional neural network. Int J Comput Assist Radiol Surg. 2021 Feb;16(2):197-206. doi: 10.1007/s11548-020-02305-w. Epub 2021 Jan 9. PMID: 33420641; PMCID: PMC7794081.

Ramos KJ, Sykes J, Stanojevic S, Ma X, Ostrenga JS, Fink A, **Quon BS**, Marshall BC, Faro A, Petren K, Elbert A, Goss CH, Stephenson AL. Survival and Lung Transplant Outcomes for Individuals With Advanced Cystic Fibrosis Lung Disease Living in the United States and Canada: An Analysis of National Registries. Chest. 2021 Sep;160(3):843-853. doi: 10.1016/j.chest.2021.04.010. Epub 2021 Apr 17. PMID: 33878343; PMCID: PMC8449008.

Ramsook AH, Molgat-Seon Y, Boyle KG, Mitchell RA, Puyat JH, Koehle MS, Sheel AW, **Guenette JA**. Reliability of diaphragm voluntary activation measurements in healthy adults. Appl Physiol Nutr Metab. 2021 Mar;46(3):247-256. doi: 10.1139/apnm-2020-0221. Epub 2020 Sep 10. PMID: 32910865.

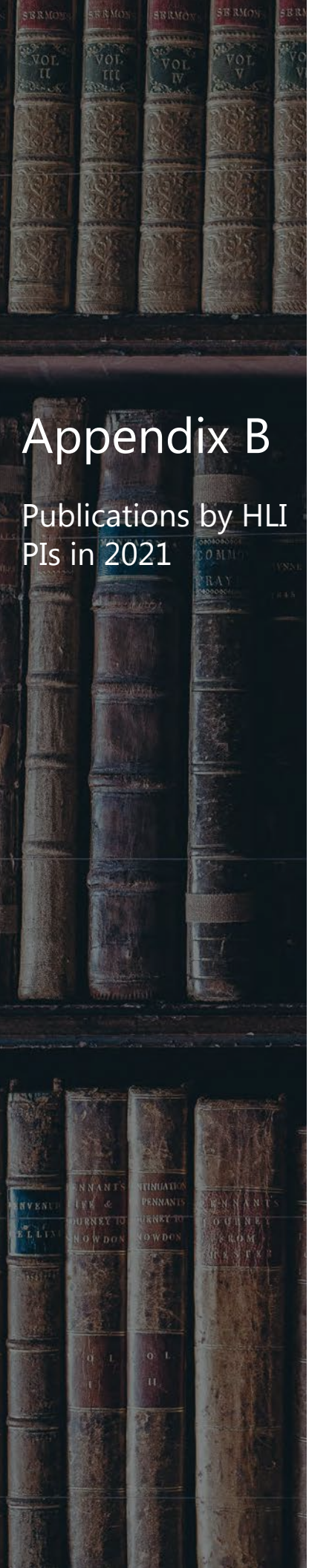
Ramsook AH, Peters CM, Leahy MG, Archiza B, Mitchell RA, Jasinovic T, Koehle MS, **Guenette JA**, Sheel AW. Reply to Beltrami. Exp Physiol. 2021 Mar;106(3):791-792. doi: 10.1113/EP089394. Epub 2021 Feb 17. PMID: 33538367.

Reilly JP, Meyer NJ, Shashaty MG, Anderson BJ, Ittner C, Dunn TG, Lim B, Forker C, Bonk MP, Kotloff E, Feng R, Cantu E, Mangalmurti NS, Calfee CS, Matthay MA, Mikacenic C, **Walley KR**, **Russell J**, Christiani DC, Wurfel MM, Lanken PN, Reilly MP, Christie JD. The ABO histo-blood group, endothelial activation, and acute respiratory distress syndrome risk in critical illness. J Clin Invest. 2021 Jan 4;131(1):e139700. doi: 10.1172/JCI139700. PMID: 32931480; PMCID: PMC7773362.

Remy-Jardin M, **Ryerson CJ**, Schiebler ML, Leung ANC, Wild JM, Hoeper MM, Alderson PO, Goodman LR, Mayo J, Haramati LB, Ohno Y, Thistlethwaite P, van Beek EJR, Knight SL, Lynch DA, Rubin GD, Humbert M. Imaging of pulmonary hypertension in adults: a position paper from the Fleischner Society. Eur Respir J. 2021 Jan 5;57(1):2004455. doi: 10.1183/13993003.04455-2020. PMID: 33402372.

Remy-Jardin M, **Ryerson CJ**, Schiebler ML, Leung ANC, Wild JM, Hoeper MM, Alderson PO, Goodman LR, Mayo J, Haramati LB, Ohno Y, Thistlethwaite P, van Beek EJR, Knight SL, Lynch DA, Rubin GD, Humbert M. Imaging of Pulmonary Hypertension in Adults: A Position Paper from the Fleischner Society. Radiology. 2021 Mar;298(3):531-549. doi: 10.1148/radiol.2020203108. Epub 2021 Jan 5. PMID: 33399507.

Rice MB, Henderson SB, Lambert AA, Cromar KR, Hall JA, Cascio WE, Smith PG, Marsh BJ, Coefield S, Balmes JR, Kamal A, Gilmour MI, **Carlsten C**, Navarro KM, Collman GW, Rappold A, Miller MD, Stone SL, Costa DL. Respiratory Impacts of Wildland Fire Smoke: Future Challenges and Policy Opportunities. An Official American Thoracic Society Workshop Report. Ann Am Thorac Soc. 2021 Jun;18(6):921-930. doi: 10.1513/AnnalsATS.202102-148ST. PMID: 33938390; PMCID: PMC8456726.



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Publications by HLI PIs in 2021

Roifman I, Arora RC, Bewick D, Chow CM, Clarke B, Cowan S, Ducharme A, Gin K, Graham M, Gupta A, Hardiman S, Hartleib M, Jackson S, Jassal D, Kazmi M, Lamarche Y, Légaré JF, Leong-Poi H, Mansour S, Marelli A, Ruel M, Small G, Sterns L, Turgeon R, Virani S, Wijeysundera HC, Wong K, Wood DA, Zieroth S, Singh G, **Krahn AD**. Cardiovascular Care Delivery During the Second Wave of COVID-19 in Canada. Can J Cardiol. 2021 May;37(5):790-793. doi: 10.1016/j.cjca.2020.11.016. Epub 2020 Dec 9. PMID: 33307163; PMCID: PMC7836859.

Roston TM, Grewal J, **Krahn AD**. Pregnancy in catecholaminergic polymorphic ventricular tachycardia: therapeutic optimization and multidisciplinary care are key to success. Herzschrittmacherther Elektrophysiol. 2021 Jun;32(2):199-206. English. doi: 10.1007/s00399-021-00755-6. Epub 2021 Apr 21. PMID: 33881608.

Roston TM, Kallas D, Davies B, Franciosi S, De Souza AM, **Laksman ZW**, Sanatani S, **Krahn AD**. Burst Exercise Testing Can Unmask Arrhythmias in Patients With Incompletely Penetrant Catecholaminergic Polymorphic Ventricular Tachycardia. JACC Clin Electrophysiol. 2021 Apr;7(4):437-441. doi: 10.1016/j.jacep.2021.02.013. PMID: 33888264.

Roy G, Couture P, Genest J, Ruel I, Baass A, Bergeron J, Brisson D, **Brunham LR**, Cermakova L, Gaudet D, Khoury E, Laflamme N, Kennedy BA, Hegele RA, Drouin-Chartier JP. Influence of the LDL-Receptor Genotype on Statin Response in Heterozygous Familial Hypercholesterolemia: Insights From the Canadian FH Registry. Can J Cardiol. 2021 Nov 11:S0828-282X(21)00822-9. doi: 10.1016/j.cjca.2021.10.013. Epub ahead of print. PMID: 34774719.

Russell JA, Gordon AC, Williams MD, **Boyd JH**, **Walley KR**, Kissoon N. Vasopressor Therapy in the Intensive Care Unit. Semin Respir Crit Care Med. 2021 Feb;42(1):59-77. doi: 10.1055/s-0040-1710320. Epub 2020 Aug 20. PMID: 32820475.

Ryerson CJ, Corte TJ, Myers JL, Walsh SLF, Guler SA. A contemporary practical approach to the multidisciplinary management of unclassifiable interstitial lung disease. Eur Respir J. 2021 Dec 16;58(6):2100276. doi: 10.1183/13993003.00276-2021. PMID: 34140296; PMCID: PMC8674517.

Ryerson CJ. POINT: Should Surgical Lung Biopsy Still Be Performed for Interstitial Lung Disease Evaluation? Yes. Chest. 2021 Dec;160(6):2007-2011. doi: 10.1016/j.chest.2021.06.060. PMID: 34872665.

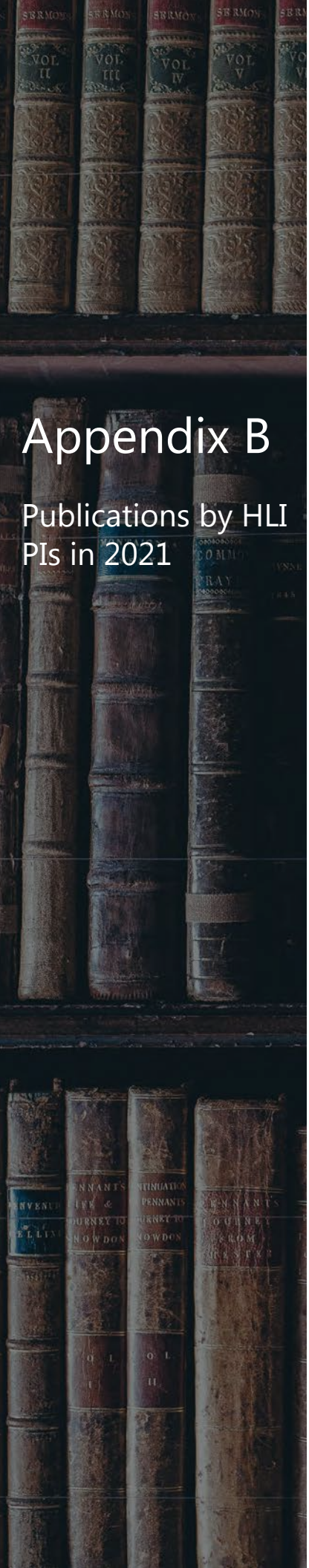
Ryerson CJ. Rebuttal From Dr Ryerson. Chest. 2021 Dec;160(6):2014-2015. doi: 10.1016/j.chest.2021.06.062. PMID: 34872667.

