THE CARDIOVASCULAR RESEARCH INSTITUTE OF VERMONT is dedicated to reducing the incidence, morbidity, and mortality of heart and vascular diseases through improving prevention, diagnosis, and treatment.

By fostering collaborations among departments at The University of Vermont and The University of Vermont Medical Center, the Cardiovascular Research Institute of Vermont encourages the critical thinking that challenges assumptions and promotes excellence in clinical practice.

CONTENTS

Cardiovascular Research News ......................... 2
Research Focus: Patient-Centered Research .......... 4
Researcher Support ......................................... 8
Scholarly Events ............................................ 10
Connecting Our Scholars ................................. 12
Research Funding: Highlights .......................... 14
Research Publications: Highlights ..................... 18
Patent Activity .............................................. 23
Scholarly Presentations ................................... 24
Board of Directors & Leadership Council ............. 25
Contact Information ...................................... back cover
MESSAGE FROM THE DIRECTOR

The Cardiovascular Research Institute of Vermont (CVRI) seeks to foster cardiovascular research. We accomplish this mission by promoting collaboration, highlighting research accomplishments in cardiovascular disease, and supporting career development. In the pages that follow you will see the mission of the CVRI brought to life as we highlight efforts designed to improve the care of patients with cardiovascular disease and highlight achievements that include grant funding, participation in clinical trials, and the publication of research findings.

In July 2017, the University of Vermont invested Benedek Erdos, M.D., Ph.D. as the inaugural Bloomfield Early Career Professor in Cardiovascular Research. Dr. Erdos was selected by the Board of Directors of the CVRI who felt that he was exceptionally well qualified for this prestigious honor. Dr. Erdos has pioneered an innovative hypothesis that brain-derived neurotrophic factor may be a common mediator of hypertension. His research uses novel genetic tools that could change our ability to treat hypertension and prevent cardiovascular events because hypertension is a major cause of morbidity and mortality. The Board felt that the support provided by this Professorship should enhance the likelihood of success for this talented junior investigator. Dr. Martin Bloomfield, an alumnus of the University of Vermont and a member of the Cardiovascular Leadership Council, has chosen to give back to his alma mater in a meaningful manner by endowing this Professorship that is designed to both recognize and support an extraordinary early career investigator in cardiovascular research.

Jim Ray, who was an avid cyclist who died of heart disease in 1996. Early Career Investigators in cardiovascular research are the beneficiaries because funds raised by this ride in 2017 were used to support attendance of early career scientists and physicians at leading-edge conferences and educational forums. Additional support for early career investigators is provided by a gift from Paul Millman (also a member of the Cardiovascular Leadership Council) and his company, Chroma Technologies. This funding supports summer research projects in cardiovascular disease by first-year medical students.

The Early Career Advisory Committee of the CVRI actively promoted cardiovascular research and enhanced collaboration through a series of events designed to encourage scientific exchange. This spring, the Early Career Advisory Committee awarded small grants to junior investigators. The selection process has been educational for both the applicants and the Early Career Advisory Committee, who were provided with a “grant review boot camp” by their Board advisor, Dr. Mary Cushman.

We are proud of the accomplishments achieved in cardiovascular research at the University of Vermont. Thank you for taking the time to learn about these accomplishments in the pages that follow.
Risk of blood clots increases with the amount of time spent watching television, even if people get the recommended amount of physical activity, according to preliminary research presented at the American Heart Association's Scientific Sessions 2017 in Anaheim, Calif., November 2017.

"Watching TV itself isn’t likely bad, but we tend to snack and sit still for prolonged periods while watching,” said Mary Cushman, M.D., M.Sc., co-author of the study and professor of medicine at the Larner College of Medicine at the University of Vermont and a CVRI Board of Directors member.

Prolonged TV viewing has already been associated with heart disease involving blocked arteries, but this is the first study in a western population to look at blood clots in veins of the legs, arms, pelvis, and lungs called venous thromboembolism or VTE.

Among 15,158 middle-aged (45-64 years) participants in the Atherosclerosis Risk in Communities Study, researchers found that the risk of developing a venous thromboembolism for the first time was:

• 1.7 times higher in those who reported they watch TV “very often” compared with those who watch TV “never or seldom”;
• 1.8 times higher in participants who met recommended guidelines for physical activity and reported watching TV “very often” compared with those who reported watching TV “never or seldom”;
• Increased with more TV viewing both for life-threatening clots in the extremities and those in the lungs; and while obesity was more common in people who watched more TV, in the study only about 25 percent of the increased risk could be explained by the presence of obesity.

“Think about how you can make the best use of your time to live a fuller and healthier life. You could put a treadmill or stationary bike in front of your TV and move while watching. Or you can delay watching TV by 30 minutes while you take a walk. If you must see your favorite show, tape it while you are out walking so you can watch it later, skipping the ads,” said Cushman, who is also the director of the Thrombosis and Hemostasis Program at the University of Vermont Medical Center.

