

Cardiovascular Division
Washington University
School of Medicine

Faculty Research Interests
2017-2018

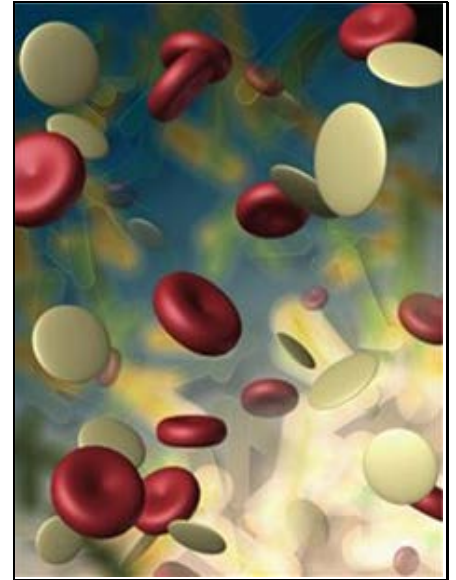
Introduction

The Cardiovascular Division and related disciplines at the Washington University School of Medicine have a distinguished track record of research productivity in both the clinical and basic sciences. The objectives of this document are twofold:

- 1.) To provide an overview of current research activities of individual investigators within the Cardiovascular Division, as well as investigators in related fields of research; and
- 2.) To assist residents, fellows, graduate students, MSTPs and junior faculty members in identifying potential mentors with specific research interests.

The document is updated at least annually to reflect evolving research interests. Questions regarding ongoing or proposed research projects should be directed to individual investigators. General questions about the Mentorship Program should be addressed to members of the Mentorship Committee, comprising Drs. Barger, D. Brown, Kates, Mann, Davila, Peterson, and Rich.

Comments or suggestions about the utility of this document and how it could be improved should be addressed to Michael W Rich, MD, Professor of Medicine, at mrich@wustl.edu.



How to Use This Document



Residents, fellows, and others who wish to identify potential mentor(s) are encouraged to browse through the Index, which lists investigators according to their areas of interest. Names in the Table of Contents and in the Index are hyperlinked to the Investigator's page within the document. Names on each Investigator's page are hyperlinked to the Cardiology website (or Washington University faculty website for investigators outside the Cardiovascular Division). The website provides additional details about each investigator's training, publications, and clinical activities. Key words at the bottom of each investigator's page indicate terms listed in the Index.

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[Dana R. Abendschein, PhD](#)

Associate Professor of Medicine, Cell Biology, and Physiology

Current research interests

- Inhibition of thrombosis during treatment of myocardial infarction in pigs with use of targeted antithrombotic agents to increase efficacy and decrease bleeding complications.
- Assessing effect of optimized antithrombotics on longer-term recovery of reperfused myocardium with use of MRI to detect residual fibrosis as an index of heart failure.
- Identification of unstable atherosclerotic plaque in rabbits with use of novel antithrombotic probes and optical imaging as well as treating the eroding plaque with targeted antithrombotics.
- Role of phospholipase A₂γ in myocardial reperfusion injury after infarction and during diabetes in mice.

Representative Publications

1. Maji D, Solomon M, Nguyen A, Pierce RA, Woodard PK, Akers WJ, Achilefu S, Culver JP, Abendschein DR, Shokeen M. Noninvasive imaging of focal atherosclerotic lesions using fluorescence molecular tomography. *J Biol Optics*, 2014; 19:110501-110503.
2. Moeckel D, Jeong S, Sun X, Broekman J, Nguyen A, Marcus AJ, Robson S, Chen R, Abendschein DR. Optimizing human apyrase to treat arterial thrombosis and limit reperfusion injury without bleeding risk. *Science: Translational Medicine*, 2014 (Aug 6); 6(248):248ra105. PMID: 25100739.
3. Moon SH, Mancuso DJ, Sims HF, Liu X, Nguyen AL, Yang K, Guan SP, Dilthey BG, Jenkins CM, Abendschein D, Gross RW. Cardiac myocyte specific knockout of calcium-independent phospholipase A₂γ decreases oxidized fatty acids during ischemia/reperfusion and reduces infarct size. *J Biol Chem* 2016; 291(37):19687-19700. PMCID: PMC5016701.
4. Nie X, Laforest R, Elvington A, Randolph GJ, Zheng J, Voller T, Abendschein DR, Lapi SE, Woodard PK. PET/MR imaging of hypoxic atherosclerosis using ⁶⁴Cu-ATSM in a rabbit model. *J Nuc Med* 2016; 116:172544 PMCID: PMC27390157.
5. Yin Q, Abendschein D, Muccigrosso D, O'Connor R, Goldstein T, Zheng, J. A non-contrast CMR index for assessing myocardial fibrosis. *Magn Reson Imag*, 2017; 42:69-73.
6. Liu H, Jin H, Yue X, Han J, Baum P, Abendschein DR, Tu Z. PET study of sphingosine-1-phosphate receptor expression in response to vascular inflammation in a rat model of carotid injury. *Mol Imaging* 2017; 16, [Epub ahead of print]. PMCID: In progress.

Key words: atherosclerosis, antithrombotics, imaging, reperfusion injury and heart failure, animal models, and calcium independent phospholipases

[Amit Amin, MD](#)

Assistant Professor of Medicine

Current Research Interests

- Improving outcomes of percutaneous coronary intervention (PCI)
- Reducing PCI complications, including bleeding and acute kidney injury
- Reducing costs of PCI and acute coronary syndromes
- Cost-effectiveness of adjunctive therapies in interventional cardiology
- Cost-effectiveness of radial access PCI

Representative Publications

1. Amin AP, Spertus JA, Reid KJ, Lan X, Buchanan DM, Decker C, Masoudi FA. The prognostic importance of worsening renal function during an acute myocardial infarction on long-term mortality. *Am Heart J*. 2010 Dec;160(6):1065-71.
2. Amin AP, Wang TY, McCoy L, Bach RG, Efron MB, Peterson ED, Cohen DJ. Impact of Bleeding on Quality of Life in Patients on DAPT: Insights From TRANSLATE-ACS. *J Am Coll Cardiol* 2016 January 5;67(1):59-65.
3. Depta JP, Patel JS, Novak E, Gage BF, Masrani SK, Raymer D, Facey G, Patel Y, Zajarias A, Lasala JM, Amin AP, Kurz HI, Singh J, Bach RG. Risk model for estimating the 1-year risk of deferred lesion intervention following deferred revascularization after fractional flow reserve assessment. *Eur Heart J* 2015 February 21;36(8):509-15.
4. Amin AP, Wang TY, McCoy L, Bach RG, Efron MB, Peterson ED, Cohen DJ. Impact of Bleeding on Quality of Life in Patients on DAPT: Insights From TRANSLATE-ACS. *J Am Coll Cardiol* 2016;67(1):59-65.
5. Amin AP, Bach RG, Caruso ML, Kennedy KF, Spertus JA. Association of Variation in Contrast Volume with Acute Kidney Injury in Patients Undergoing Percutaneous Coronary Intervention. *JAMA Cardiol*. 2017 Jul 5. doi: 10.1001/jamacardio.2017.2156. PMID: 28678988
6. Qintar M, Spertus JA, Tang Y, Buchanan DM, Chan PS, Amin AP, Salisbury AC. Noncardiac Chest Pain after Myocardial Infarction: Frequency and Association with Health Status Outcomes. *Am Heart J*. 2017 Apr; 186: 1-11. doi: 10.1016/j.ahj.2017.01.001. PMID 28454822
7. Shafiq A, Gosch K, Amin AP, Ting HH, Spertus JA, Salisbury AC. Predictors and Variability of Drug-Eluting VS Bare-metal Stent Selection in Contemporary Percutaneous Coronary Intervention: Insights from the PRISM Study. *Clin Cardiol*. 2017 Mar 16. doi: 10.1002/clc.22693. PMID: 28300284
8. Amin AP, Patterson M, House JA, Giersiefen H, Spertus, JA, Baklanov DV, Chhatriwalla AK, Safley DM, Cohen DJ, Rao SV, Marso SP. Costs Associated with Access Site and Same-Day Discharge Among Medicare Beneficiaries Undergoing Percutaneous Coronary Intervention: An Evaluation of the Current Percutaneous Coronary Intervention Care Pathways in the United States. *JACC Cardiovasc Interv* 2017 Feb 27; 10(4): 342-351. Doi: 10.1016/j.jcin.2016.11.049. PMID: 28231901.