Ryzhaya N, Cermakova L, Trinder M, Ruel I, Coutinho T, Genest J, **Brunham LR**. Sex Differences in the Presentation, Treatment, and Outcome of Patients With Familial Hypercholesterolemia. J Am Heart Assoc. 2021 Jun;10(11):e019286. doi: 10.1161/JAHA.120.019286. Epub 2021 May 25. PMID: 34032141; PMCID: PMC8483526.

Sadatsafavi M, Adibi A, Puhan M, Gershon A, Aaron SD, **Sin DD**. Moving beyond AUC: decision curve analysis for quantifying net benefit of risk prediction models. Eur Respir J. 2021 Nov 4;58(5):2101186. doi: 10.1183/13993003.01186-2021. PMID: 34503984.

Sadatsafavi M, McCormack J, Petkau J, Lynd LD, Lee TY, **Sin DD**. Should the number of acute exacerbations in the previous year be used to guide treatments in COPD? Eur Respir J. 2021 Feb 11;57(2):2002122. doi: 10.1183/13993003.02122-2020. PMID: 32855228; PMCID: PMC7876420.

Safabakhsh S, **Krahn AD**, **Laksman Z**. Exercise Testing With Flecainide Demonstrates Provocable Brugada Syndrome. CJC Open. 2021 Apr 9;3(8):1079-1081. doi: 10.1016/j.cjco.2021.04.001. PMID: 34505047; PMCID: PMC8413235.



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Publications by HLI PIs in 2021

Safabakhsh S, Panwar P, Barichello S, Sangha SS, Hanson PJ, Van Petegem F, **Laksman Z**. THE ROLE OF PHOSPHORYLATION IN ATRIAL FIBRILLATION: A FOCUS ON MASS SPECTROMETRY APPROACHES. Cardiovasc Res. 2021 Mar 21:cvab095. doi: 10.1093/cvr/cvab095. Epub ahead of print. PMID: 33744917.

Saleh D, Fisher JH, Provencher S, Liang Z, **Ryerson CJ**, Weatherald J. A Systematic Evaluation of Quality, Accuracy, and Reliability of Internet Websites about Pulmonary Arterial Hypertension. Ann Am Thorac Soc. 2021 Nov 23. doi: 10.1513/AnnalsATS.202103-325OC. Epub ahead of print. PMID: 34813417.

Salimian S, Deyell MW, Andrade JG, Chakrabarti S, Bennett MT, **Krahn AD**, Hawkins NM. Heart failure treatment in patients with cardiac implantable electronic devices: Opportunity for improvement. Heart Rhythm O2. 2021 Dec 17;2(6Part B):698-709. doi: 10.1016/j.hroo.2021.09.010. PMID: 34988519; PMCID: PMC8710628.

Schaeffer MR, **Guenette JA**, Jensen D. Impact of ageing and pregnancy on the minute ventilation/carbon dioxide production response to exercise. Eur Respir Rev. 2021 Jul 20;30(161):200225. doi: 10.1183/16000617.0225-2020. PMID: 34289982.

Schaeffer MR, McBride E, Mitchell RA, Boyle KG, Ramsook AH, Puyat JH, Macnutt MJ, **Guenette JA**. Effects of the Turbine™ on Ventilatory and Sensory Responses to Incremental Cycling. Med Sci Sports Exerc. 2021 Jan;53(1):192-199. doi: 10.1249/MSS.0000000000002427. PMID: 32520874.

Schlegel M, Sharma M, Brown EJ, Newman AAC, Cyr Y, Afonso MS, Corr EM, **Koelwyn GJ**, van Solingen C, Guzman J, Farhat R, Nikain CA, Shanley LC, Peled D, Schmidt AM, Fisher EA, Moore KJ. Silencing Myeloid Netrin-1 Induces Inflammation Resolution and Plaque Regression. Circ Res. 2021 Aug 20;129(5):530-546. doi: 10.1161/CIRCRESAHA.121.319313. Epub 2021 Jul 22. PMID: 34289717; PMCID: PMC8529357.

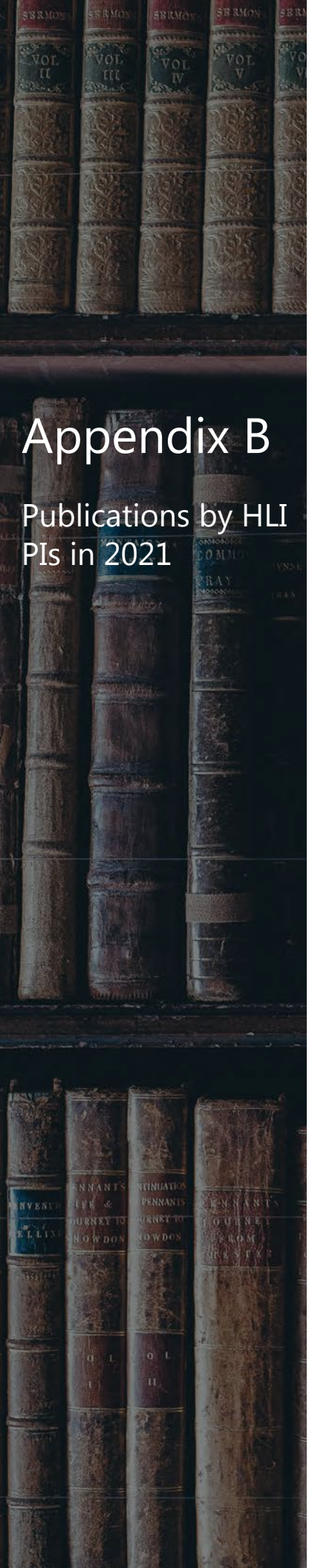
Sellers SL, Gulsin GS, Zaminski D, Bing R, Latib A, Sathananthan J, Pibarot P, Bouchareb R. Platelets: Implications in Aortic Valve Stenosis and Bioprosthetic Valve Dysfunction From Pathophysiology to Clinical Care. JACC Basic Transl Sci. 2021 Nov 17;6(12):1007-1020. doi: 10.1016/j.jacbts.2021.07.008. PMID: 35024507; PMCID: PMC8733745.

Serruys PW, Hara H, Garg S, Kawashima H, Nørgaard BL, Dweck MR, Bax JJ, Knuuti J, Nieman K, **Leipsic JA**, Mushtaq S, Andreini D, Onuma Y. Coronary Computed Tomographic Angiography for Complete Assessment of Coronary Artery Disease: JACC State-of-the-Art Review. J Am Coll Cardiol. 2021 Aug 17;78(7):713-736. doi: 10.1016/j.jacc.2021.06.019. PMID: 34384554.

Shah AS, Ryu MH, Hague CJ, Murphy DT, Johnston JC, **Ryerson CJ**, **Carlsten C**, Wong AW. Changes in pulmonary function and patient-reported outcomes during COVID-19 recovery: a longitudinal, prospective cohort study. ERJ Open Res. 2021 Sep 13;7(3):00243-2021. doi: 10.1183/23120541.00243-2021. PMID: 34522693; PMCID: PMC8310958.

Shah AS, Wong AW, Hague CJ, Murphy DT, Johnston JC, **Ryerson CJ**, **Carlsten C**. A prospective study of 12-week respiratory outcomes in COVID-19-related hospitalisations. Thorax. 2021 Apr;76(4):402-404. doi: 10.1136/thoraxjnl-2020-216308. Epub 2020 Dec 3. PMID: 33273023; PMCID: PMC7716339.

Shahangian K, Ngan DA, Chen HHR, Oh Y, Tam A, Wen J, Cheung C, Knight DA, **Dorscheid DR**, **Hackett TL**, Hughes MR, **McNagny KM**, Hirota JA, Niikura M, **Man SFP**, **Sin DD**. IL-4Rα blockade reduces influenza-associated morbidity in a murine model of allergic asthma. Respir Res. 2021 Mar 2;22(1):75. doi: 10.1186/s12931-021-01669-0. PMID: 33653328; PMCID: PMC7922715.



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Publications by HLI PIs in 2021

Sheldon R, Faris P, Tang A, Ayala-Paredes F, Guzman J, Marquez M, Morillo CA, **Krahn AD**, Kus T, Ritchie D, Safdar S, Maxey C, Raj SR; POST 4 investigators. Midodrine for the Prevention of Vasovagal Syncope : A Randomized Clinical Trial. Ann Intern Med. 2021 Oct;174(10):1349-1356. doi: 10.7326/M20-5415. Epub 2021 Aug 3. PMID: 34339231.

Shin SB, **McNagny KM**. ILC-You in the Thymus: A Fresh Look at Innate Lymphoid Cell Development. Front Immunol. 2021 May 6;12:681110. doi: 10.3389/fimmu.2021.681110. PMID: 34025680; PMCID: PMC8136430.

Sidsworth DA, **Sellers SL**, Reutens-Hernandez JP, Dunn EA, Gray SL, Payne GW. Impact of sex on microvascular reactivity in a murine model of diet-induced obesity and insulin resistance. Heliyon. 2021 Feb 12;7(2):e06217. doi: 10.1016/j.heliyon.2021.e06217. PMID: 33644477; PMCID: PMC7895723.

Smith KA, **Thamboo A**, Chan Y, Chin CJ, Werger M, Rotenberg B. Virtual Care in Rhinology. J Otolaryngol Head Neck Surg. 2021 Apr 13;50(1):24. doi: 10.1186/s40463-021-00505-1. PMID: 33849641; PMCID: PMC8042468.

Smolen KK, Plotkin AL, Shannon CP, Idoko OT, Pak J, Darboe A, van Haren S, Amenyogbe N, **Tebbutt SJ**, Kollmann TR, Kampmann B, Ozonoff A, Levy O, Odumade OA; EPIC Consortium. Ontogeny of plasma cytokine and chemokine concentrations across the first week of human life. Cytokine. 2021 Dec;148:155704. doi: 10.1016/j.cyto.2021.155704. Epub 2021 Sep 28. PMID: 34597920; PMCID: PMC8665647.