Each year, it is estimated that between 300,000 to 600,000 people in the U.S. develop venous thromboembolism. Besides avoiding prolonged TV watching, people can lower their risk by maintaining a healthy weight and staying physically active.

Other co-authors on the research presentation are Yasuhiko Kubota, M.D., and Aaron R. Folsom, M.D., M.P.H., of the University of Minnesota School of Public Health; Neil Zakai, M.D., M.Sc., of the UVM Larner College of Medicine; and Wayne D. Rosamond, Ph.D., M.S., of the University of North Carolina’s Gillings School of Global Public Health.

The National Heart, Lung, and Blood Institute funded the study.

ADES’ CARDIAC REHAB EXPERTISE FEATURED IN CONSUMER REPORTS ARTICLE

Phillip Ades, M.D., CVRI Distinguished Investigator and UVM Professor of Cardiovascular Medicine provided his cardiac rehabilitation expertise for a 2017 Consumer Reports Health article titled, “What’s Missing from Your Heart-Attack Recovery Plan.”

Part of the problem, as Ades explained, is the lack of geographically available options. “There are too few in many big cities, and in rural areas you could be a 3-hour drive from the nearest cardiac rehabilitation center,” he says. “Physical activity improves fitness, and if fitness is improved it’s easier to do daily activities. Even small improvements in physical function can greatly improve quality of life and self-esteem, and lead to overall better health.”
In cells, cargo that contains tiny packages of critical biological material are transported by teams of minuscule myosin molecular “motors” along complex actin filament “highways.” How these motors reach their destination when confronted with numerous intersections without GPS is a mystery. In a study published in the July 2017 issue of *Nature Communications*, University of Vermont researchers, including several associated with the CVRI, built three-dimensional (3D) actin highways with intersections as well as under- and over-passes within microfluidic chambers to emulate the complicated highways that myosin motors encounter in cells.

“We challenged motors to navigate their cargo along suspended filament tracks through intersections with the intention of understanding how teams of these motors work together when faced with a directional dilemma,” says Andrew Lombardo, a graduate student in molecular physiology and biophysics at the Larner College of Medicine at the University of Vermont.

He and colleagues in the lab of David Warshaw, Ph.D., chair of Molecular Physiology and Biophysics and a CVRI Board of Directors member, used tiny, 3-micrometer-sized beads in these special chambers, as structural supports to spin a web of suspended actin filament highways between the beads.

“Similar to a tightrope artist carefully walking between two buildings, myosin motors bind to the suspended actin highways while carrying their cargo and ‘walking’ along these tightropes,” said Lombardo. He and his colleagues observed that the motors were surprisingly adept at moving their cargo through the complex physical and directional challenges presented by these 3D highways.

“Actin filaments and intersections are numerous in the cell – for the motors, it’s like navigating a city,” says Lombardo. “However, you would never make it across town if you turned at every intersection.” In fact, myosin motors prefer to turn at intersections when such intersections are formed on flat surfaces. But when suspended 3D highways and intersections were created, teams of motors now carry their cargo in a relatively straight line through the intersections despite the option to turn or stop.

“This simple model transport system provides a window into one of the most fundamental processes that occurs in every single cell within the human body,” says Lombardo.

In addition to Lombardo and Warshaw, co-authors on the study include UVM Molecular Physiology and Biophysicists Shane Nelson, Ph.D., Yusuf Ali, Ph.D., Research Engineer Guy Kennedy, and CVRI Distinguished Investigator Kathleen Trybus, Ph.D., as well as Sam Walcott of the Department of Mathematics, University of California, Davis. This work was funded by the National Institutes of Health, National Science Foundation, and the National Aeronautics and Space Administration.
Physician scientists can find inspiration — and solutions — in every corner of an academic medical center: the clinic, the research arena, or while teaching. That’s how Peter Spector, M.D., a University of Vermont professor of medicine and director of electrophysiology at The UVM Medical Center, came to co-develop — with Professor of Medicine and engineer Jason Bates, Ph.D. — a three-dimensional computational model of a human heart called Visible EP.

No matter the source of the inspiration, its ultimate focus remains the same: the development of new knowledge that can be put to use to offer better, more successful treatments and therapies to improve patients’ lives.

The software technology that Spector and Bates built is as remarkable as their collaboration. Spector came to the table with the vision of the final product and a deep understanding of electrophysiology and how the heart works, but was unfamiliar with the programming process. Bates possessed programming skills and expertise in computational models. Together, they produced a technology that very accurately models the electrical behavior of the human heart, to the smallest level of detail.

Bates and Spector created Visible EP (which stands for “electrophysiology”) as a means to gain a better understanding of how to cure the most common abnormal heart rhythm — atrial fibrillation (AF) — which afflicts more than five million people in the U.S. alone. Previous treatments had been less than adequate.