Key words: cost-effectiveness analysis, interventional cardiology, outcomes research

Richard G. Bach, MD

Professor of Medicine

Current Research Interests

- Hypertrophic cardiomyopathy: physiology, treatment, and genetics
- Acute coronary syndromes
- Diabetes and CAD
- Coronary physiology and imaging

Representative Publications

1. Subherwal S, Bach RG, Chen AY, Gage BF, Rao SV, Newby LK, Wang TY, Gibler WB, Ohman EM, Roe MT, Pollack CV Jr, Peterson ED, Alexander KP. Baseline Risk of Major Bleeding in Non-ST-Segment Elevation Myocardial Infarction: The CRUSADE (Can Rapid risk stratification of Unstable angina patients Suppress Adverse outcomes with Early implementation of the ACC/AHA guidelines) Bleeding Score. *Circulation* 2009;119:1873-1882.
2. Cresci S, Wu J, Province MA., Spertus JA, Steffes M, McGill JB, Alderman EL, Brooks MM, Kelsey SF, Frye RL, Bach RG. PPAR-Pathway Gene Polymorphisms Associated with Extent of Coronary Artery Disease in Patients with Type 2 Diabetes in the BARI 2D Trial. *Circulation* 2011;124:1426-1434.
3. Bach RG, Brooks MM, Lombardero M, Genuth S, Donner TW, Garber A, Kennedy L, Monrad ES, Pop-Busui R, Kelsey SF, Frye RL; BARI 2D Investigators. Rosiglitazone and outcomes for patients with diabetes mellitus and coronary artery disease in the Bypass Angioplasty Revascularization Investigation 2 Diabetes (BARI 2D) trial. *Circulation*. 2013;128(8):785-94.
4. Cresci S, Depta JP, Lenzini PA, Li AY, Lanfear DE, Province MA, Spertus JA, Bach RG. Cytochrome p450 gene variants, race, and mortality among clopidogrel-treated patients after acute myocardial infarction. *Circ Cardiovasc Genet*. 2014;7(3):277-86.
5. Depta JP, Lenzini PA, Lanfear DE, Wang TY, Spertus JA, Bach RG, Cresci S. Clinical outcomes associated with proton pump inhibitor use among clopidogrel-treated patients within CYP2C19 genotype groups following acute myocardial infarction. *Pharmacogenomics J*. 2015;15:20–25.
6. Depta JP, Patel JS, Novak E, Gage BF, Masrani S, Raymer D, Facey G, Patel Y, Zajarias A, Lasala J, Amin AP, Kurz HI, Singh J, Bach RG. Risk model for estimating the one-year risk of deferred lesion intervention following deferred revascularization after fractional flow reserve assessment. *Eur Heart J*, 2015;36(8):509-15.
7. Mehta SM, Depta JP, Novak E; Patel JS; Patel Y; Raymer D; Facey G, Zajarias A, Lasala JM, Singh J, Bach RG*, Kurz HI. Association of Lower Fractional Flow Reserve Values With Higher Risk of Adverse Cardiac Events for Lesions Deferred Revascularization Among Patients With Acute Coronary Syndrome. *J Am Heart Assoc* 2015;4:e002172 doi: 10.1161/JAHA.115.002172; Published online ahead of print, August 20, 2015.

Key words: coronary artery disease, diabetes, hypertrophic cardiomyopathy, imaging

Philip M. Barger, MD, MSc

Associate Professor of Medicine

Current research interests

- Molecular mechanisms of cardiac reverse remodeling and recovery
- Adult congenital heart disease

Representative Publications

1. Zhang W, Chancey AL, Tzeng HP, Zhou Z, Lavine KJ, Gao F, Sivasubramanian N, Barger PM, Mann DL. The development of myocardial fibrosis in transgenic mice with targeted overexpression of tumor necrosis factor requires mast cell-fibroblast interactions. *Circulation*. 2011 Nov 8;124(19):2106-16.
2. Mann DL, Barger PM, Burkhoff D. Myocardial recovery and the failing heart: myth, magic, or molecular target? *J Am Coll Cardiol*. 2012 Dec 18;60(24):2465-72.
3. Divakaran VG, Evans S, Topkara VK, Diwan A, Burchfield J, Gao F, Dong J, Tzeng HP, Sivasubramanian N, Barger PM, Mann DL. Tumor necrosis factor receptor-associated factor 2 signaling provokes adverse cardiac remodeling in the adult Mammalian heart. *Circ Heart Fail*. 2013 May 1;6(3):535-43.
4. Tzeng HP, Evans S, Gao F, Chambers K, Topkara VK, Sivasubramanian N, Barger PM, Mann DL. Dysferlin mediates the cytoprotective effects of TRAF2 following myocardial ischemia reperfusion injury. *J Am Heart Assoc*. 2014 Feb 26;3(1):e000662.

Key words: reverse remodeling, congenital heart disease

Anita Bhandiwad, MD

Associate Professor of Medicine

Current Research Interests

- Cardiac magnetic resonance imaging
- Echocardiography
- Nuclear cardiology

Representative Publications

1. Danias PG, Bhandiwad AR: Cardiac Magnetic Resonance Imaging. In Heller, GV and Hendel, RC (Eds): Nuclear Cardiology: Practical Applications. McGraw-Hill, p. 227-242, 2004.
2. Fuisz AR, Pohost GM, Bhandiwad AR. Clinical utility of cardiovascular magnetic resonance imaging. In: UpToDate, Rose, BD (Ed), UpToDate, Waltham, MA, 2005, 2006, 2007.
3. Bhandiwad AR, Cummings WK, Crowley M, Woodard PK. Cardiovascular magnetic resonance with an MR compatible pacemaker. Journal of Cardiovascular Magnetic Resonance. 2013, 15:18.