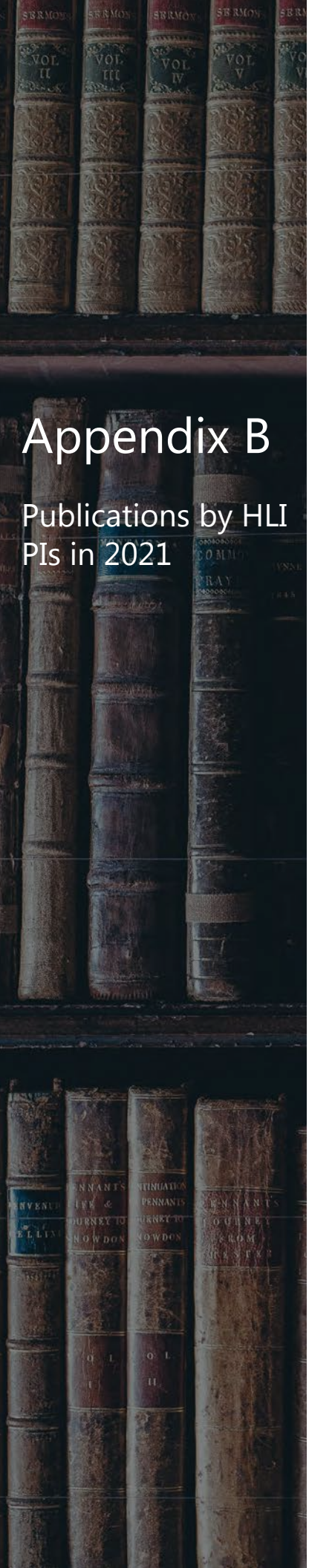
Spagnolo P, Distler O, **Ryerson CJ**, Tzouvelekis A, Lee JS, Bonella F, Bouros D, Hoffmann-Vold AM, Crestani B, Matteson EL. Mechanisms of progressive fibrosis in connective tissue disease (CTD)-associated interstitial lung diseases (ILDs). Ann Rheum Dis. 2021 Feb;80(2):143-150. doi: 10.1136/annrheumdis-2020-217230. Epub 2020 Oct 9. PMID: 33037004; PMCID: PMC7815631.

Spagnolo P, Kropski JA, Jones MG, Lee JS, Rossi G, Karampitsakos T, Maher TM, Tzouvelekis A, **Ryerson CJ**. Idiopathic pulmonary fibrosis: Disease mechanisms and drug development. Pharmacol Ther. 2021 Jun;222:107798. doi: 10.1016/j.pharmthera.2020.107798. Epub 2020 Dec 24. PMID: 33359599; PMCID: PMC8142468.

Spagnolo P, **Ryerson CJ**, Putman R, Oldham J, Salisbury M, Sverzellati N, Valenzuela C, Guler S, Jones S, Wijsenbeek M, Cottin V. Early diagnosis of fibrotic interstitial lung disease: challenges and opportunities. Lancet Respir Med. 2021 Sep;9(9):1065-1076. doi: 10.1016/S2213-2600(21)00017-5. Epub 2021 Jul 28. PMID: 34331867.

Squier K, Scott A, Hunt MA, **Brunham LR**, Wilson DR, Screen H, Waugh CM. The effects of cholesterol accumulation on Achilles tendon biomechanics: A cross- sectional study. PLoS One. 2021 Sep 16;16(9):e0257269. doi: 10.1371/journal.pone.0257269. PMID: 34529718; PMCID: PMC8445482

Steinberg C, Davies B, Mellor G, Tadros R, **Laksman ZW**, Roberts JD, Green M, Alqarawi W, Angaran P, Healey J, Sanatani S, Leather R, Seifer C, Fournier A, Duff H, Gardner M, McIntyre C, Hamilton R, Simpson CS, **Krahn AD**. Short-coupled ventricular fibrillation represents a distinct phenotype among latent causes of unexplained cardiac arrest: a report from the CASPER registry. Eur Heart J. 2021 Jul 31;42(29):2827-2838. doi: 10.1093/eurheartj/ehab275. PMID: 34010395.



Appendix B

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Steinberg C, Dognin N, Sodhi A, Champagne C, Staples JA, Champagne J, **Laksman Z**, Sarrazin JF, Bennett M, Plourde B, Deyell MW, Andrade JG, Roy K, Yeung-Lai- Wah JA, Hawkins NM, Mondésert B, Blier L, Nault I, O'Hara G, **Krahn AD**, Philippon F, Chakrabarti S. Driving Restrictions and Early Arrhythmias in Patients Receiving a Secondary Prevention Implantable Cardioverter-Defibrillator (DREAM-ICD-II study). Circulation. 2021 Dec 16. doi: 10.1161/CIRCULATIONAHA.121.056471. Epub ahead of print. PMID: 34913361.

Steinberg C, **Krahn AD**. Quinidine vs. ICD therapy in short-coupled ventricular fibrillation-is a randomized trial the next logical step? Eur Heart J. 2021 Oct 7;42(38):3993-3994. doi: 10.1093/eurheartj/ehab614. PMID: 34480551.

Steinberg C, Pilote S, Philippon F, **Laksman ZW**, Champagne J, Simard C, **Krahn AD**, Drolet B. SCN5A-C683R exhibits combined gain-of-function and loss-of- function properties related to adrenaline-triggered ventricular arrhythmia. Exp Physiol. 2021 Mar;106(3):683-699. doi: 10.1113/EP089088. Epub 2021 Feb 5. PMID: 33480457.

Stephenson AL, Ramos KJ, Sykes J, Ma X, Stanojevic S, **Quon BS**, Marshall BC, Petren K, Ostrenga JS, Fink AK, Faro A, Elbert A, Chaparro C, Goss CH. Bridging the survival gap in cystic fibrosis: An investigation of lung transplant outcomes in Canada and the United States. J Heart Lung Transplant. 2021 Mar;40(3):201-209. doi: 10.1016/j.healun.2020.12.001. Epub 2020 Dec 7. PMID: 33386232; PMCID: PMC7925420.

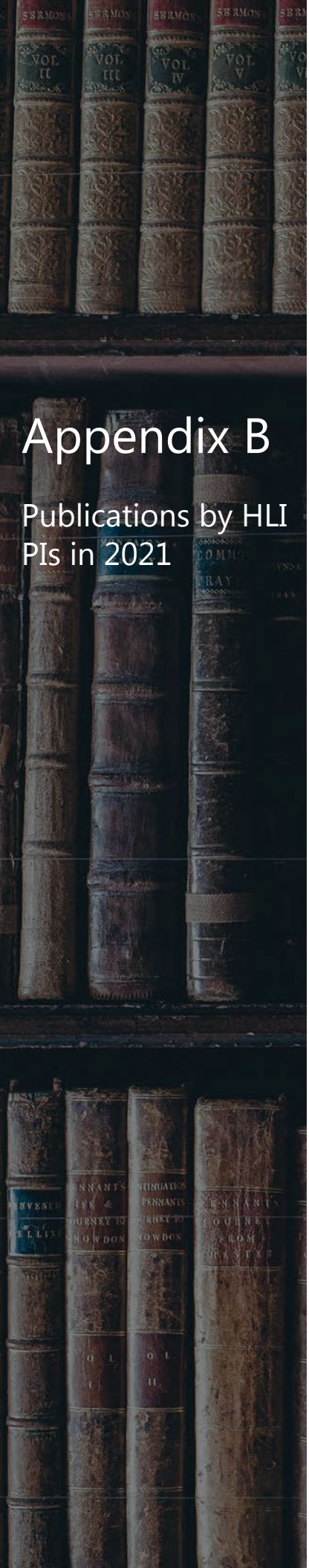
Stiles MK, Wilde AAM, Abrams DJ, Ackerman MJ, Albert CM, Behr ER, Chugh SS, Cornel MC, Gardner K, Ingles J, James CA, Jimmy Juang JM, Kääb S, Kaufman ES, **Krahn AD**, Lubitz SA, MacLeod H, Morillo CA, Nademanee K, Probst V, Saarel EV, Sacilotto L, Semsarian C, Sheppard MN, Shimizu W, Skinner JR, Tfelt-Hansen J, Wang DW. 2020 APHRS/HRS expert consensus statement on the investigation of decedents with sudden unexplained death and patients with sudden cardiac arrest, and of their families. Heart Rhythm. 2021 Jan;18(1):e1-e50. doi: 10.1016/j.hrthm.2020.10.010. Epub 2020 Oct 19. PMID: 33091602; PMCID: PMC8194370.

Stiles MK, Wilde AAM, Abrams DJ, Ackerman MJ, Albert CM, Behr ER, Chugh SS, Cornel MC, Gardner K, Ingles J, James CA, Juang JJ, Kääb S, Kaufman ES, **Krahn AD**, Lubitz SA, MacLeod H, Morillo CA, Nademanee K, Probst V, Saarel EV, Sacilotto L, Semsarian C, Sheppard MN, Shimizu W, Skinner JR, Tfelt-Hansen J, Wang DW. 2020 APHRS/HRS expert consensus statement on the investigation of decedents with sudden unexplained death and patients with sudden cardiac arrest, and of their families. J Arrhythm. 2021 Apr 8;37(3):481-534. doi: 10.1002/joa3.12449. PMID: 34141003; PMCID: PMC8207384.

Suehs CM, Menzies-Gow A, Price D, Bleecker ER, Canonica GW, Gurnell M, Bourdin A; Oral Corticosteroids Tapering Delphi Expert Panel. Expert Consensus on the Tapering of Oral Corticosteroids for the Treatment of Asthma. A Delphi Study. Am J Respir Crit Care Med. 2021 Apr 1;203(7):871-881. doi: 10.1164/rccm.202007-2721OC. PMID: 33112646. D Dorscheid is a member of the Oral Corticosteroids Tapering Delphi Expert Panel.

Sverzellati N, **Ryerson CJ**, Milanese G, Renzoni EA, Volpi A, Spagnolo P, Bonella F, Comelli I, Affanni P, Veronesi L, Manna C, Ciuni A, Sartorio C, Tringali G, Silva M, Michieletti E, Colombi D, Wells AU. Chest radiography or computed tomography for COVID-19 pneumonia? Comparative study in a simulated triage setting. Eur Respir J. 2021 Sep 9;58(3):2004188. doi: 10.1183/13993003.04188-2020. PMID: 33574070; PMCID: PMC7877328.