The result of their teamwork is a program that mimics the behavior of the heart from every aspect, as well as features the ability to provide unpredictable responses — a phenomenon called emergent behavior. While the parts of the heart and the rules of interaction have been programmed into the system, the computational heart model’s reaction is entirely emergent, says Spector.

“We’ve made, essentially, a living, breathing, interactive human heart,” he says. “It will sit there and beat in what would be the equivalent of a normal rhythm; you can induce every sort of abnormal heart rhythm that you can imagine that a patient could have, and it’s all happening on a computer screen.”

Visible EP’s emergent behavior feature makes it an attractive tool for medical education, as well as research applications. Because it can’t be readily seen, electrophysiology has been regarded as a particularly difficult specialty to teach; the field was waiting for just such a teaching tool as Visible EP.

Spector uses the Visible EP technology in his arrhythmia research lab. Using this computer model, combined with studies of the real human heart, the group has proposed a new approach to analyzing an individual patient’s electrical activity and to using this information to guide a new type of ablation. In addition, the team has developed a new catheter, signal processing...
algorithms and a mapping approach for treatment of AF. This work was initially sponsored by a generous grant from the Evslin Foundation.

One patient who typifies the beneficial outcomes that come from cardiovascular research is Paula Desseau of Essex Junction, Vt. Desseau has lived life with atrial fibrillation — “afib,” as she refers to it — for many years.

“Any exertion that I did, my heart would go into afib,” says Desseau. “You would never know when it would go into afib,” she says, and each occurrence would be a cause for major concern, and a trip to the emergency department.

After Paula’s third ablation treatment, Spector and his care team expected to find that with some of the ablations they’d created, the
scars had healed up.

“We discovered, much to our chagrin, that none of the scars had healed up,” recalls Spector. “If you look it up in a textbook, there’s no next move. We were stuck with pulling catheters out, waking Paula up, and telling her, ‘I’m sorry, there’s nothing we can do for you.’ But we knew from the work that we’re doing in the research lab that that’s not true. We used our catheters in a way that’s guided by the research work we’d done to tell us where we thought the fibrillation was coming from. We did a little bit more ablation than we had done already. That little bit made all the difference. Paula remained in normal rhythm for years after that final procedure.”

That research-based difference is something Paula Desseau thinks about every day.

“I don’t know if I’d be here today if Dr. Spector had not done all he did for me,” she says.
Dr. Benedek Erdos Invested as Inaugural Bloomfield Professor

Benedek Erdos, M.D., Ph.D., an assistant professor in the Department of Pharmacology at the Robert Larner, M.D. College of Medicine at the University of Vermont, was invested in a formal ceremony on July 31, 2017 as the inaugural Martin E. Bloomfield ’56, M.D.’60 and Judith S. Bloomfield ’59 Early Career Professor in Cardiovascular Research.

The endowed professorship was established by Dr. Marty Bloomfield, a dual-degree UVM alumnus and retired cardiologist, and his wife Judy, a fellow Catamount and retired psychologist. Dr. Erdos is receiving funding for two years, with potential funding for a third year, to support his research project: “Brain-Derived Neurotrophic Factor, a Novel Hypothalamic Mediator in Hypertension.”

Designed to significantly increase our understanding of the mechanisms of blood pressure regulation, the proposed studies in the Erdos Lab may help to identify novel therapeutic targets to treat hypertension.

This faculty position is particularly significant because it marks the first time ever at the University of Vermont that an early-career professorship has been endowed. As federal funding for research becomes more competitive, private philanthropy can help launch promising young careers with the potential to benefit not only the University of Vermont, but society at large.

The Bloomfields’ decision to focus their philanthropic impact on an early-career professorship is based on personal experiences. At the time when Dr. Bloomfield was beginning his own career, research funding was not readily available. Years later, the Bloomfields’ son Dan — also a cardiologist – benefited early in his career through research funding from an endowed assistant professorship that serves as the inspiration for their gift.

Following remarks from UVM Foundation President and CEO Shane Jacobson, UVM President Tom Sullivan and Larner College of Medicine Dean Rick Morin, Dr. Erdos was presented with a medallion in front of family, friends, colleagues and students in the Hoehl Gallery at the Larner College of Medicine on the UVM campus. After receiving his medallion, Dr. Erdos invited Dr. Bloomfield to the podium to present the donor with a matching medallion, which was followed by comments from Dr. Bloomfield.

Now a revered campus tradition, the formal investiture ceremony recognizes the importance of endowed positions and is one of the highest honors UVM can bestow on its faculty members and the generous donors who make it possible.

Dr. Erdos received his medical degree and Ph.D. from Semmelweis University in Budapest, the oldest medical school in Hungary. Following post-doctoral work at Wake Forest University, he held research positions at the University of Florida prior to arriving at UVM in 2014.