Key words: imaging, cardiac MRI, echocardiography

Joseph J. Billadello, MD

Associate Professor of Medicine

Current Research Interests

- Adult congenital heart disease

Representative Publications

1. Holt DB, Singh GK, Rhee EK, Billadello J and Ludomirsky A: Prinzmetal Angina in an Adolescent: Adjunctive Role of Tissue Synchronization Imaging. *Circulation* 2005; 112: e91 - e92.
2. Hidalgo A, Ho ML, Bhalla S, Woodard PK, Billadello JJ and Gutierrez FR: Inferior Type Sinus Venosus Atrial Septal Defect, MR Findings. *J Thorac Imaging*, 2008; Nov; 23(4):266-8.
3. Schilling, JD and Billadello, JJ: Right Coronary Artery to Coronary Sinus Fistula by TEE, Cardiac MRI, and Coronary Angiography. *Clin Cardiol* 2009 Jul 32(7): E29-30.
4. Cedars, AM, Javidan-Nejad, C, Goyal, M, Billadello, J and Ludbrook, P: Massive Global Right Ventricular Hypertrophy with Both Fixed and Dynamic Obstruction and Pulmonary Valve Dysplasia. *Congenit Heart Dis*, 2012;7:66–70.
5. Bradley, EA, Chakinala, M, and Billadello, JJ: Usefulness of Medical Therapy for Pulmonary Hypertension and Delayed Atrial Septal Defect Closure. *Am J Cardiol*, 2013;112(9):1471-1476.
6. Bradley E, Parker J, Novak E, Ludbrook P, Billadello J, Cedars A. Cardiovascular disease in late survivors of tetralogy of Fallot: A tertiary care center experience. *Tex Heart Inst J* 2013;40(4):418-23.
7. Bierhals, AJ, Rossini, S, Woodard, PK, Javidan-Nejad, C, Billadello, JJ, Bhalla, S, and Gutierrez, FR: Segmental Analysis of Congenital Heart Disease: Putting the “Puzzle” Together with Computed Tomography. *Int J Cardiovasc Imaging*, 2014; 30(6):1161-72.
8. Lindley, KJ, Madden, T, Cahill, AG, Ludbrook, PA and Billadello, JJ: Contraceptive Use and Unintended Pregnancy in Women with Congenital Heart Disease. *Obstet Gynecol*, 2015; 126(2):363-9.
9. Martinez, SC, Byku, M, Cedars, AM, Ludbrook, PA and Billadello, JJ: Increased BMI is Associated with Heart Failure and Mortality in Fontan Patients. Abstract accepted for presentation at the 25th International Symposium on Adult Congenital Heart Disease in Toronto, Ontario, Canada June 2015.
10. Sintek, MA, Singh, J and Billadello, JJ: Dynamic Evaluation of Coronary Anomalies Originating from the Opposite Sinus of Valsalva (ACAOS). *Curr Treat Opin Cardiovasc Med*; 2015; 17(11):47.
11. Martinez, SC, Byku, M, Novak, EL, Cedars, AM, Eghtesady, P, Ludbrook, PA and Billadello, JJ: Increased Body Mass Index is Associated with Congestive Heart Failure and Mortality in Adult Fontan Patients. *Congenit Heart Dis*. 2016;11:71-79.
12. Anwar, S, Singh, GK, Varughese, J, Nguyen, H, Billadello, JJ, Sheybani, EF, Woodard, PK, Manning, P and Eghtesady, P: 3D Printing in Complex Congenital Heart Disease Across a Spectrum of Age, Pathology and Imaging Techniques. *JACC Cardiovasc Imaging* 2017; in press.
13. Anwar S, Singh GK, Petrucci O, Eghtesady P, Woodard PK, Billadello JJ. (2017) Adult Congenital Heart Disease. In Farooqi KM (Editor) *Rapid Prototyping in Cardiac Disease: 3D Printing the Heart*. (pp. 99-109). New York, NY: Springer International.

Key words: congenital heart disease

Alan C. Braverman, MD

Alumni Endowed Professor in Cardiovascular Diseases, Department of
Medicine

Current Research Interests

- Genetically triggered aneurysm syndromes (Marfan, Loeys-Dietz, Familial TAA disease)
- Aortic dissection
- Bicuspid aortic valve and aortopathy
- Aortic disease in pregnancy

Representative Publications

1. Buchan JG, Alvarado DM, Haller G, Cruchaga C, Harms MB, Zhang T, Willing MC, Grange DK, Braverman AC, Miller N, Morcuende J, Tang N, Dobbs MB, Gurnett CA. Rare variants in FBN1 and FBN2 are associated with severe adolescent idiopathic scoliosis. *Hum Mol Genet.* 2014 Oct 1;23(19):5271-82. Doi:10.1093/hmg/ddu224. Epub 2014 May 15. PMID: 24833718
2. Braverman AC. Diseases of the Aorta. In, Bonow RO, Mann DL, Zipes DP, Libby P. Braunwald's Heart Disease, 10th Edition, 2014.
3. Chaddha A, Kline-Rogers E, Woznicki E, Brook R, Housholder-Hughes S, Braverman AC, Pitler L, Hirsch A, and Eagle KA. Activity recommendations for post-aortic dissection patients. *Circulation* 2014 Oct 14;130(16):e140 Doi:10.1161/CIRCULATIONAHA.113.005819.
4. Lacro RV, Dietz HC, Sleeper LA, Yetman AT, Bradley TJ, Colan SD, Pearson DG, Tierney ESSS, Levine JC, Atz AM, Benson W, Braverman AC, Chen S, De Backer J, Gelb BD, Grossfeld PD, Klein GL, Lai WW, Liou A, Loeys BL, Markham LW, Olson AK, Paridon SM, Pemberton VL, Pierpont ME, Pyeritz RE, Radojewski E, Roman MJ, Sharkey AM, Stylianou MP, Wechsler SB, Young LT, Mahony L, for the Pediatric Heart Network Investigators. Randomized Trial of Atenolol Versus Losartan in Children and Young Adults With Marfan Syndrome. *N Engl J Med.* 2014 Nov 27;371(22):2061-71. doi: 10.1056/NEJMoa1404731. Epub 2014 Nov 18. PMID:25405392.
5. Braverman AC. Clinical Manifestations and Diagnosis of Bicuspid Aortic Valve. In UpToDate, Basow DS (Ed), UpToDate, Waltham, MA, September 1014.
6. Braverman AC. Treatment of Bicuspid Aortic Stenosis in Adults. In: UpToDate, Basow DS (Ed), UpToDate, Waltham, MA, August 2014.
7. Braverman AC. Guidelines for Management of Bicuspid Aortic Valve Aneurysms: What is the Clinician to Do? *Curr Opin Cardiol.* 2014;29:489-91.
8. Braverman AC. Recognizing Marfan Syndrome in Athletes. American College of Cardiology, Sports and Exercise Cardiology Section Web page, 2015, <http://www.acc.org/clinical-topics/sports-and-exercise-cardiology>.
9. Adamo L, Braverman AC. Surgical threshold for bicuspid aortic valve aneurysm: A case for individual decision making. *Heart* 2015; June 15, 2015. June 15, 2015 as 10.1136/heartjnl-2014-306601

Key Words: aorta and great vessels, aortic stenosis, valvular heart disease

Angela L. Brown, MD

Associate Professor of Medicine

Current Research Interests

- Hypertensive Heart Disease
- Resistant hypertension
- Tools/strategies for implementing community education on cardiovascular disease prevention