Syed N, Ryu MH, Dhillon S, Schaeffer MR, Ramsook AH, **Leung JM**, **Ryerson CJ**, **Carlsten C**, **Guenette JA**; Canadian Respiratory Research Network. Effects of Traffic-Related Air Pollution on Exercise Endurance, Dyspnea, and Cardiorespiratory Physiologic Features in Health and COPD: A Randomized, Placebo-Controlled Crossover Trial. Chest. 2021 Oct 23:S0012-3692(21)04207-0. doi: 10.1016/j.chest.2021.10.020. Epub ahead of print. PMID: 34699772.



Appendix B

Publications by HLI PIs in 2021

Symvoulakis EK, Kamekis A, Drakonaki E, Mastrodemou S, **Ryerson CJ**, Antoniou K. Frailty and chronic respiratory disease: the need for a multidisciplinary care model. Sarcoidosis Vasc Diffuse Lung Dis. 2021;38(3):e2021031. doi: 10.36141/svdld.v38i3.11599. Epub 2021 Sep 30. PMID: 34744425; PMCID: PMC8552571.

Takagi H, **Leipsic JA**, Indraratna P, Gulsin G, Khasanova E, Tzimas G, Lin FY, Shaw LJ, Lee SE, Andreini D, Al-Mallah MH, Budoff MJ, Cademartiri F, Chinnaiyan K, Choi JH, Conte E, Marques H, de Araújo Gonçalves P, Gottlieb I, Hadamitzky M, Maffei E, Pontone G, Shin S, Kim YJ, Lee BK, Chun EJ, Sung JM, Virmani R, Samady H, Stone PH, Berman DS, Narula J, Bax JJ, Chang HJ. Association of Tube Voltage With Plaque Composition on Coronary CT Angiography: Results From PARADIGM Registry. JACC Cardiovasc Imaging. 2021 Dec;14(12):2429-2440. doi: 10.1016/j.jcmg.2021.07.011. Epub 2021 Aug 18. PMID: 34419398.

Takagi H, **Leipsic JA**, McNamara N, Martin I, Fairbairn TA, Akasaka T, Nørgaard BL, Berman DS, Chinnaiyan K, Hurwitz-Koweek LM, Pontone G, Kawasaki T, Rønnow Sand NP, Jensen JM, Amano T, Poon M, Øvrehus KA, Sonck J, Rabbat MG, Mullen S, De Bruyne B, Rogers C, Matsuo H, Bax JJ, Douglas PS, Patel MR, Nieman K, Ihdayhid AR. Trans-lesional fractional flow reserve gradient as derived from coronary CT improves patient management: ADVANCE registry. J Cardiovasc Comput Tomogr. 2022 Jan-Feb;16(1):19-26. doi: 10.1016/j.jcct.2021.08.003. Epub 2021 Sep 2. PMID: 34518113.

Takahashi N, Nakada TA, **Walley KR**, **Russell JA**. Significance of lactate clearance in septic shock patients with high bilirubin levels. Sci Rep. 2021 Mar 18;11(1):6313. doi: 10.1038/s41598-021-85700-w. PMID: 33737668; PMCID: PMC7973422.

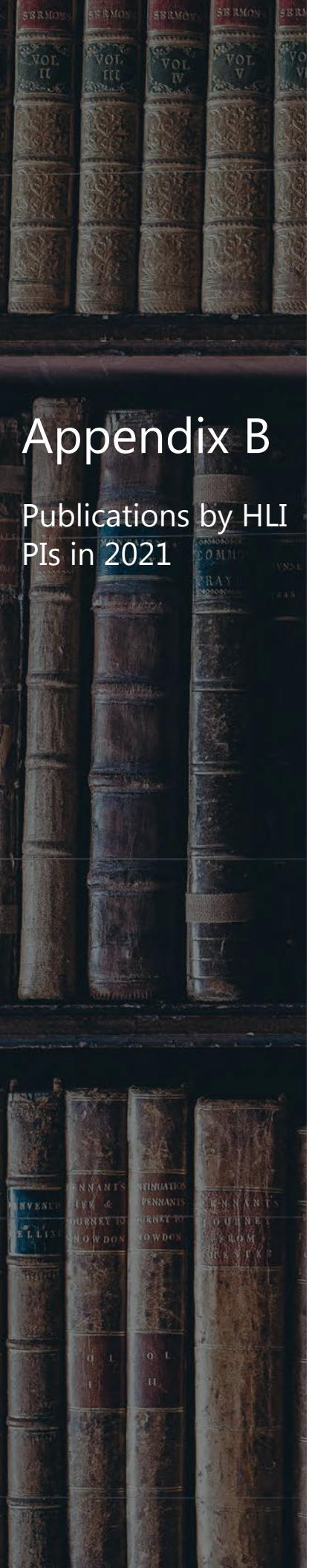
Takiguchi H, Yang CX, Yang CWT, Sahin B, Whalen BA, Milne S, Akata K, Yamasaki K, Yang JSW, Cheung CY, Vander Werff R, **McNagny KM**, Leitao Filho FS, Shaipanich T, **van Eeden SF**, Obeidat M, **Leung JM**, **Sin DD**. Macrophages with reduced expressions of classical M1 and M2 surface markers in human bronchoalveolar lavage fluid exhibit pro-inflammatory gene signatures. Sci Rep. 2021 Apr 15;11(1):8282. doi: 10.1038/s41598-021-87720-y. PMID: 33859282; PMCID: PMC8050093.

Tam A, Leclair P, Li LV, Yang CX, Li X, Witzigmann D, Kulkarni JA, **Hackett TL**, **Dorscheid DR**, Singhera GK, **Hogg JC**, Cullis PR, **Sin DD**, Lim CJ. FAM13A as potential therapeutic target in modulating TGF-β-induced airway tissue remodeling in COPD. Am J Physiol Lung Cell Mol Physiol. 2021 Aug 1;321(2):L377-L391. doi: 10.1152/ajplung.00477.2020. Epub 2021 Jun 9. PMID: 34105356.

Tan WC, Bourbeau J, Nadeau G, Wang W, Barnes N, Landis SH, Kirby M, **Hogg JC**, **Sin DD**; CanCOLD Collaborative Research Group; authors would also like to thank the men and women who participated in the study and individuals in the CanCOLD Collaborative Research Group not listed as authors:. High eosinophil counts predict decline in FEV1: results from the CanCOLD study. Eur Respir J. 2021 May 27;57(5):2000838. doi: 10.1183/13993003.00838-2020. PMID: 33303555.

Tang GHL, Sengupta A, Alexis SL, Zaid S, **Leipsic JA**, Blanke P, Grubb KJ, Gada H, Yakubov SJ, Rogers T, Lerakis S, Khera S, Adams DH, Sharma SK, Kini A, Reardon MJ. Conventional versus modified delivery system technique in commissural alignment from the Evolut low-risk CT substudy. Catheter Cardiovasc Interv. 2021 Oct 9. doi: 10.1002/ccd.29973. Epub ahead of print. PMID: 34626449.

Tang JKK, Andrade JG, Hawkins NM, **Laksman ZW**, Krahn AD, Bennett MT, Heilbron B, Chakrabarti S, Yeung-Lai-Wah JA, Deyell MW. Effectiveness of medical therapy for treatment of idiopathic frequent premature ventricular complexes. J Cardiovasc Electrophysiol. 2021 Aug;32(8):2246-2253. doi: 10.1111/jce.15150. Epub 2021 Jul 7. PMID: 34216056.



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Tarakji KG, **Krahn AD**, Poole JE, Mittal S, Kennergren C, Biffi M, Korantzopoulos P, Dallaglio PD, Lexcen DR, Lande JD, Hilleren G, Holbrook R, Wilkoff BL. Risk Factors for CIED Infection After Secondary Procedures: Insights From the WRAP-IT Trial. JACC Clin Electrophysiol. 2021 Sep 18:S2405-500X(21)00766-0. doi: 10.1016/j.jacep.2021.08.009. Epub ahead of print. PMID: 34600848.

Tehrani AY, Ciufolini MA, **Bernatchez P**. Nitric oxide in the Marfan vasculature: Friend or foe? Nitric Oxide. 2021 Nov 1;116:27-34. doi: 10.1016/j.niox.2021.08.006. Epub 2021 Aug 31. PMID: 34478846.

Tehrani AY, White Z, Milad N, Esfandiarei M, Seidman MA, **Bernatchez P**. Blood pressure-independent inhibition of Marfan aortic root widening by the angiotensin II receptor blocker valsartan. Physiol Rep. 2021 May;9(10):e14877. doi: 10.14814/phy2.14877. PMID: 34042309; PMCID: PMC8157789.

Thamboo A, Kilty S, Witterick I, Chan Y, Chin CJ, Janjua A, Javer A, Lee J, Monterio E, Rotenberg B, Scott J, Smith K, Sommer DD, Sowerby L, Tewfik M, Wright E, Desrosiers M. Canadian Rhinology Working Group consensus statement: biologic therapies for chronic rhinosinusitis. J Otolaryngol Head Neck Surg. 2021 Mar 9;50(1):15. doi: 10.1186/s40463-021-00493-2. PMID: 33750471; PMCID: PMC7945300.

Thamboo A, Patel VS, Hwang PH. 5-year outcomes of salvage endoscopic nasopharyngectomy for recurrent nasopharyngeal carcinoma. J Otolaryngol Head Neck Surg. 2021 Feb 17;50(1):12. doi: 10.1186/s40463-020-00482-x. PMID: 33597031; PMCID: PMC7888158.

Thomson EM, Filiatreault A, Williams A, Rider CF, **Carlsten C**. Exposure to Diesel Exhaust and Plasma Cortisol Response: A Randomized Double-Blind Crossover Study. Environ Health Perspect. 2021 Mar;129(3):37701. doi: 10.1289/EHP8923. Epub 2021 Mar 26. PMID: 33769847; PMCID: PMC7997608.