Dr. Erdos’ research supports the mission of the CVRI, which leverages the world-class research facilities as well as clinical capabilities of the Larner College of Medicine and the UVM Medical Center to reduce the incidence, morbidity and mortality of heart and vascular diseases. Dr. Bloomfield in 2017 joined the Cardiovascular Leadership Council, a group of community members who serve as ambassadors for the CVRI.
Scholarly Events

The Cardiovascular Research Institute of Vermont (CVRI) brings outstanding scientists in cardiovascular medicine to The University of Vermont as Visiting Professors.

A gift from Martin Bloomfield, M.D.’60 enables CVRI to host the Burton E. Sobel Visiting Professor series, which honors Burton E. Sobel, MD, the Founding Director of CVRI. In addition to formal lectures, each Sobel Visiting Professor participates in meetings with early career investigators and a “Scholar’s Tea,” where selected early career investigators meet as a group with the Visiting Professor to discuss any topic and ask any question that may come to mind.

**BURTON E. SOBEL VISITING PROFESSOR SEMINARS**

**May 31 – June 1, 2017**
ROBERT A. HARRINGTON, M.D.
Arthur L. Bloomfield Professor and Chair, Department of Medicine, Stanford University
Chair, FDA Cardiovascular and Renal Drugs Advisory Committee
and host of a regular podcast on theheart.org: The Bob Harrington Show

- Seminar: Education and Research in an Era of Quality, Big Data, Precision Medicine, and Digital Health
- Interactive Discussion: Social Media in Medicine: How social media is being used to access and disseminate science to both scientists and the public

**October 4 – 6, 2017**
DAVID C. GOFF, JR., M.D., PH.D.
Director, Division of Cardiovascular Sciences, National Heart, Lung, and Blood Institute

- Medicine Grand Rounds: Eliminating Cardiovascular Disparities through Community-Engaged Research: A thought exercise
- Interactive Discussion: Where’s the Funding Going: NHLBI Strategic Vision implementation for the Division of Cardiovascular Sciences

The Early Career Visiting Professorship was launched in 2017 by CVRI’s Early Career Advisory Committee (ECAC). These professorships bring to campus a successful early career investigator for a series of events focusing on trainees and junior investigators.

**EARLY CAREER VISITING PROFESSOR SEMINAR**

**October 29 – 31, 2017**
BENJAMIN PROSSER, PH.D.
Assistant Professor, Department of Physiology, Pennsylvania Muscle Institute, Perelman School of Medicine, University of Pennsylvania
and The American Heart Association’s 2017 “Outstanding Early Career Investigator”

- Research Seminar: Inotropy via Cytoskeletal Regulation
- Interactive Discussion: Establishing Independence: Lessons learned in starting a new lab

Nels Olson, Ph.D., assistant professor, Pathology and Laboratory Medicine and ECAC Chair (left) presents Benjamin Prosser, Ph.D., with the ECAC’s “Rising Star Award” for impressive achievement early in his research career.
David C. Goff, Jr., M.D., Ph.D. delivers his Medicine Grand Rounds, “Eliminating Cardiovascular Disparities Through Community-Engaged Research: A thought exercise,” on October 5, 2017 in the Davis Auditorium of the University of Vermont Medical Center. Dr. Goff’s visit was supported by the Martin E. Bloomfield, M.D. ’60 Endowed Visiting Professorship Fund.
Connecting Our Scholars

The Cardiovascular Research Institute of Vermont encompasses the full range of scholarship, from young scientists and physicians at the start of their careers to our Distinguished Investigators with decades of notable work to their credit. Through travel awards, research seminars, and an Early Career Advisory Committee available to them, junior investigators who are affiliated with the CVRI have plenty of rich opportunities to interact with and learn from their more experienced colleagues.

CVRI TRAVEL AWARDS

American Heart Association EPI/Lifestyle 2017 Scientific Sessions
Portland, OR – March 2017
Daniel Douce, M.D.
Fellow, Hematology and Oncology, Department of Medicine
POSTER PRESENTATION: Association of sickle cell trait with common electrocardiographic abnormalities in the Reasons for Geographic and Racial Differences in Stroke (REGARDS) study

American College of Cardiology 66th Annual Scientific Sessions
Washington, DC – March 2017
Mehdi Rambod, M.D.
Fellow, Cardiovascular Division, Department of Medicine
POSTER PRESENTATION: New-onset platypnea orthodeoxia and old patent foramen ovale: To close it or not to close it?