Representative Publications

1. de las Fuentes L, Brown AL, Waggoner AD, Davila-Roman VG. Plasma Triglyceride Level is an Independent Predictor of Altered Left Ventricular Relaxation. *J Am Soc Echocardiogr* 2005 Dec; 18(12):1285-91.
2. de las Fuentes L, Brown AL, Reagan JL, Towler DA, Waggoner AD, Dávila-Román VG. Increased Carotid Intima-Media Thickness in Metabolic Syndrome. *Circulation* 2005;112: II-384.
3. Dong SJ, de las Fuentes L, Brown AL, Waggoner AD, Ewald GA, Dávila-Román VG. NT-proBNP Levels: Correlation with Echocardiographically-determined Left Ventricular Filling Pressures in An Ambulatory Cohort. *J Am Soc Echocardiogr* 2006;19:1017-1025.
4. de las Fuentes L, Brown AL, Mathews SJ, Waggoner AD, Soto P, Gropler RJ, Dávila-Román VG. Metabolic Syndrome is Associated with Abnormal Left Ventricular Diastolic Function Independent of LV Mass. *Eur Heart J*. 2007 Mar;28(5):553-9.
5. Brown AL. Obesity and Metabolic Syndrome in African American Women. *J Cardiometab Syndr*. 2008 Spring;3(2):126-128.
6. Flack JM, Sica DA, Bakris G, Brown AL, Ferdinand KC, Grimm RH, Hall WD, Jones WE, Kountz DS, Lea JP, Nasser S, Nesbitt SD, Saunders E, Scisney-Matlock M, Jamerson KA. Management of high blood pressure in Blacks: an update of the International Society on Hypertension in Blacks consensus statement. *Hypertension* 2010 Nov;56(5):780-800.
7. Brown A, Captain B. 50 years of thiazides: should thiazide diuretics be considered third-line hypertension treatment? *Am J Ther* 2011 Nov;18(6):e244-e254, doi:10.1097/MJT.0b013e3181e90863
8. Brown AL, Lau JMC. Cardiovascular Disease in Special Populations. In: Cuculich PS, Kates AM. *The Washington Manual of Cardiology Subspecialty Consult*. 3rd ed. Philadelphia: Wolters Kluwer, 2014:467-485.
9. Egan BM, Bland VJ, Brown AL, Ferdinand KC, Hernandez GT, Jamerson KA, Johnson WR, Kountz DS, Li J, Osei K, Reed JW, Saunders E. Hypertension in African Americans aged 60 to 79 years: statement from the International Society of Hypertension in Blacks. *J Clin Hypertens (Greenwich)*. 2015 Mar 10. doi: 10.1111/jch.12511.

Key words: hypertension, prevention, women and minorities

David L. Brown, MD

Professor of Medicine

Current Research Interests

- Use of Existing Public and Proprietary Databases to Answer Clinical Questions in Cardiovascular Disease
- Comparative effectiveness research of treatments for cardiovascular disease
- Health services/health policy research for cardiovascular disease
- Meta-analysis
- Machine learning and predictive analytics
- Ischemic Heart Disease including microvascular dysfunction and coronary spasm

Representative Publications

1. Brown DL. The Recommendation for Stenting in Stable Coronary Artery Disease—Ignoring the Evidence, Excluding the Patient. A Teachable Moment. *JAMA Intern Med.* 2015;175(7):1090-1091. doi:10.1001/jamainternmed.2015.1705.
2. Mitchell JD, Brown DL. Update on percutaneous coronary intervention in stable coronary artery disease. *JAMA Intern Med.* 2016;176(12):1855-1856. doi:10.1001/jamainternmed.2016.6656.
3. Pierce B, Bole I, Patel V, Brown DL. Clinical outcomes of remote ischemic preconditioning prior to cardiac surgery: an updated meta-analysis of randomized controlled trials. <https://doi.org/10.1161/JAHA.116.004666>. *Journal of the American Heart Association.* 2017;6:e004666. Originally published February 20, 2017.
4. Fohtung RB, Brown DL, Koh WJH, Bartz TM, Carbone LD, Civitelli R, Stein PK, Chaves PHM, Kestenbaum BR, Kizer JR. Bone mineral density and risk of heart failure in older adults: the Cardiovascular Health Study. <https://doi.org/10.1161/JAHA.116.004344> *Journal of the American Heart Association.* 2017;6:e004344. Originally published March 13, 2017.
5. Patel V, Pierce B, Bodapati R, Brown DL, Ives D, Stein P. Association of Holter-derived heart rate variability with the development of heart failure in the Cardiovascular Health Study. *JACC Heart Fail.* 2017 Jun;5(6):423-431.
6. Chung M, Novak E, Brown DL. Effect of prompt revascularization on outcomes in diabetics with stable ischemic heart disease and prior myocardial infarction: insights from the BARI 2D Trial. *Coronary Artery Disease* 2017; 28(4):301-306.
7. Khan A, Chung M, Novak E, Brown DL. The long-term hazard of smoking in diabetic patients with stable ischemic heart disease. *Eur J Prev Cardiol*; First Published May 18, 2017.

Key Words: outcomes research, comparative effectiveness research, meta-analysis, coronary artery disease, health services research, patient-centered care, ischemic heart disease, microvascular dysfunction, coronary spasm

George J. Broze, Jr., MD

Professor of Medicine and Cell Biology and Physiology

Current Research Interests

- Regulation of coagulation
- Thrombosis
- Atherosclerosis

Representative Publications

1. Huang X, Yan Y, Tu Y, Gatti J, Broze GJ Jr, Zhou A, Olson ST. Structural basis for catalytic activation of protein Z-dependent protease inhibitor (ZPI) by protein Z. *Blood* 2012;120:1726-1733.
2. Girard TJ, Lasky NM, Tuley EA, Broze GJ Jr. Protein Z, protein Z-dependent protease inhibitor (serpin A10), and the acute-phase response. *J. Thromb. Haemost.* 2013;11:375-378.
3. Feng D, Stafford KA, Broze GJ, Stafford DW. Evidence of clinically significant extravascular stores of factor IX. *J. Thromb. Haemost.* 2013;11:2176-2178.
4. Broze GJ Jr. An acquired, calcium-dependent, factor X inhibitor. *Blood Cells Mol. Diseases* 2014;52:116-120.
5. van den Boogaard FE, Van't Veer C, roelofs JJ, Meijers JC, Schultz MJ, Broze GJ Jr, van der Poll T. Endogenous tissue factor pathway inhibitor has a limited effect on host defense in murine pneumococcal pneumonia. *Thromb. Haemost.* 2015;114:115-122.

Key words: thrombosis, atherosclerosis, basic science

Robert M. Carney, PhD

Professor of Psychiatry

Current Research Interests

- The effects of psychiatric depression on the course and outcome of coronary heart Disease
- Potential mechanisms underlying the risk of depression on cardiac related morbidity and Mortality
- The effects of treating depression on course and outcome of coronary heart disease

Representative Publications

1. Whooley MA, deJonge P, Vittinghoff E, Otte C, Moos R, Carney RM, Ali S, Dowray S, Na B, Feldman MD, Schiller NB, Browner WS. Depressive symptoms, health behaviors, and risk of cardiovascular events in patients with coronary heart disease. JAMA. 2008; 300:2379-2388.
2. Carney RM, Freedland KE, Rubin EH, Rich MW, Steinmeyer BC, Harris WS. Omega-3 augmentation of sertraline in the treatment of depression in patients with coronary heart disease: a randomized controlled trial. JAMA, 2009; 302(15):1651-1657.
3. Freedland KE, Skala JA, Carney RM et al. Treatment of depression after coronary artery bypass surgery: a randomized controlled trial. Arch Gen Psychiatry 2009 April; 66(4):387-96.
4. Carney RM, Freedland KE. Treatment-resistant depression and mortality after acute coronary syndrome. Am J Psychiatry 2009 April; 166(4):410-417.
5. Carney RM, Freedland KE. Depression and coronary heart disease. Nature Reviews Cardiology, 2017; 14(3):145-155. PM: 27853162.