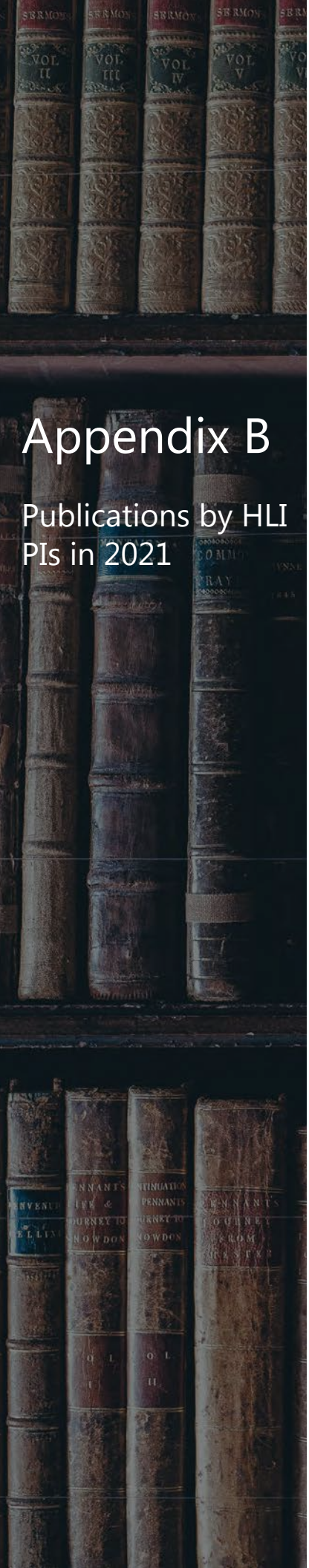
Trinder M, **Brunham LR**. Polygenic scores for dyslipidemia: the emerging genomic model of plasma lipoprotein trait inheritance. Curr Opin Lipidol. 2021 Apr 1;32(2):103-111. doi: 10.1097/MOL.0000000000000737. PMID: 33395106.

Trinder M, Vikulova D, Pimstone S, Mancini GBJ, **Brunham LR**. Polygenic architecture and cardiovascular risk of familial combined hyperlipidemia. Atherosclerosis. 2022 Jan;340:35-43. doi: 10.1016/j.atherosclerosis.2021.11.032. Epub 2021 Dec 6. PMID: 34906840.

Trinder M, Wang Y, Madsen CM, Ponomarev T, Bohunek L, Daisely BA, Julia Kong H, Blauw LL, Nordestgaard BG, Tybjærg-Hansen A, Wurfel MM, **Russell JA**, **Walley KR**, Rensen PCN, **Boyd JH**, **Brunham LR**. Inhibition of Cholesteryl Ester Transfer Protein Preserves High-Density Lipoprotein Cholesterol and Improves Survival in Sepsis. Circulation. 2021 Mar 2;143(9):921-934. doi: 10.1161/CIRCULATIONAHA.120.048568. Epub 2020 Nov 24. PMID: 33228395.

Tsai APY, Hur SA, Wong A, Safavi M, Assayag D, Johannson KA, Morisset J, Fell C, Fisher JH, Manganas H, Shapera S, Cox G, Gershon AS, Hambly N, Khalil N, To T, Wilcox PG, Halayko A, Kolb MR, **Ryerson CJ**. Minimum important difference of the EQ-5D-5L and EQ-VAS in fibrotic interstitial lung disease. Thorax. 2021 Jan;76(1):37-43. doi: 10.1136/thoraxjnl-2020-214944. Epub 2020 Oct 6. PMID: 33023996.

Tsutsui M, Cheung CY, Wada T, Jaw JE, Yang CWT, **Bernatchez P**, White Z, Yang CX, Bae EJA, Choi LH, Gelbart D, Lichtenstein S, Machan L, Elizur E, Wolff K, Goodacre E, Lipnicki M, Wong D, **Sin DD**. Radiofrequency therapy improves exercise capacity of mice with emphysema. Sci Rep. 2021 Oct 8;11(1):20056. doi: 10.1038/s41598-021-99474-8. PMID: 34625605; PMCID: PMC8501094.



Appendix B

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Tsutsui M, Gerayeli F, **Sin DD**. Pulmonary Rehabilitation in a Post-COVID-19 World: Telerehabilitation as a New Standard in Patients with COPD. Int J Chron Obstruct Pulmon Dis. 2021 Feb 19;16:379-391. doi: 10.2147/COPD.S263031. PMID: 33642858; PMCID: PMC7903963.

Turner CT, Bolsoni J, Zeglinski MR, Zhao H, Ponomarev T, Richardson K, Hiroyasu S, Schmid E, Papp A, **Granville DJ**. Granzyme B mediates impaired healing of pressure injuries in aged skin. NPJ Aging Mech Dis. 2021 Mar 5;7(1):6. doi: 10.1038/s41514-021-00059-6. PMID: 33674592; PMCID: PMC7935969.

Turner CT, Zeglinski MR, Richardson KC, Santacruz S, Hiroyasu S, Wang C, Zhao H, Shen Y, Sehmi R, Lima H, Gauvreau GM, **Granville DJ**. Granzyme B Contributes to Barrier Dysfunction in Oxazolone-Induced Skin Inflammation through E-Cadherin and FLG Cleavage. J Invest Dermatol. 2021 Jan;141(1):36-47. doi: 10.1016/j.jid.2020.05.095. Epub 2020 Jun 3. PMID: 32504614.

Usman K, Hsieh A, **Hackett TL**. The Role of miRNAs in Extracellular Matrix Repair and Chronic Fibrotic Lung Diseases. Cells. 2021 Jul 6;10(7):1706. doi: 10.3390/cells10071706. PMID: 34359876; PMCID: PMC8304879.

Valanarasu JMJ, Sindagi VA, **Hacihaliloglu I**, Patel VM. KiU-Net: Overcomplete Convolutional Architectures for Biomedical Image and Volumetric Segmentation. IEEE Trans Med Imaging. 2021 Nov 23;PP. doi: 10.1109/TMI.2021.3130469. Epub ahead of print. PMID: 34813472.

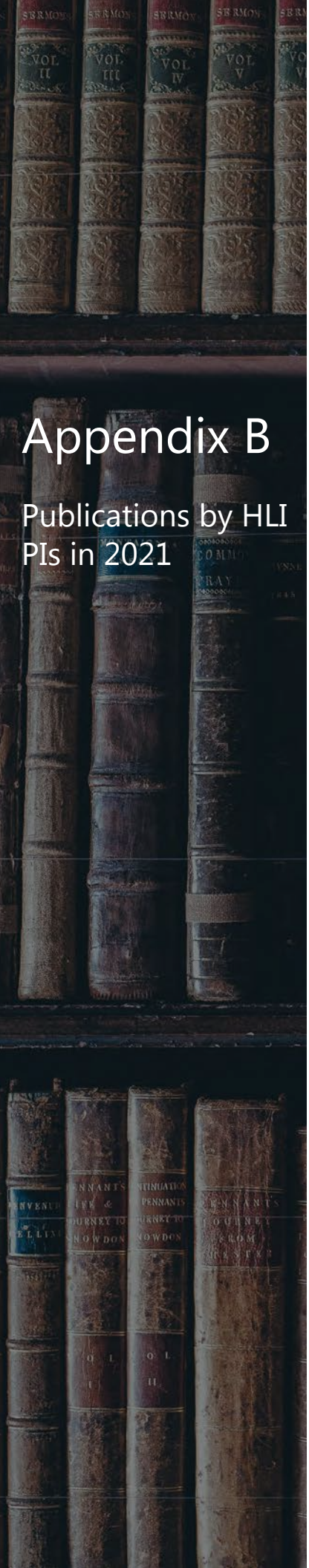
Valette K, Li Z, Bon-Baret V, Chignon A, Bérubé JC, Eslami A, Lamothe J, Gaudreault N, Joubert P, Obeidat M, van den Berge M, Timens W, **Sin DD**, Nickle DC, Hao K, Labbé C, Godbout K, Côté A, Laviolette M, Boulet LP, Mathieu P, Thériault S, Bossé Y. Prioritization of candidate causal genes for asthma in susceptibility loci derived from UK Biobank. Commun Biol. 2021 Jun 8;4(1):700. doi: 10.1038/s42003-021-02227-6. PMID: 34103634; PMCID: PMC8187656.

Vameghestahbanati M, Kirby M, Maltais F, Jensen D, Doiron D, **Tan WC**, Bourbeau J, Smith BM; CanCOLD Investigators. Dysanapsis and the Spirometric Response to Inhaled Bronchodilators. Am J Respir Crit Care Med. 2021 Oct 15;204(8):997-1001. doi: 10.1164/rccm.202107-1574LE. PMID: 34265233; PMCID: PMC8534630.

Vameghestahbanati M, Kirby M, Tanabe N, Vasilescu DM, Janssens W, Everaerts S, Vanaudenaerde BM, Benedetti A, **Hogg JC**, Smith BM. Central Airway Tree Dysanapsis Extends to the Peripheral Airways. Am J Respir Crit Care Med. 2021 Feb 1;203(3):378-381. doi: 10.1164/rccm.202007-3025LE. PMID: 33137261; PMCID: PMC7874305.

van Diemen PA, Bom MJ, Driessen RS, Schumacher SP, Everaars H, de Winter RW, van de Ven PM, Freiman M, Goshen L, Heijtel D, Langzam E, Min JK, **Leipsic JA**, Raijmakers PG, van Rossum AC, Danad I, Knaapen P. Prognostic Value of RCA Pericoronary Adipose Tissue CT-Attenuation Beyond High-Risk Plaques, Plaque Volume, and Ischemia. JACC Cardiovasc Imaging. 2021 Aug;14(8):1598-1610. doi: 10.1016/j.jcmg.2021.02.026. Epub 2021 May 3. PMID: 33958312.

van Eeden SF. Letter from Canada: A pandemic that has humbled us? Respirology. 2021 May;26(5):513-514. doi: 10.1111/resp.14027. Epub 2021 Mar 1. PMID: 33650194; PMCID: PMC8014742.