Society for Reproductive Investigation 64th Annual Scientific Meeting
Orlando, FL – March 2017
Theresa Nga-Ling Ko, Ph.D.
Postdoctoral Associate, Department of Obstetrics, Gynecology and Reproductive Sciences
ORAL PRESENTATION: Venoarterial signaling (VAS) modulates shear stress-induced gestational uterine artery expansive remodeling

Aaron Gelinne, B.S.
Medical Student, Larner College of Medicine Class of 2019s
POSTER PRESENTATION: Remodeling and altered biomechanics of the mouse abdominal aorta during and after pregnancy

Carole McBride, Ph.D.
Research Specialist, Department of Obstetrics, Gynecology and Reproductive Sciences
POSTER PRESENTATIONS (4):
Placental underperfusion and its clinical associations
Amyloid precursor protein products are associated with vessel stiffness and hypertension in subsequent pregnancy
Women with prior preterm preeclampsia have elevated inflammation and endothelial dysfunction compared to nulliparous women
Bone mineral density is decreased in women who develop preeclampsia

International Society for Cerebral Blood Flow & Metabolism – Brain 2017
Berlin, Germany – April 2017
Siu-Lung (Kelvin) Chan, B.Sc., Ph.D.
Research Analyst, Department of Neurological Sciences
POSTER PRESENTATION: Increased infarction and hemorrhagic transformation in aged spontaneous hypertensive rats: Role of collateral CBF
**Experimental Biology 2017**
Chicago, IL – April 2017
Daniel M. Collier, Ph.D.
Research Assistant Professor, Department of Pharmacology
**POSTER PRESENTATION:** Extracellular histones induce propagating Ca2+ influx, Ca2+ overload, and endothelial cell death in resistance-sized mouse mesenteric arteries

**Society for Cardiovascular Angiography and Interventions**
New Orleans, LA – May 2017
Sreedivya Chava, M.D.
Fellow, Cardiovascular Division, Department of Medicine
**POSTER PRESENTATION:** Coronary CT angiography to detect severe coronary artery disease prior to transcatheter aortic valve replacement

**International Society on Thrombosis and Haemostasis 26th Congress**
Berlin, Germany – July 2017
Laura M. Haynes, Ph.D.
Postdoctoral Associate, Department of Biochemistry
**ORAL PRESENTATION:** Clot-bound thrombin characterization of plasma clots in a flow reactor

**Military Health System Research Symposium 2017**
Kissimmee, FL – August 2017
Maria Cristina Bravo, Ph.D.
Faculty Scientist, Department of Biochemistry
**POSTER PRESENTATION:** Computational assessment that utilizes composition data from distinct patient cohorts to help determine procoagulant dynamics in burn patients over time

**American Society of Nuclear Cardiology, 22nd Annual Scientific Session**
Kansas City, MO – September 2017
Sherri Khadanga, M.D.
Fellow, Cardiovascular Division, Department of Medicine
**POSTER PRESENTATION:** Ratio of myocardial uptake to blood pool activity in dual-time-point 18F-FDG PET for the diagnosis of cardiac sarcoidosis

**TCT – Transcatheter Cardiovascular Therapeutics**
Denver, CO – October 2017
Amir Azarbal, M.D.
Fellow, Cardiovascular Division, Department of Medicine
**POSTER PRESENTATION:** Acute kidney recovery in patients undergoing transcatheter aortic valve replacement

**American Heart Association Annual Scientific Sessions**
Anaheim, CA – November 2017
Lakshmi Nambiar, M.D.
Fellow, Cardiovascular Division, Department of Medicine
**POSTER PRESENTATION:** Left ventricular end-diastolic volume predicts exercise capacity in patients with a normal ejection fraction

**American Society of Hematology**
Atlanta, GA – December 2017
Heather Wright, DO
Resident, Internal Medicine, Department of Medicine
**POSTER PRESENTATION:** Venous thromboembolism (VTE) increases the healthcare burden in patients with malignant glioma (MG) (shown left)
Research Funding: 2017 Highlights

Understanding the causes and consequences of cardiovascular disease, from the molecule to the patient to populations to policy, drives a robust research enterprise at the University of Vermont, and represents a significant portion of the $85 million in funding received by the Larner College of Medicine in 2017. Grant funding comes from federal, state, corporate and non-profit sources; below is a sampling of current awards.

Cardiac Muscle

National Institutes of Health Funding

NIH R01 HL122744
Tachycardia-Induced Sarcolemmal Calcium Extrusion Defect in Patients with Diastolic Dysfunction
PI: Markus Meyer, M.D.
$1,044,000

HNLBI U10 HL110342
Heart Failure Research Network - Vermont, New York and Quebec Regional Clinical Center
PI: Peter VanBuren, M.D.
$1,150,000

HNLBI R01 HL118524
Myofilament Based Mechanisms of Diastolic Dysfunction in HFpEF
PI: Martin LeWinter, M.D.
$1,800,000

NIH/NIAMS R01 AR065826
Skeletal Muscle atrophy and Dysfunction in Human Cancer
PI: Michael Toth, Ph.D.
$271,172

NIH/NIAMS R01 AG050305
Skeletal Muscle atrophy and Dysfunction Following Total Knee Arthroplasty
PI: Michael Toth, Ph.D.
$294,306