Key words: behavioral medicine, coronary artery disease, depression, sleep disorders

Murali M. Chakinala, MD

Professor of Medicine

Current Research Interests

- Therapeutics in pulmonary arterial hypertension
- Non-invasive evaluation in pulmonary hypertension

Representative Publications

1. Sundry R, Billadello J, Zheng J, Ahrens T, Chakinala M. External Doppler is an accurate and reproducible method of measuring cardiac output in patients with pulmonary hypertension. *Am J Respir Crit Care Med.* 2008; 177. A917. (abstract)
2. Murugappan M, Zheng J, Taichman D, Steen V, McGoon M, Soto, F, Park M, Chakinala M. Agreement for Functional Class Assignment Among Pulmonary Hypertension Experts Using a Standardized Activities Questionnaire. *Am J Respir Crit Care Med.* 2008; 177. (abstract)
3. Taichman DB, McGoon M, Harhay MO, Archer-Chicko C, Sager JS, Murugappan M, Chakinala MM, Palevsky HI, and Gallop R. Wide Variation in Clinicians' Assessment of New York Heart Association / World Health Organization Functional Class in Patients with Pulmonary Arterial Hypertension. *Mayo Clinic Proceedings.* 2009; 84(7): 586-592.
4. Bradley EA, Chakinala MM, and Billadello JJ. Delayed atrial septal defect closure in the presence of pulmonary arterial hypertension: Medical therapy may improve closure candidacy. *Am J Cardiol.* 2013; 112(9): 1471-6.
5. Lahm T and Chakinala MM. World Health Organization Group 5 Pulmonary Hypertension. *Clin Chest Med.* 2013; 34 (4): 753-778.
6. Chakinala MM and Barst RJ. From short-term outcomes to long-term benefits: the evolution of clinical trials in pulmonary arterial hypertension. *Pulmonary Circulation.* 2013; 3(3): 507-22. PMID: 24618537
7. Frantz RP, Schilz RJ, Chakinala MM, Badesch DB, Frost AE, McLaughlin VV, Barst RJ, Rosenberg D, Miller DM, Hartline BK, Benton WW, Farber HW. Hospitalization and Survival in Patients Utilizing Epoprostenol for Injection in the PROSPECT Observational Study. *Chest.* 2015; 147(2): 484-94.

Key words: pulmonary hypertension, pulmonary arterio-venous malformations, right heart failure

Sharon Cresci, MD

Associate Professor of Medicine and Genetics

Current Research Interests

- Association of genetic variation with clinical outcomes in individuals with both diabetes mellitus and coronary artery disease.
- Role of genetic variation in the variable response to pharmacologic treatment (i.e., pharmacogenomics).
- Determination of modifier genes that influence phenotypic expression in patients with hypertrophic cardiomyopathy.

Representative Publications

1. Cresci S, Wu J, Province MA, Spertus JA, Steffes M, McGill JB, Alderman EL, Brooks MM, Kelsey SF, Frye RL, Bach RG. Peroxisome proliferator-activated receptor pathway gene polymorphism associated with extent of coronary artery disease in patients with type 2 diabetes in the Bypass Angioplasty Revascularization Investigation 2 Diabetes Trial. *Circulation* 2011; 124(13):1426-1434. PMID:21911782.
2. Cresci S, Dorn GW, Jones PG, Beitelshes AL, Li AY, Lenzini PA, Province MA, Spertus JA, Lanfear DE. Adrenergic-pathway gene variants influence β -blocker-related outcomes after acute coronary syndrome in a race-specific manner. *J Am Coll Cardiol* 2012; 60:898-907. PMID: PMC3678950.
3. Cresci S, Depta J, Lenzini PA, Li AY, Lanfear DE, Province MA, Spertus JA, Bach RG. Cytochrome P450 gene variants, race, and mortality among clopidogrel treated patients following acute myocardial infarction. *Circ Cardiovasc Genet* 2014; 7:277-286. PMID: PMC4104276.
4. Depta J, Lenzini PA, Lanfear DE, Wang TY, Spertus JA, Bach RG, Cresci S. Clinical outcomes associated with proton pump inhibitor use among clopidogrel-treated patients within CYP2C19 genotype groups following acute myocardial infarction. *Pharmacogenomics J* 2015; 15:20-25. PMID: PMC4287459.
5. Buchanan DM, Arnold S, Li Y, Jones PG, Longmore LS, Spertus JA, Cresci S. The association of smoking status with angina and health-related quality of life after acute myocardial infarction. *Circ Cardiovasc Qual Outcomes* 2015; 8:493-500.

Key words: coronary artery disease, diabetes, echocardiography, genetics, hypertrophic cardiomyopathy, molecular cardiology, pharmacogenomics, risk factors, translational research

Phillip S. Cuculich, MD

Associate Professor of Medicine

Current Research Interests

- Noninvasive cardiac mapping and stereotactic radioablation
- Surgical/ablation techniques for atrial fibrillation and ventricular tachycardia
- Noninvasive electrophysiologic imaging of uterine contractions to study preterm birth

Representative Publications

1. Cuculich PS, Zhang J, Wang Y, Desouza KA, Vijayakumar R, Woodard PK, Rudy Y. The electrophysiological cardiac ventricular substrate in patients after myocardial infarction: noninvasive characterization with electrocardiographic imaging. *J Am Coll Cardiol*. 2011 Oct 25; 58(18):1893-902. PubMed PMID: 22018301; PubMed Central PMCID: PMC3365586.
2. Zhang J, Desouza KA, Cuculich PS, Cooper DH, Chen J, Rudy Y. Continuous ECGI mapping of spontaneous VT initiation, continuation, and termination with antitachycardia pacing. *Heart Rhythm*. 2012 Jan 2. PMID: 22222277; PubMed Central PMCID: PMC3376666.
3. Desouza KA, Joseph SM, Cuculich PS, Ewald GA, Rudy Y. Noninvasive mapping of ventricular activation in patients with transplanted hearts. *Journal of Electrocardiology*. 2013; 46: 698-701. PMID: 23773656.
4. Zhang J, Sacher F, Hoffmayer K, O'Hara ZT, Strom M, Cuculich P, Silva J, Cooper D, Faddis M, Hocini M, Haissaguerre M, Scheinman M, Rudy Y. The Cardiac Electrophysiologic Substrate Underlying the ECG Phenotype and Electrogram Abnormalities in Brugada Syndrome Patients. *Circulation* 2015; 131:1950-1959.
5. Bear L, Cuculich PS, Bernus O, Efimov I, Dubois R. Introduction to noninvasive cardiac mapping. *Card Electrophysiol Clin*. 2015 Mar; 7(1):1-16. doi: 10.1016/j.ccep.2014.11.015. PMID: 25784020.
6. Vijayakumar R, Vasireddi SK, Cuculich PS, Faddis MN, Rudy Y. Methodology Considerations in Phase Mapping of Human Cardiac Arrhythmias. *Circ Arrhythm Electrophysiol*. 2016 Nov; 9(11). pii: e004409. PMID: 27906655.
7. Zhang J, Cooper DH, Desouza KA, Cuculich PS, Woodard PK, Smith TW, Rudy Y. Electrophysiologic Scar Substrate in Relation to VT: Noninvasive High-Resolution Mapping and Risk Assessment with ECGI. *Pacing Clin Electrophysiol*. 2016 Aug; 39(8):781-91. doi: 10.1111/pace.12882. Epub 2016 Jun 6. PMID: 27197804.
8. Lakkireddy D, Afzal MR, Lee RJ, Nagaraj H, Tschopp D, Gidney B, Ellis C, Altman E, Lee B, Kar S, Bhadwar N, Sanchez M, Gadiyaram V, Evonich R, Rasekh A, Cheng J, Cuoco F, Chandhok S, Gunda S, Reddy M, Atkins D, Bommana S, Cuculich P, Gibson D, Nath J, Ferrell R, Matthew E, Wilber D. Short and long-term outcomes of percutaneous left atrial appendage suture ligation: Results from a US multicenter evaluation. *Heart Rhythm*. 2016 May; 13(5):1030-6. doi: 10.1016/j.hrthm.2016.01.022. Epub 2016 Feb 9. PMID: 26872554.
9. Junjie Zhang, Mèlèze Hocini, Maria Strom, Phillip S. Cuculich, Daniel H. Cooper, Frédéric Sacher, Michel Haissaguerre, Yoram Rudy. The Electrophysiological Substrate of Early Repolarization Syndrome. *JACC: Clinical Electrophysiology* Mar 2017; 335; DOI: 10.1016/j.jacep.2016.12.017.