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van Rosendael AR, van den Hoogen IJ, Gianni U, Ma X, Tantawy SW, Bax AM, Lu Y, Andreini D, Al-Mallah MH, Budoff MJ, Cademartiri F, Chinnaiyan K, Choi JH, Conte E, Marques H, de Araújo Gonçalves P, Gottlieb I, Hadamitzky M, **Leipsic JA**, Maffei E, Pontone G, Shin S, Kim YJ, Lee BK, Chun EJ, Sung JM, Lee SE, Virmani R, Samady H, Sato Y, Stone PH, Berman DS, Narula J, Blankstein R, Min JK, Lin FY, Shaw LJ, Bax JJ, Chang HJ. Association of Statin Treatment With Progression of Coronary Atherosclerotic Plaque Composition. JAMA Cardiol. 2021 Nov 1;6(11):1257-1266. doi: 10.1001/jamacardio.2021.3055. PMID: 34406326; PMCID: PMC8374741.

VARC-3 WRITING COMMITTEE, Généreux P, Piazza N, Alu MC, Nazif T, Hahn RT, Pibarot P, Bax JJ, **Leipsic JA**, Blanke P, Blackstone EH, Finn MT, Kapadia S, Linke A, Mack MJ, Makkar R, Mehran R, Popma JJ, Reardon M, Rodes-Cabau J, Van Mieghem NM, Webb JG, Cohen DJ, Leon MB. Valve Academic Research Consortium 3: updated endpoint definitions for aortic valve clinical research. Eur Heart J. 2021 May 14;42(19):1825-1857. doi: 10.1093/eurheartj/ehaa799. PMID: 33871579.

VARC-3 WRITING COMMITTEE:, Généreux P, Piazza N, Alu MC, Nazif T, Hahn RT, Pibarot P, Bax JJ, **Leipsic JA**, Blanke P, Blackstone EH, Finn MT, Kapadia S, Linke A, Mack MJ, Makkar R, Mehran R, Popma JJ, Reardon M, Rodes-Cabau J, Van Mieghem NM, Webb JG, Cohen DJ, Leon MB. Valve Academic Research Consortium 3: Updated Endpoint Definitions for Aortic Valve Clinical Research. J Am Coll Cardiol. 2021 Jun 1;77(21):2717-2746. doi: 10.1016/j.jacc.2021.02.038. Epub 2021 Apr 19. PMID: 33888385.

Verleden SE, Kirby M, Everaerts S, Vanstapel A, McDonough JE, Verbeken EK, Braubach P, Boone MN, Aslam D, Verschakelen J, Ceulemans LJ, Neyrinck AP, Van Raemdonck DE, Vos R, Decramer M, **Hackett TL**, **Hogg JC**, Janssens W, Verleden GM, Vanaudenaerde BM. Small airway loss in the physiologically ageing lung: a cross-sectional study in unused donor lungs. Lancet Respir Med. 2021 Feb;9(2):167-174. doi: 10.1016/S2213-2600(20)30324-6. Epub 2020 Oct 5. PMID: 33031747.

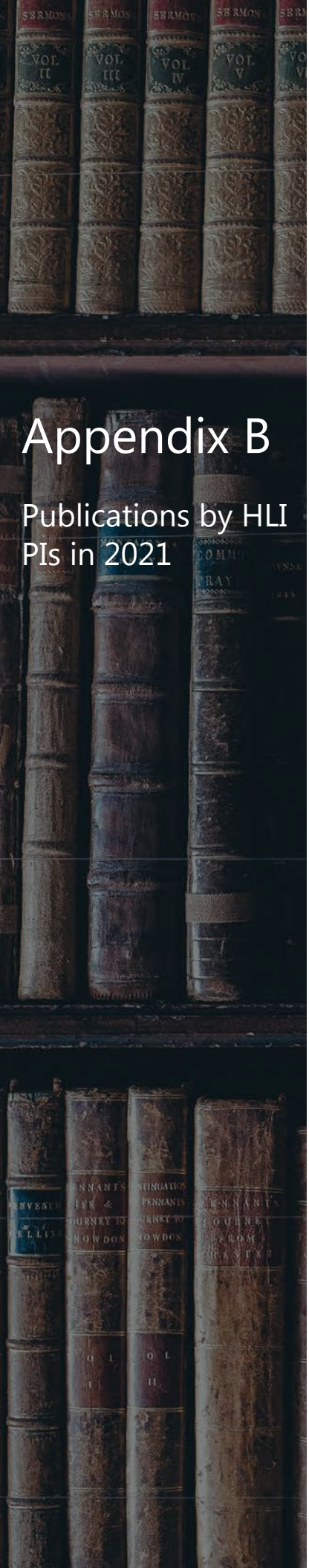
Vikulova DN, Trinder M, Mancini GBJ, Pimstone SN, **Brunham LR**. Familial Hypercholesterolemia, Familial Combined Hyperlipidemia, and Elevated Lipoprotein(a) in Patients With Premature Coronary Artery Disease. Can J Cardiol. 2021 Nov;37(11):1733-1742. doi: 10.1016/j.cjca.2021.08.012. Epub 2021 Aug 26. PMID: 34455025.

Villines TC, Al'Aref SJ, Andreini D, Chen MY, Choi AD, De Cecco CN, Dey D, Earls JP, Ferencik M, Gransar H, Hecht H, **Leipsic JA**, Lu MT, Marwan M, Maurovich-Horvat P, Nicol E, Pontone G, Weir-McCall J, Whelton SP, Williams MC, Arbab-Zadeh A, Feuchtner GM. The Journal of Cardiovascular Computed Tomography: 2020 Year in review. J Cardiovasc Comput Tomogr. 2021 Mar-Apr;15(2):180-189. doi: 10.1016/j.jcct.2021.02.004. Epub 2021 Feb 22. PMID: 33685845.

Virdee S, **Tan WC**, **Hogg JC**, Bourbeau J, Hague CJ, **Leipsic JA**, Kirby M. Spatial Dependence of CT Emphysema in Chronic Obstructive Pulmonary Disease Quantified by Using Join-Count Statistics. Radiology. 2021 Dec;301(3):702-709. doi: 10.1148/radiol.2021210198. Epub 2021 Sep 14. PMID: 34519575.

Wan D, Andrade J, **Laksman Z**. Thromboembolic risk stratification in atrial fibrillation-beyond clinical risk scores. Rev Cardiovasc Med. 2021 Jun 30;22(2):353-363. doi: 10.31083/j.rcm2202042. PMID: 34258903.

Wang L, Chitano P, **Seow CY**. Filament evanescence of myosin II and smooth muscle function. J Gen Physiol. 2021 Mar 1;153(3):e202012781. doi: 10.1085/jgp.202012781. PMID: 33606000; PMCID: PMC7901143.



Appendix B

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Wang Y, Gao H, Wang F, Ye Z, Mokry M, Turner AW, Ye J, Koplev S, Luo L, Alsaigh T, Adkar SS, Elishaev M, Gao X, Maegdefessel L, Björkegren JLM, Pasterkamp G, Miller CL, Ross EG, Leeper NJ. Dynamic changes in chromatin accessibility are associated with the atherogenic transitioning of vascular smooth muscle cells. Cardiovasc Res. 2021 Nov 24:cvab347. doi: 10.1093/cvr/cvab347. Epub ahead of print. PMID: 34849613.

Wen J, Milne S, **Sin DD**. Pulmonary rehabilitation in a postcoronavirus disease 2019 world: feasibility, challenges, and solutions. Curr Opin Pulm Med. 2021 Oct 21. doi: 10.1097/MCP.0000000000000832. Epub ahead of print. PMID: 34690256.

White Z, Milad N, **Sellers SL**, **Bernatchez P**. Effect of Dysferlin Deficiency on Atherosclerosis and Plasma Lipoprotein Composition Under Normal and Hyperlipidemic Conditions. Front Physiol. 2021 Jul 22;12:675322. doi: 10.3389/fphys.2021.675322. PMID: 34366880; PMCID: PMC8339577.

White Z, Theret M, Milad N, Tung LW, Chen WW, Sirois MG, Rossi F, **Bernatchez P**. Cholesterol absorption blocker ezetimibe prevents muscle wasting in severe dysferlin-deficient and mdx mice. J Cachexia Sarcopenia Muscle. 2021 Dec 19. doi: 10.1002/jcsm.12879. Epub ahead of print. PMID: 34927367.

Won KB, Heo R, Park HB, Lee BK, Lin FY, Hadamitzky M, Kim YJ, Sung JM, Conte E, Andreini D, Pontone G, Budoff MJ, Gottlieb I, Chun EJ, Cademartiri F, Maffei E, Marques H, de Araújo Gonçalves P, **Leipsic JA**, Lee SE, Shin S, Choi JH, Virmani R, Samady H, Chinnaiyan K, Berman DS, Narula J, Shaw LJ, Bax JJ, Min JK, Chang HJ. Atherogenic index of plasma and the risk of rapid progression of coronary atherosclerosis beyond traditional risk factors. Atherosclerosis. 2021 May;324:46-51. doi: 10.1016/j.atherosclerosis.2021.03.009. Epub 2021 Mar 13. PMID: 33813155.

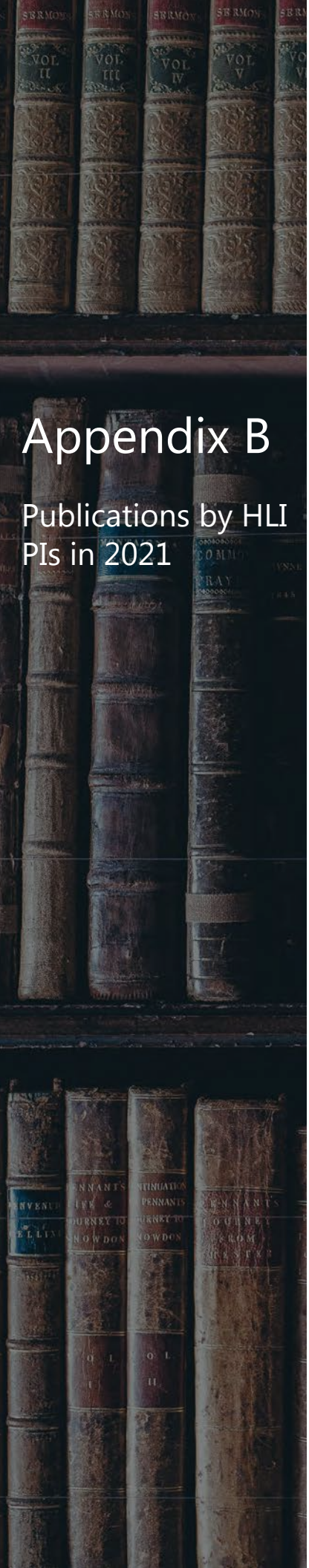
Wong AW, Khor YH, Donohoe K, Comes A, Marcoux V, Fisher JH, Johannson KA, Assayag D, Morisset J, Shapera S, Khalil N, Fell CD, Manganas H, Cox G, To T, Gershon AS, Hambly N, Halayko AJ, Sadatsafavi M, Wilcox PG, Kolb M, Richeldi L, **Ryerson CJ**. Prescribing Patterns and Tolerability of Mycophenolate and Azathioprine in Patients with Non-IPF Fibrotic Interstitial Lung Disease. Ann Am Thorac Soc. 2021 Dec 13. doi: 10.1513/AnnalsATS.202108-954RL. Epub ahead of print. PMID: 34898386.