NIH/NIAMS R01 AG04725
Sex-specific Adaptations to Different Resistance Exercise Programs in Older Adults
Site PI: Michael Toth, Ph.D.
$377,039

Clinical Trials/Industry Support

Medtronic

The Heart Rate 80bpm Study
PI: Markus Meyer, M.D.
$50,000

CoreValve® Transcatheter Aortic Valve Replacement in Patients at Low Risk for Surgical Aortic Valve Replacement
Site PI: Harold Dauerman, M.D.
$250,000

AdaptResponse Clinical Trial
Local PI: Joseph F. Winget, M.D.
$67,550

Product Surveillance Registry 09-167 Registries Study: Patients who have received specific leads in the past 30 days, examining the longevity of the system/leads once implanted
PI: Robert Lobel, M.D.
$250,000

Edwards Lifesciences

Transcatheter Aortic Valve Replacement to UNload the Left Ventricle in Patients with ADvanced Heart Failure: A randomized trial (TAVR UNLOAD)
Site PI: Harold Dauerman, M.D.
$250,000

UVM REACH 17-0505
Inflammatory BioMarkers in Heart Failure with Preserved Ejection Fraction
PI: Johannes Steiner, M.D.
$10,000

Luitpold Pharmaceuticals

A Randomized, Double-Blind, Placebo-Controlled Study to Investigate the Efficacy and Safety of Injectafer® (Ferric Carboxymaltose) at Treatment for Heart Failure with Iron Deficiency (HEART-FID) Site PI: Johannes Steiner, M.D.

Mass General Hospital

Voice Changes Predict Heart Failure (VOICE-HF)
Site PI: Johannes Steiner, M.D.
**Vascular Biology / Thrombosis**

**National Institutes of Health Funding**

**R01 1HL121706**
Regulation of Myoendothelial Function by Signaling Microdomains in Hypertension  
PI: Mark T. Nelson, Ph.D.  
$325,981

**T32 HL007594**
Thrombosis and Hemostasis Program for Academic Trainees  
PI: Robert J. Kelm, Jr., Ph.D.  
NCE

**R01 HL131181**
K+ Sensing and Electrical Signaling by Kir Channels in Brain Vasculature  
PI: Mark T. Nelson, Ph.D.  
$435,348

**R01 NS093289-01**
Targeting Parenchymal Arterioles in Acute Stroke Treatment  
PI: Marilyn J. Cipolla, Ph.D.  
$1,653,665

**NIH/NHLBI PO1 HL095488-01**
Calcium Signaling in the Cerebrovascular Unit in Health and Disease  
PI: Mark T. Nelson, Ph.D.  
$7,821,664

**UM1 HL120877**
Analysis and Characterization of Trauma-Induced Coagulopathy  
PI: Kenneth Mann, Ph.D.  
$2,100,000

**R01 NS045940-10**
The Role of the Blood-brain Barrier in Seizure during Pregnancy and Preeclampsia  
PI: Marilyn J. Cipolla, Ph.D.  
$1,667,970

**HHS N2682015000031**
Multiethnic Study of Atherosclerosis (MESA)  
Task 1 and 3 Repository Maintenance  
Subcontract PI: Russell Tracy, Ph.D.  
$94,418

**U01 AG050499**
Enabling Reduction of Low-grade Inflammation in Seniors (ENRGISe)  
Subcontract PI: Russell Tracy, Ph.D.  
$131,412

**R01 HL120854**
Tcell Subsets as Risk Factors for CVD in CHS and Mesa  
Subcontract PI: Russell Tracy, Ph.D.  
$178,556

**R01 HL125032**
Immune Function and the Risk of Cardiovascular Disease among HIV+ and Uninfected Veterans  
Subcontract PI: Russell Tracy, Ph.D.  
$221,384

**R01 HL126542**
Targeting Hypercoagulation to Reduce Inflammation in Treated HIV Disease  
Subcontract PI: Russell Tracy, Ph.D.  
$141,825

**R01 HL126543**
Role of Innate Immunity in HIV related Vascular Disease: Biomarkers and Mechanisms  
Subcontract PI: Russell Tracy, Ph.D.  
$104,199

**RO1 AG053325**
Non-esterified Fatty Acids and Cardiometabolic Disease in Older Adults  
Subcontract PI: Russell Tracy, Ph.D.  
$200,352

**10H2 NS100605**
Microglial, Inflammatory and Omics Markers of Cerebral Small Vessel Disease in the CHARGE Consortium  
Subcontract PI: Russell Tracy, Ph.D.  
$332,262

**NINDS NS041588**
Etiology of Geographic and Racial Differences in Stroke Mortality  
Subcontract PI: Mary Cushman, M.D., M.Sc.  
$233,243

**NHLBI HL59367**
Epidemiology of Venous Thrombosis and Pulmonary Embolism  
Subcontract PI: Mary Cushman, M.D., M.Sc.  
$223,963