Key words: arrhythmias, atrial fibrillation, ventricular tachycardia, multimodality cardiac imaging, electrophysiology, translational research

Victor G. Davila-Roman, MD

Professor of Medicine, Anesthesiology, and Radiology

Current Research Interests

- Cardiovascular imaging: echocardiography, vascular ultrasound, nuclear cardiology, cardiac CT
- Cardiac metabolism, Hypertensive heart disease, Diastolic function
- Cardiovascular genetic epidemiology

Representative Publications

1. Gu CC, Flores HR, de las Fuentes L, Davila-Roman VG. Enhanced detection of genetic association of hypertensive heart disease by analysis of latent phenotypes. *Genetic Epidemiol* 2008; 32(6):528-38.
2. de las Fuentes L, Waggoner AD, Mohammed BS, Stein RI, Miller BV 3rd, Foster GD, Wyatt HR, Klein S, Davila-Roman VG. Effect of moderate diet-induced weight loss and weight regain on cardiovascular structure and function. *J Am Coll Cardiol* 2009; 54(25):2376-81.
3. Mathews SJ, de las Fuentes L, Podaralla P, Cabellon A, Bierhals A, Spence K, Slatopolsky E, Davila-Roman VG, Delmez JA. Effects of Sodium Thiosulfate on Vascular Calcification in ESRD: A Pilot Study of Feasibility, Safety, and Efficacy. *Am J Nephrol* 2011; 33:131-138.
4. Lin CH, Kurup S, Herrero P, Schechtman KB, Eagon JC, Klein S, Dávila-Román VG, Stein RI, Dorn GW, Gropler RJ, Peterson LR. Myocardial Oxygen Consumption Change Predicts Ventricular Relaxation Improvement in Obese Humans after Weight Loss. *Obesity* 2011; 19:1804-1812.
5. de las Fuentes L, Yang W, Dávila-Román VG, Gu CC. Pathway-based genome-wide association analysis of coronary heart disease identifies biologically important gene sets. *Eur J Hum Genet*. Advance online publication, 18 April 2012; doi:10.1038/ejhg.2012.66.
6. Vader JM, LaRue SJ, Stevens SR, Mentz RJ, DeVore AD, Lala A, Groarke JD, AbouEzzeddine OF, Dunlay SM, Grodin JL, Davila-Roman VG, de Las FL. Timing and Causes of Readmission After Acute Heart Failure Hospitalization-Insights From the Heart Failure Network Trials. *J Card Fail* 2016 April 28.
7. Kadkhodayan A, Lin CH, Coggan AR, Kisrieva-Ware Z, Schechtman KB, Novak E, Joseph SM, Davila-Roman VG, Gropler RJ, Dence C, Peterson LR. Sex affects myocardial blood flow and fatty acid substrate metabolism in humans with nonischemic heart failure. *J Nucl Cardiol* 2016 April 5.
8. Barve RA, Gu CC, Yang W, Chu J, Davila-Roman VG, de Las FL. Genetic association of left ventricular mass assessed by M-mode and two-dimensional echocardiography. *J Hypertens* 2016 January; 34(1):88-96.

Key words: cardiac imaging, cardiac metabolism, hypertension, genetic epidemiology, translational research, diastolic function, echocardiography

[Lisa de las Fuentes, MD](#)

Associate Professor of Medicine and Biostatistics

Current Research Interests

- Genetic epidemiology of cardiovascular disease and drug response
- Hypertensive heart disease
- Metabolic and inflammatory cardiovascular risk factors

Representative Publications

1. de las Fuentes L, Herrero P, Peterson LR, Kelly DP, Gropler RJ, Dávila-Román VG. Myocardial fatty acid metabolism: Independent predictor of left ventricular mass in hypertensive heart disease. *Hypertension* 2003; 41:83-87.
2. de las Fuentes L, Brown AL, Mathews SJ, Waggoner AD, Soto PF, Gropler RJ, Dávila-Román VG. Metabolic Syndrome is Associated with Abnormal Left Ventricular Diastolic Function Independent of LV Mass. *European Heart J* 2007; 28:553-559.
3. de las Fuentes L, Waggoner AD, Mohammed BS, Stein RI, Miller BV, Foster GD, Wyatt H, Klein S, Dávila-Román VG. Effect of moderate diet-induced weight loss and weight regain on cardiovascular structure and function. *J Am Coll Cardiol* 2009; 54:2376–81. PMID: PMC2818984.
4. de las Fuentes L, Sung YJ, Schwander KL, Kalathiveetil S, Hunt SC, Arnett DK and Rao DC. The role of SNP-loop diuretic interactions in hypertension across ethnic groups in HyperGEN. *Front Genet* 2013; 4:304. PMID: PMC3872290.
5. Sung YJ, de las Fuentes L, Schwander KL, Simino J, Rao DC. Gene-smoking Interactions Identify Several Novel Blood Pressure Loci in the Framingham Heart Study. *Am J Hypertens* 2015; 28:343-54. PMID: PMC4402348.
6. Chen G, de las Fuentes L, Gu CC, He J, Gu D, Kelly T, Hixson J, Jaquish C, Rao DC, Rice TK. Aggregate blood pressure responses to serial dietary sodium and potassium intervention: defining responses using independent component analysis. *BMC Genetics* 2015; 16:64. PMID: PMC4474450.
7. Grodin JL, Stevens SR, de las Fuentes L, Kiernan M, Birati EY, Gupta D, Bart BA, Felker GM, Chen HH, Butler J, Dávila-Román VG, Marguiles K, Hernandez AF, Anstrom KJ. Intensification of Medication Therapy for Cardiorenal Syndrome in Acute Decompensated Heart Failure. *J Card Fail* 2016; 22:26-32. PMID: PMC4706474.
8. Barve RA, Gu CC, Yang W, Chu J, Dávila-Román VG, de las Fuentes L. Genetic Association of Left Ventricular Mass Assessed by M-mode and 2D Echocardiography. *J Hypertens* 2016; 34:88-96. PMID: 26556563
9. Magkos F, Fraterrigo G, Yoshino J, Leucking C, Kirbach K, Kelly SC, de las Fuentes L, He S, Okunade AL, Patterson BW, Klein S. Effects of moderate and subsequent progressive weight loss on metabolic function and adipose tissue biology in humans with obesity. *Cell Metab* 2016; 23:591-601. PMID: PMC4833627.
10. Vader JM, LaRue SJ, Stevens SR, Mentz RJ, DeVore AD, Lala A, Groarke JD, AbouExxeddine OF, Dunlay SM, Grodin JL, Dávila-Román VG, de las Fuentes L. Timing and Causes of Readmission after Acute Heart Failure Hospitalization – Insights from the Heart Failure Network Trials. *J Cardiac Fail* 2016;22:875-883. PMID: 27133201.