Wong AW, López-Romero S, Figueroa-Hurtado E, Vazquez-Lopez S, Milne KM, **Ryerson CJ**, **Guenette JA**, Cortés-Telles A. Predictors of reduced 6-minute walk distance after COVID-19: a cohort study in Mexico. Pulmonology. 2021 Nov-Dec;27(6):563-565. doi: 10.1016/j.pulmoe.2021.03.004. Epub 2021 Mar 26. PMID: 33832849; PMCID: PMC7997705.

Xiang P, Mohamud Y, **Luo H**. SNAP47 Interacts with ATG14 to Promote VP1 Conjugation and CVB3 Propagation. Cells. 2021 Aug 20;10(8):2141. doi: 10.3390/cells10082141. PMID: 34440910; PMCID: PMC8394894.

Xu F, Tanabe N, Vasilescu DM, McDonough JE, Coxson HO, Ikezoe K, Kinose D, Ng KW, Verleden SE, Wuyts WA, Vanaudenaerde BM, Verschakelen J, Cooper JD, Lenburg ME, Morshead KB, Abbas AR, Arron JR, Spira A, **Hackett TL**, Colby TV, **Ryerson CJ**, **Ng RT**, **Hogg JC**. The transition from normal lung anatomy to minimal and established fibrosis in idiopathic pulmonary fibrosis (IPF). EBioMedicine. 2021 Apr;66:103325. doi: 10.1016/j.ebiom.2021.103325. Epub 2021 Apr 13. PMID: 33862585; PMCID: PMC8054143.

Xu F, Vasilescu DM, Kinose D, Tanabe N, Ng KW, Coxson HO, Cooper JD, **Hackett TL**, Verleden SE, Vanaudenaerde BM, Stevenson CS, Lenburg ME, Spira A, **Tan WC**, **Sin DD**, **Ng RT**, **Hogg JC**. The molecular and cellular mechanisms associated with the destruction of terminal bronchioles in chronic obstructive pulmonary disease. Eur Respir J. 2021 Oct 21:2101411. doi: 10.1183/13993003.01411-2021. Epub ahead of print. PMID: 34675046.



Appendix B

Publications by HLI PIs in 2021

Xu J, de Oliveira DM, Trudeau MA, Yang Y, Chin JJY, **Sin DD**, **Sandford AJ**, Wong JMY. Mild catalytic defects of tert rs61748181 polymorphism affect the clinical presentation of chronic obstructive pulmonary disease. Sci Rep. 2021 Feb 22;11(1):4333. doi: 10.1038/s41598-021-83686-z. PMID: 33619289; PMCID: PMC7900122.

Xue YC, Ng CS, Mohamud Y, Fung G, Liu H, Bahreyni A, Zhang J, **Luo H**. FUS/TLS Suppresses Enterovirus Replication and Promotes Antiviral Innate Immune Responses. J Virol. 2021 May 24;95(12):e00304-21. doi: 10.1128/JVI.00304-21. PMID: 33827951; PMCID: PMC8316056.

Yang C, Zhao H, **Tebbutt SJ**. Balancing the Risks and Benefits of COVID-19 Vaccination for Pregnant Women and Their Children. Front Immunol. 2021 Dec 16;12:748456. doi: 10.3389/fimmu.2021.748456. PMID: 34975839; PMCID: PMC8716367.

Yang C, Zhao H, **Tebbutt SJ**. Long-term effects on survivors with COVID-19. Lancet. 2021 Nov 20;398(10314):1872. doi: 10.1016/S0140-6736(21)02323-0. PMID: 34801103; PMCID: PMC8601683.

Yang CX, Schon E, Obeidat M, Kobor MS, McEwen L, MacIsaac J, Lin D, Novak RM, Hudson F, Klinker H, Dharan N, Horvath S, Bourbeau J, **Tan W**, **Sin DD**, **Man SFP**, Kunisaki K, **Leung JM**. Occurrence of Accelerated Epigenetic Aging and Methylation Disruptions in Human Immunodeficiency Virus Infection Before Antiretroviral Therapy. J Infect Dis. 2021 May 28;223(10):1681-1689. doi: 10.1093/infdis/jiaa599. PMID: 32959881; PMCID: PMC8161637.

Yang N, Singhera GK, Yan YX, Pieper MP, **Leung JM**, **Sin DD**, **Dorscheid DR**. Olodaterol exerts anti-inflammatory effects on COPD airway epithelial cells. Respir Res. 2021 Feb 23;22(1):65. doi: 10.1186/s12931-021-01659-2. PMID: 33622325; PMCID: PMC7901009.

Yip W, Hughes MR, Li Y, Cait A, Hirst M, Mohn WW, **McNagny KM**. Butyrate Shapes Immune Cell Fate and Function in Allergic Asthma. Front Immunol. 2021 Feb 15;12:628453. doi: 10.3389/fimmu.2021.628453. PMID: 33659009; PMCID: PMC7917140.

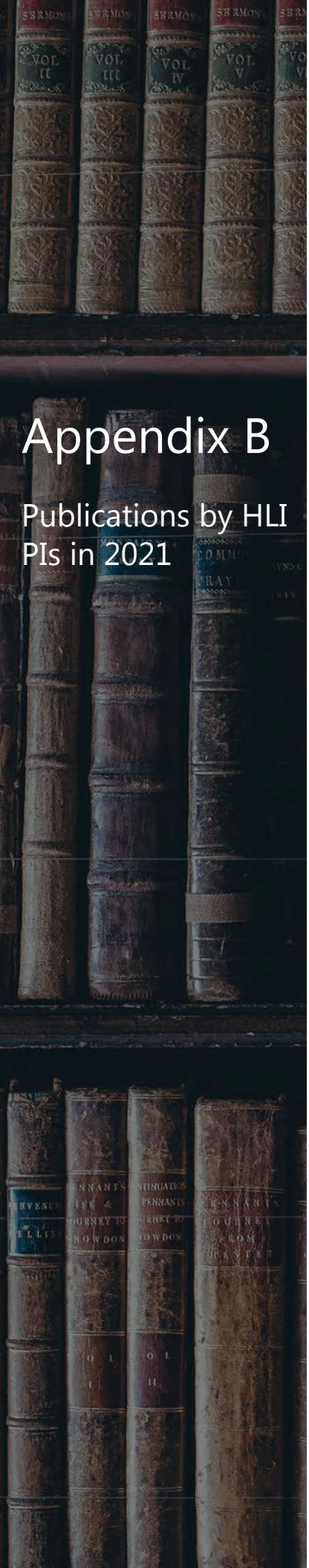
Yong M, Hernaiz-Leonardo JC, Alqunaee M, **Quon BS**, Javer A. The prevalence of CFTR mutations in patients with chronic rhinosinusitis: A systematic review and meta-analysis. Clin Otolaryngol. 2022 Jan;47(1):24-33. doi: 10.1111/coa.13875. Epub 2021 Oct 26. PMID: 34664411.

Yong M, Wu YQ, Howlett J, Ballreich J, Walgama E, **Thamboo A**. Cost-effectiveness analysis comparing dupilumab and aspirin desensitization therapy for chronic rhinosinusitis with nasal polyposis in aspirin-exacerbated respiratory disease. Int Forum Allergy Rhinol. 2021 Dec;11(12):1626-1636. doi: 10.1002/alr.22865. Epub 2021 Jul 26. PMID: 34309219.

Yong M, Wu YQ, Su S, Hanna E, Prisman E, **Thamboo A**, Walgama E. The effect of prior radiation on the success of ventral skull base reconstruction: A systematic review and meta-analysis. Head Neck. 2021 Sep;43(9):2795-2806. doi: 10.1002/hed.26709. Epub 2021 May 11. PMID: 33973680.

Yoon YE, Baskaran L, Lee BC, Pandey MK, Goebel B, Lee SE, Sung JM, Andreini D, Al-Mallah MH, Budoff MJ, Cademartiri F, Chinnaiyan K, Choi JH, Chun EJ, Conte E, Gottlieb I, Hadamitzky M, Kim YJ, Lee BK, **Leipsic JA**, Maffei E, Marques H, de Araújo Gonçalves P, Pontone G, Shin S, Narula J, Bax JJ, Lin FY, Shaw L, Chang HJ. Differential progression of coronary atherosclerosis according to plaque composition: a cluster analysis of PARADIGM registry data. Sci Rep. 2021 Aug 24;11(1):17121. doi: 10.1038/s41598-021-96616-w. PMID: 34429500; PMCID: PMC8385056.

Yucel-Finn A, Nicol E, **Leipsic JA**, Weir-McCall JR. CT in planning transcatheter aortic valve implantation procedures and risk assessment. Clin Radiol. 2021 Jan;76(1):73.e1-73.e19. doi: 10.1016/j.crad.2019.11.015. Epub 2019 Dec 26. PMID: 31883615.



Appendix B

Publications by HLI PIs in 2021

Zahradnik TM, Cresswell M, Squier K, Waugh C, **Brunham L**, Screen H, Scott A. Can Achilles tendon xanthoma be distinguished from Achilles tendinopathy using Dixon method MRI? A cross-sectional exploratory study. BMC Musculoskelet Disord. 2021 Jul 16;22(1):627. doi: 10.1186/s12891-021-04494-0. PMID: 34271888; PMCID: PMC8285885.