**R01 N05080850**
Impact of Disordered Mineral Metabolism on Stroke and Cognitive Impairment  
Subcontract PI: Nancy Jenny, Ph.D.  
$6,904

**R01 HL093009**
Mediators of Atherosclerosis in So. Asians Living in America  
Subcontract PI: Nancy Jenny, Ph.D.  
$211,541

**R01 HD0319216A1**
National Longitudinal Study of Adolescent Health – Wave V  
Subcontract PI: Mary Cushman, M.D., M.Sc.  
$465,472

**R01 HD087061**
Social Context, the Life Course, and Genetic Transcription in Add Health  
Subcontract PI: Mary Cushman, M.D., M.Sc.  
$31,911

**R01 AG023629**
Exceptional Survival: Trajectories to Function  
Subcontract PI: Mary Cushman, M.D., M.Sc.  
$14,895

**K99 HL129045**
Immune Activation and Immunosenescence Biomarkers and Cardiovascular Disease Risk  
PI: Nels Olson, Ph.D.  
$111,512

**American Heart Association Funding**

**Founders Affiliate Grant-in-Aid 16GRNT31160006**
Role of PURB in Controlling the Phenotypic Plasticity of Vascular Smooth Muscle Cells  
PI: Robert J. Kelm, Jr., Ph.D.  
$131,412

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### Funding from Other Agencies

**Naval Health Research Center NHRC**  
**BAA 13-001**  
*Complex Systems Approaches to Characterizing Trauma Induced Coagulopathy*  
PI: Kathleen Brummel-Ziedins, Ph.D.  
$2,613,270

**European Union 666881 Horizon 2020**  
*Small Vessel Disease in a Mechanistic Perspective: Targets for Intervention - Affected Pathways and Mechanistic Exploration for Prevention of Stroke and Dementia*  
PI: Mark T. Nelson, Ph.D., for WP1; Co-PI for WP2, WP3, WP4, WP5  
$162,610

**British Heart Foundation**  
*Imaging Small Artery Endothelial Calcium Signals in Human Obesity: Does Damage to TRPV4 Channel Function Explain Endothelial Dysfunction? Clinical Research Training Fellowship at UVM for Majid Ahmed.*  
Co-PIs: Adam S. Greenstein, Ph.D., and Mark T. Nelson, Ph.D.  
£164,006

**Fondation Leducq**  
*Pathogenesis of Small Vessel Disease of the Brain*  
North American Coordinator: Mark T. Nelson, Ph.D.  
$251,085

**Totman Medical Research Trust**  
*Cerebrovascular Research*  
PI: Mark T. Nelson, Ph.D.  
$150,000

### Clinical Trials/Industry Support

**Sanofi**  
*Odyssey Outcomes Trial*  
Local PI: Friederike Keating, M.D.  
$56,000

**Boston Scientific**  
*EVOLVE SHORT DAPT: A National Registry of 3 Months Dual Antiplatelet Therapy in Conjunction with SYNERGY Bioreosorbable Polymer Drug Eluting Stent for Patients at High Risk of Bleeding, National Steering Committee*  
Site PI: Harold Dauerman, M.D.  
$300,000

With the start of each new academic year, the University of Vermont welcomes new medical students, trainees, and faculty to campus.

On August 30, CVRI’s Early Career Advisory Committee hosted the first annual **Welcome Soiree**

The event, held in the Garden Atrium at UVMMC, provided an opportunity for newcomers to meet others interested in cardiovascular research and learn about the programs and funding available through CVRI.
Robert Harrington, M.D., Arthur L. Bloomfield Professor and Chair of the Department of Medicine at Stanford University and host of a regular podcast on theheart.org (The Bob Harrington Show), leads a discussion on social media in medicine in the Health Science Research Facility at the Larner College of Medicine during his visit to campus in May 2017.
Research Publications: 2017 Highlights

Across our academic medical center campus, throughout the region, and around the world, teams of physicians and scientists are dedicated to reducing the incidence, morbidity, and mortality of heart and vascular diseases through improving prevention, diagnosis and treatment. We are pleased to present a sampling of publications and high-profile presentations from our University of Vermont colleagues engaged across a wide range of cardiovascular research.

Cardiac Muscle


Vascular Biology/Thrombosis


Ades PA. Effect of alirocumab dose increase on LDL-lowering and lipid goal attainment: is treatment to goal the way to go? Coron Artery Dis. 2017;28:1867-7.


Research Publications: A Sampling (continued)


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Research Publications: A Sampling (continued)


Rubin LJ, Hopkins WE. Diagnostic evaluation of pulmonary hypertension in adults. In: UpToDate; Rose BD (Ed); UpToDate, Waltham, MA; 2017.
Rubin LJ, Hopkins WE. Overview of pulmonary hypertension. In: UpToDate; Rose BD (Ed); UpToDate, Waltham, MA; 2017.