Key words: hypertension, risk factors, genetic epidemiology, diastolic function, echocardiography

Abhinav Diwan, MD, MBBS

Associate Professor of Medicine, Cell Biology and Physiology

Current Research Interests

- Role of lysosomes in organelle quality control and cell survival under starvation stress
- Regulation of lysosome function in cardiac macrophages in heart failure
- Regulation of lysosomal machinery in Alzheimer's disease and amyloid heart disease
- Role of autophagy in hypertrophic cardiomyopathy (Danon disease)

Representative Publications

1. Ma X, Godar RJ, Liu H, Diwan A. Enhancing lysosome biogenesis attenuates Bnip3-induced cardiomyocyte death. *Autophagy*. 2012 Mar 1; 8(3):297-309. PMID: PMC3337840.
2. Ma X, Liu H, Foyil SR, Godar RJ, Weinheimer CJ, Hill JA, Diwan A. Impaired Autophagosome Clearance Contributes to Cardiomyocyte Death in Ischemia-Reperfusion Injury. *Circulation*. 2012 Jun 26; 125(25):3170-81. PMID: PMC3397471.
3. Ma X, Liu H, Foyil SR, Godar RJ, Weinheimer CJ, Diwan A. Autophagy is impaired in cardiac ischemia-reperfusion injury. *Autophagy*. 2012 Sep 1; 8(9). PMID: PMC3442889.
4. Yang KC, Ma X, Liu H, Kovacs A, Barger PM, Mann DL, Diwan A. TNF-receptor associated factor-2 mediates mitochondrial autophagy. *Circulation Heart Failure*. 2015 Jan; 8(1):175-87. PMID: PMC4303508.
5. Xiao Q, Yan P, Ma X, Liu H, Perez R, Zhu A, Gonzales E, Burchett JM, Schuler DR, Cirrito JR, Diwan A*, Lee JM* (*contributed equally, co-corresponding authors). Astrocytic lysosome biogenesis facilitates A β clearance and attenuates amyloid plaque pathogenesis. *The Journal of Neuroscience* 2014; 34: 9607-9620.
6. Xiao Q, Yan P, Ma X, Liu H, Perez R, Zhu A, Gonzales E, Burchett JM, Schuler DR, Cirrito JR, Diwan A*, Lee JM* (*contributed equally, co-corresponding authors). Astrocytic lysosome biogenesis facilitates A β clearance and attenuates amyloid plaque pathogenesis. *The Journal of Neuroscience*. 2014 Jul 16; 34(29):9607-20. PMID: PMC4099542.
7. Godar RJ, Ma X, Liu H, Murphy JT, Weinheimer CJ, Kovacs A, Crosby SD, Saftig P, Diwan A. Repetitive Stimulation of Autophagy-Lysosome Machinery by Intermittent Fasting Preconditions the Myocardium to Ischemia-Reperfusion Injury. *Autophagy*. 2015 Sep 2; 11(9):1537-60. doi: 10.1080/15548627.2015.1063768.; PMID: PMC4590628.
8. Lampropoulou V, Sergushichev A, Bambouskova M, Nair S, Vincent EE, Loginicheva E, Cervantes-Barragan L, Ma X, Huang SC, Griss T, Weinheimer CJ, Khader S, Randolph GJ, Pearce EJ, Jones RG, Diwan A, Diamond MS, Artyomov MN. *Cell Metabolism*. 2016 Jun 28. pii: S1550-4131(16)30253-4. doi: 10.1016/j.cmet.2016.06.004.
9. Liu H, * Javaheri A,* Godar RJ, Murphy JT, Ma X, Rohatgi N, Mahadevan J, Hyrc K, Saftig P, Marshall C, McDaniel ML, Remedi MS, Razani B, Urano F, Diwan A. (*contributed equally) Intermittent Fasting Preserves Beta-cell Mass in Obesity-induced Diabetes via the Autophagy-Lysosome Pathway. Accepted in *Autophagy* 2017.

Key words: autophagy, lysosome, amyloid, ischemia-reperfusion, heart failure, cell death

Gerald W. Dorn, II, MD

Philip and Sima K. Needleman Professor of Medicine

Current Research Interests

- Biology of mitochondria in the heart; metabolic remodeling
- Molecular and biochemical signaling for cardiac hypertrophy and heart failure
- Genetic diseases affecting mitochondrial dynamism and mitophagy

Representative Publications

1. Chen Y and Dorn GW II. PINK1-phosphorylated Mitofusin 2 is a Parkin receptor for culling damaged mitochondria. *Science* 2013; 340:471-5.
2. Kasahara A, Cipolat S, Chen Y, Dorn GW II*, Scorrano L* (* co-contributing authors). Mitochondrial fusion directs cardiomyocyte differentiation via calcineurin/notch signaling. *Science* 2013; 342:734-7.
3. Matkovich SJ, Hu Y, Dorn GW II, Regulation of cardiac microRNAs by cardiac microRNAs. *Circ Res* 2013; 113:62-71.
4. Bhandari P, Song M, Chen Y, Burelle Y, Dorn GW II. Mitochondrial contagion induced by Parkin deficiency in *Drosophila* hearts and its containment by suppressing mitofusin. *Circ Res* 2014; 114:257-65.
5. Song M, Chen Y, Gong G, Murphy E, Rabinovitch P, Dorn GW II. Super-suppression of mitochondrial ROS signaling impairs compensatory autophagy in primary mitophagic cardiomyopathy. *Circ Res* 2014; 115:348-53.
6. Matkovich SJ, Edwards JR, Grossenheider TC, de Guzman Strong C, Dorn GW II. Epigenetic coordination of embryonic heart transcription by dynamically regulated lncRNAs. *Proc Natl Acad Sci USA* 2014; 111:12264-9.
7. Song M, Mihara K, Chen Y, Scorrano L, Dorn GW II. Mitochondrial fission and fusion factors reciprocally orchestrate mitophagic culling in mouse hearts and cultured fibroblasts. *Cell Metab* 2015; 21:273-85.
8. Picard M, McManus M, Csordas G, Varnai P. Dorn GW II, Williams D, Hajnoczky G, Wallace DC. Trans-mitochondrial coordination of cristae at regulated membrane junctions. *Nat Commun* 2015; 6:6259.
9. Song M, Matkovich SJ, Zhang Y, Hammer DJ, and Dorn GW II. Combined cardiomyocyte PKC δ and PKC ϵ gene deletion uncovers their central role in restraining developmental and reactive heart growth. *Sci Signal*, 2015; 8:ra39.
10. Song M, Guong G, Burelle Y, Gustafsson AB, Kitsis RN, Matkovich SJ, and Dorn GW II. Interdependence of Parkin-mediated mitophagy and mitochondrial fission in adult mouse hearts. *Circ Res* 2015;117:246-351.

Key words: mitophagy, heart failure, molecular cardiology

Gregory A. Ewald, MD

Professor of Medicine

Current Research Interests

- Mechanical circulatory support in advanced heart failure
- Medical therapy in patients with heart failure
- Device therapy in patient with heart failure
- Remote monitoring in management of heart failure
- Cardiac transplantation/donor evaluation and management
- Depression in heart failure