Zhang P, **Carlsten C**, Chaleckis R, Hanhineva K, Huang M, Isobe T, Koistinen VM, Meister I, Papazian S, Sdougkou K, Xie H, Martin JW, Rappaport SM, Tsugawa H, Walker DI, Woodruff TJ, Wright RO, Wheelock CE. Defining the Scope of Exposome Studies and Research Needs from a Multidisciplinary Perspective. Environ Sci Technol Lett. 2021 Oct 12;8(10):839-852. doi: 10.1021/acs.estlett.1c00648. Epub 2021 Sep 7. PMID: 34660833; PMCID: PMC8515788.

Zhao G, Aghakeshmiri S, Chen YT, Zhang HM, Yip F, **Yang D**. NFAT5-Mediated Signalling Pathways in Viral Infection and Cardiovascular Dysfunction. Int J Mol Sci. 2021 May 4;22(9):4872. doi: 10.3390/ijms22094872. PMID: 34064510; PMCID: PMC8124654.

Zhao K, Oualkacha K, Lakhal-Chaieb L, Labbe A, Klein K, Ciampi A, Hudson M, Colmegna I, Pastinen T, Zhang T, **Daley D**, Greenwood CMT. A novel statistical method for modeling covariate effects in bisulfite sequencing derived measures of DNA methylation. Biometrics. 2021 Jun;77(2):424-438. doi: 10.1111/biom.13307. Epub 2020 Jun 5. PMID: 32438470; PMCID: PMC8359306.

Zhu K, Gill J, Kirkham A, Chen J, Ellis A, Crosbie S, Denson-Camp H, Peters H, **Camp P**. Safety and efficacy of inpatient pulmonary rehabilitation for patients hospitalised with an acute exacerbation of chronic obstructive pulmonary disease: a systematic review protocol. BMJ Open. 2021 Jun 23;11(6):e043377. doi: 10.1136/bmjopen-2020-043377. PMID: 34162633; PMCID: PMC8231038.

Appendix C

HLI Friday Seminar Series 2021

January 15	Inclusion of Sex and Gender: An essential determinant for biomedical research Speaker: Dr. Neeloffer Mookheriee Host: Dr. Chris Carlsten
January 22	Cost Effectiveness of Case Detection Strategies for the Early Detection of COPD Speaker: Dr. Kate Johnson
January 29	COVID 19 and COPD: An Update From HLI Speaker: Dr. Don Sin
February 5	Bioengineering cardiomyocytes from human induced pluripotent stem cells to model arrhythmogenic cardiomyopathy Speaker: Dr. Jared Churko Host: Dr. Leili Rohani
February 12	Sensors, wearables, data analytics in Emergency Medicine Speaker: Dr. Kendall Ho Host: Dr. Don Sin
February 19	Curiosity + Data = Better Care for our Patients: A Case Study Speaker: Dr. Andrew Krahn
February 26	COVID-19, interleukin-6 and the cytokine storm Speaker: Dr. Luke Chen Host: Dr. Don Sin
March 5	Some progress toward breath tests for lung diseases Speaker: Dr. Jane Hill Host: Dr. Bradley Quon
March 12	Bench to Bedside Translation of Pro-Efferocytic Therapies for Cardiovascular Disease Speaker: Dr. Nicholas Leeper Host: Dr. Gordon Francis
March 19	Translational Cardiovascular Research: Focus on Valvular Heart Disease Innovation from Bedside to Bench Speakers: Drs. Stephanie Sellers and Janarthanan Sathananthan
March 26	Is it time for another paradigm shift in the treatment of Structural Heart Disease? Speaker: Dr. David Wood Host: Dr. Don Sin

Appendix C

HLI Friday Seminar Series 2021

May 9	Expore data integration to understand atherosclerotic disease in the world of 'omics Speaker: Dr. Ying Wang
April 6	St. Paul's Foundation & the next 5 years of philanthropic support for research Speaker: Teija Beck
April 30	Quantitative CT Imaging of COPD: Emerging Methods and New Insights Speaker: Dr. Miranda Kirby Host: Dr. Wan Tan
May 7	Single Cell Approaches to Understanding Cardiac Development and Regeneration Speaker: Dr. Sean Wu Host: Dr. Leili Rohani
May 28	Cardiac events and comorbid conditions: a two-way relationship Speaker: Dr. Graeme Koelwyn Host: Dr. Jim Hogg
June 11	Developing treatments for COVID-19 Speaker: Dr. Anthony Gordon Host: Dr. Jim Russell
September 10	Stem Cells & Genomics for Precision Cardiovascular Medicine Speaker: Dr. Joseph Wu Host: Dr. Leili Rohani
September 17	Combinatorial mirotissue engineering Speaker: Dr. Derek Toms Host: Dr. Leili Rohani
September 24	Advanced Biofabrication Strategies for Tissue Engineering, Regenerative Medicine and Organ-On-Chip Applications Speaker: Dr. Houman Savoji Host: Dr. Leili Rohani

Appendix C

HLI Friday Seminar Series 2021

October 15	AI-guided ultrasound imaging for surgery and diagnostics Speaker: Dr. Ilker Hacihaliloglu
October 22	The many faces of RAGE: from COPD biomarker to epithelial repair in emphysema Speaker: Dr. Simon Pouwels Host: Dr. Emmanuel Osei
November 5	Lung microbiome: facing skepticisms, challenges and dissecting its function Speaker: Dr. Leopoldo Segal Host: Dr. Don Sin
November 12	Unravelling the complexities of multicellular and multiorgan interactions to understand airway inflammation and fibrosis in chronic lung disease Speaker: Dr. Emmanuel Osei Host: Dr. Tillie Hackett
November 19	Biobanking in Cardiovascular Tissue Registry to facilitate ongoing internal and external research projects Speakers: JHLR and CVTR Biobanking Teams
November 26	Hyperpolarized 129Xe Lung MRI: Practical Insights and Opportunities for Innovation in Respiratory Medicine Speaker: Dr. Rachel Eddy
May 28	Cardiac events and comorbid conditions: a two-way relationship Speaker: Dr. Graeme Koelwyn Host: Dr. Jim Hogg
December 3	New Insights into Plaque Vulnerability and Atherosclerosis Speaker: Dr. Aloke Finn Host: Dr. Ying Wang
December 10	In Vivo Micro-CT as a Means of Monitoring Respiratory Disease Speaker: Dr. Nancy Ford

Appendix D

HLI Research-in-Progress (RIP) Seminar Series 2021

January 11	In Vitro Co-culture Systems of SMCs and Macrophages in Atherosclerosis Speaker: Carleena Ortega
January 18	Association between cholinergic synapse gene polymorphisms and the late-phase response in allergic rhinitis Speaker: Simran Samra
January 25	Genetic variations in RARG influences susceptibility to doxorubicin-induced cardiotoxicity in patient-specific iPSC-derived cardiomyocytes Speaker: Effimia Christidi
February 1	Lipoprotein(a), genetics, and coronary artery disease Speaker: Mark Trinder
February 8	Investigation of the role of miR-146a in the regulation of fibrosis in chronic obstructive pulmonary disease Speaker: Kauna Usman
February 22	Clinical features of occupational asthma due to western red-cedar asthma (WRCA) Speaker: Jinelle Panton
March 1	Peripheral blood microbial signatures in CF Speaker: Kang Dong
March 15	Interactions Between HIV & the Airway Epithelium: Understanding the Relationship of HIV & COPD Speaker: Ravneet Hansi
March 22	Losartan, Drug Metabolites and Protection Against Cardiopulmonary Disease: Small Chemical Differences, Huge Biological Impacts Speaker: Elodie Sauge
March 29	Chronic CVB3 infection accelerates disease progression in an ALS mouse model Speaker: Tim Xue

Appendix D

HLI Research-in-Progress (RIP) Seminar Series 2021

April 12	Blood biomarkers to identify CF pulmonary exacerbations Speaker: Naomi Potter
April 19	Exploration of factors that predict progression to non-tuberculous Mycobacteria active disease in patients with cystic fibrosis Speaker: Miguel Prieto
April 26	GenePro-ILD: A systematic review and meta-analysis of interstitial lung disease transcriptomics Speaker: Daniel He
May 3	Multi 'Omics Profiling of the HIV Airway Epithelium: Integration of the Microbiome, Transcriptome and Methylome Speaker: Marcia Jude
May 10	Costs of oxygen therapy for interstitial lung disease and chronic obstructive pulmonary disease: A retrospective study from a universal healthcare system Speaker: Ferhan Saleem
May 17	Studying lysosomal acid lipase as a potential therapeutic for atherosclerosis Speaker: Katrina Besler
May 31	Co-Segregating Proteins Differentiate Frontotemporal Dementia with TDP-43 Pathology from Related Dementias Speaker: Lauren Forgrave
June 7	Role of RAR γ and its genetic variants S427L in transcriptional response to doxorubicin-induced cardiotoxicity Speaker: Margaret Huang
September 13	Development of oncolytic coxsackeivirus B3 for lung cancer therapy Speaker: Huitao Liu
September 27	Chronic Obstructive Pulmonary Disease & COVID-19 Speaker: Firoozeh Gerayeli

Appendix D

HLI Research-in-Progress (RIP) Seminar Series 2021

October 4	Development of Oncolytic Coxsackievirus B3 for Breast Cancer Therapy Speaker: Amirhossein Bahreyni
October 18	Epigenetic Age Prediction in Targeted Methylation Sequencing Studies Speaker: Denitsa Vasileva
October 25	Diagnosing western red-cedar asthma (WRCA) using blood-based gene signatures Speaker: Jinelle Panton
November 1	Role of Nuclear Factor of Activated T cells 5 in the Pathogenesis of Coxsackievirus-induced Myocarditis Speaker: Guangze Zhao
November 15	Understanding the crosstalk between macrophages and SMCs in atherosclerosis Speaker: Eric Xiang
November 22	Early immune development is affected by sickle-cell trait Speaker: Abhinav Checkervarty
November 29	Exploring the Effects of Inhaled Corticosteroid on the Airway Microbiome and Host Interphase in Chronic Obstructive Pulmonary Disease Speaker: William Yip
December 6	Titin truncating variants and risk of atrial fibrillation Speaker: Kate Huang

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