Rubin LJ, Hopkins WE. Pathogenesis of pulmonary hypertension. In: UpToDate; Rose BD (Ed); UpToDate, Waltham, MA; 2017.


Scholarly Presentations

A sampling of CVRI researchers invited to speak at national and international meetings.

American Heart Association International Stroke Conference
Houston, TX – February 2017
Marilyn Cipolla, Ph.D.
Sanguinate™ Opens Collaterals, Improves Reperfusion and Decreases Infarction in Spontaneously Hypertensive Rats

Japanese Circulation Society
Kanazawa, Japan – March 2017
Mary Cushman, M.D., M.Sc.
Current Use of Antiplatelet Agents for Acute Coronary Syndromes in the United States

Trans-NIH Workshop on Chronic Inflammation Biomarkers in Disease Development and Prevention
Rockville, MD – May 2017
Russell Tracy, Ph.D.
Development of Chronic Disease Biomarkers Based on Inflammation and Adaptive Immunity

International Society for Advancement of Cytometry 32nd Congress
Boston, MA – June 2017
Margaret Doyle, Ph.D.
Cellular Biomarker Discovery: Assay Validation and Quality Control in High-Throughput Population Studies with an Eye Towards Clinical Utilization

International United Leukodystrophy Foundation Meeting
Minneapolis, MN – July 2017
Fabrice Dabertrand, Ph.D.
Capillary Control of Cerebral Blood Flow, and Its Disruption in Small Vessel Disease

International Society on Thrombosis and Haemostasis 2017 Congress
Berlin, Germany – July 2017
Nels Olson, Ph.D.
A Basal-State Monocyte Gene Transcription Profile is Associated with Circulating Levels of Th1 Cells: the Multi-Ethnic Study of Atherosclerosis (MESA)

International Symposium on Resistance Arteries
Manchester, UK – September 2017
Mark Nelson, Ph.D.
Keynote Speaker: Capillaries as Decoders of Neural Rhythm in the Brain: Translating thought into blood flow

International Symposium on Resistance Arteries
Manchester, UK – September 2017
Marilyn Cipolla, Ph.D.
Regulation of Vascular Resistance in the Brain: Physiology and Pathophysiology

Alliance Sante Quebec
Quebec, Canada – October 2017
Russell Tracy, Ph.D.
The Research University of the Future

International Symposium on Collaterals to the Brain
Los Angeles, CA – November 2017
Marilyn Cipolla, Ph.D.
Impact of Hypertension on Pial Collateral Function

American Heart Association Annual Scientific Sessions
Anaheim, CA – November 2017
Neil Zakai, Ph.D.
Curbing the Atherothrombotic Risk in Patients with Diabetes Mellitus
Frontiers in Medicine: Risk Stratification and Management of Acute Pulmonary Embolism

American Society of Hematology 59th Annual Meeting
Atlanta, GA – December 2017
Neil Zakai, Ph.D.
Recurrent Cerebral Sinus Thrombosis: Why was anticoagulation not enough?
Leadership Council

Members of the Cardiovascular Leadership Council serve as ambassadors for the Cardiovascular Research Institute of Vermont (CVRI), its Board of Directors, investigators and faculty, in the overall effort to educate and engage Vermonters and the broader community in support of cardiovascular medicine.

Marty Bloomfield, M.D.
New York, N.Y.

Lauren Curry
Westford, Vt.

Mary Evslin
Stowe, Vt.

Peter Gibbs
Shelburne, Vt.

Nicole LaBrecque
South Burlington, Vt.

Todd R. Lockwood
South Burlington, Vt.

Paul Millman
Westminster, Vt.

Mark Ray
Shelburne, Vt.

Patrick Robins
Burlington, Vt.

Glen Wright
Shelburne, Vt.

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Director of Cardiovascular Services, UVM Health Network;
Director, Cardiovascular Research Institute of Vermont

Ira Bernstein, M.D.
Professor and John Van Sicklen Maeck Chair of Obstetrics, Gynecology & Reproductive Sciences,
UVM Larner College of Medicine;
Medical Director of Women’s Services, University of Vermont Medical Center

Marilyn J. Cipolla, Ph.D., F.A.H.A.
Professor of Neurological Sciences, UVM Larner College of Medicine

Mary Cushman, M.D., M.Sc., F.A.H.A.
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Director, Thrombosis and Hemostasis Program, University of Vermont Medical Center

Harold L. Dauerman, M.D., F.A.C.C.
Professor of Medicine, Division of Cardiovascular Medicine, UVM Larner College of Medicine;
Network Director of Interventional Cardiology, UVM Health Network;
Cardiologist, University of Vermont Medical Center

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UVM Larner College of Medicine

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Professor and Chair of Molecular Physiology & Biophysics,
UVM Larner College of Medicine