Representative Publications

1. Park SJ, Milano CA, Tatroles AJ, Rogers JG, Adamson RM, Steadley E, Ewald GA, Sundareswaran KS, Farrar DJ, Slaughter MS. Outcomes in advanced heart failure patients with left ventricular assist devices for destination therapy. *Circ Heart Fail* 2012; 5:241-248.
2. Lavine KJ, Sintek M, Novak E, Ewald G, Geltman E, Joseph S, Pfeifer J, Mann DL. Coronary collaterals predict improved survival and allograft function in patients with coronary allograft vasculopathy. *Circ Heart Fail* 2013; 6:773-784.
3. Starling RC, Moazami N, Silvestry SC, Ewald G, Rogers JG, Milano CA, Rame JE, Acker MA, Blackstone EH, Ehrlinger J, Thuita L, Mountis MM, Soltesz EG, Lytle BW, Smedira NG. Unexpected abrupt increase in left ventricular assist device thrombosis. *N Engl J Med* 2014; 370:33-40.
4. Topkara VK, O'Neill JK, Carlisle A, Novak E, Silvestry SC, Ewald GA. Heartware and Heartmate II left ventricular assist devices as bridge to transplantation: a comparative analysis. *Ann Thorac Surg* (Epub ahead of print 2014).
5. Fang JC, Ewald GA, Allen LA, Butler J, Westlake Canary CA, Colvin-Adams M, Dickinson MG, Levy P, Stough WG, Sweitzer NK, Teerlink JR, Whellan DJ, Albert NM, Krishnamani R, Rich MW, Walsh MN, Bonnell MR, Carson PE, Chan MC, Dries DL, Hernandez AF, Hershberger RE, Katz SD, Moore S, Rodgers JE, Rogers JG, Vest AR, Givertz MM; Heart Failure Society of America Guidelines Committee. Advanced (stage D) heart failure: a statement from the Heart Failure Society of America Guidelines Committee. *J Card Fail*. 2015 Jun; 21(6):519-34.
6. Adamo L, Nassif M, Tibrewala A, Novak E, Vader J, Silvestry S, Itoh A, Ewald GA, Mann DL, LaRue SJ. The Heartmate risk score predicts morbidity and mortality in unselected left ventricular assist device recipients and risk stratifies INTERMACS Class 1 patients. *JACC Heart Fail* 2015; 3:283-90.
7. McNamara DM, Elkayam U, Alharethi R, Damp J, Hsieh E, Ewald G, Modi K, Alexis JD, Ramani GV, Semigran MJ, Haythe J, Markham DW, Marek J, Gorcsan J, Wu W-C, Lin Y, Halder I, Pisarcik J, Cooper LT, Fett JD, for the IPAC Investigators. Clinical outcomes for peripartum cardiomyopathy in North America: Results of the Investigations of Pregnancy Associated Cardiomyopathy (IPAC) study. *JACC* 2015; 66:905-14.
8. Nassif ME, LaRue SJ, Raymer DS, Novak E, Vader JM, Ewald GA, Gage BF. Relationship Between Anticoagulation Intensity and Thrombotic or Bleeding Outcomes Among Outpatients With Continuous-Flow Left Ventricular Assist Devices. *Circ Heart Fail*. 2016 May; 9(5).
9. Carney RM, Freedland KE, Steinmeyer BC, Rubin EH, Ewald G. Collaborative care for depression symptoms in an outpatient cardiology setting: a randomized clinical trial. 14-June-2016 DOI: 10.1016/j.ijcard.2016.06.045.

Key words: heart failure, heart transplantation

Mitchell N. Faddis, MD, PhD

Professor of Medicine

Current Research Interests

- Catheter ablation techniques
- Treatment of atrial fibrillation
- Cardiac resynchronization therapy for advanced heart failure

Representative Publications

1. Tereshchenko LG, Faddis MN, Fetcs BJ, Zelik KE, Efimov IR, Berger RD. Transient local injury current in right ventricular electrogram after implantable cardioverter-defibrillator shock predicts heart failure progression. *J Am Coll Cardiol* 2009; 54(9):822-8.
2. Faddis MN. A dose response for cardiac resynchronization therapy? *J Am Coll Cardiol* 2009; 53(4):361-2.
3. Cooper JA, Latacha MP, Soto GE, Garmany RG, Gleva MJ, Chen J, Faddis MN, Smith TW. The azygos defibrillator lead for elevated defibrillation thresholds: implant technique, lead stability, and patient series. *Pacing Clin Electrophysiol* 2008; 31(11):1405-10.
4. Waggoner AD, de Las Fuentes L, Faddis MN, Gleva MJ, Spence KE, Davila-Roman VG, Left ventricular diastolic filling prior to cardiac resynchronization therapy: implications for atrioventricular delay programming. *Pacing Clin Electrophysiol* 2008; 31(7):838-44.
5. Greenberg SL, Mauricio Sanchez J, Cooper JA, Cain ME, Chen J, Gleva MJ, Lindsay BD, Smith TW, Faddis MN. Sustained polymorphic arrhythmias induced by programmed ventricular stimulation have prognostic value in patients receiving defibrillators. *Pacing Clin Electrophysiol* 2007; 30(9):1067-75.
6. Cuculich PS, Wang Y, Lindsay BD, Faddis MN, Schuessler RB, Damiano RJ, Jr., Li L, Rudy Y. Noninvasive characterization of epicardial activation in humans with diverse atrial fibrillation patterns. *Circulation* 2010 October 5; 122(14):1364-72.
7. Wang Y, Cuculich PS, Zhang J, Desouza KA, Vijayakumar R, Chen J, Faddis MN, Lindsay BD, Smith TW, Rudy Y. Noninvasive electroanatomic mapping of human ventricular arrhythmias with electrocardiographic imaging. *Sci Transl Med* 2011 August 31; 3(98):98ra84.
8. Marrus SB, Andrews CM, Cooper DH, Faddis MN, Rudy Y. Repolarization changes underlying long-term cardiac memory due to right ventricular pacing: noninvasive mapping with electrocardiographic imaging. *Circ Arrhythm Electrophysiol* 2012 August 1; 5(4):773-81

Key words: arrhythmias, atrial fibrillation, electrophysiology, heart failure, implantable devices

[Kenneth E. Freedland, PhD, FAHA](#)

Professor of Psychiatry

Current Research Interests

- Depression, anxiety, stress, and physical inactivity in patients with coronary heart disease or heart failure
- Roles of depression and inadequate self-care in heart failure rehospitalizations
- Interventions for depression and inadequate self-care in heart failure
- Clinical trials in behavioral medicine and behavior trial methodology
- Sleep apnea and other sleep problems in depressed cardiac patients

Representative Publications

1. Freedland KE, Carney RM, Rich MW, Steinmeyer BC, Rubin EH. Cognitive Behavior Therapy for Depression and Self-Care in Heart Failure Patients: A Randomized Clinical Trial. *JAMA Intern Med.* 2015 Nov; 175(11):1773-82.
2. Freedland KE, Carney RM, Rich MW, Steinmeyer BC, Skala JA, Dávila-Román VG. Depression and Multiple Rehospitalizations in Patients With Heart Failure. *Clin Cardiol.* 2016 May; 39(5): 257-62.
3. Carney RM, Freedland KE, Steinmeyer BC, Rubin EH, Ewald G. Collaborative care for depression symptoms in an outpatient cardiology setting: A randomized clinical trial. *Int J Cardiol.* 2016 Sep 15; 219:164-71
4. Freedland KE, Hesseler MJ, Carney RM, Steinmeyer BC, Skala JA, Dávila-Román VG, Rich MW. Major Depression and Long-Term Survival of Patients With Heart Failure. *Psychosom Med.* 2016 Oct; 78(8):896-903.
5. Carney RM, Freedland KE. Depression and coronary heart disease. *Nat Rev Cardiol.* 2017 Mar; 14(3):145-155.

Key words: behavioral medicine, coronary artery disease, depression, depressive disorders, heart failure, sleep disorders, heart failure self-care

Brian F. Gage, MD, MSc

Professor of Medicine

Current Research Interests

- Anticoagulants
- Atrial fibrillation
- Pharmacogenomics

Representative Publications

1. Gage BF, Waterman AD, Shannon W et al. Validation of Clinical Classification Schemes for Predicting Stroke: Results from the National Registry of Atrial Fibrillation (NRAF) Project. *JAMA* 2001; 285:2864-70.
2. Rieder MJ, Reiner AP, Gage BF, Nickerson DA, et al. VKORC1 Haplotypes Predict Warfarin Dose. *N Engl J Med* 2005; 352:2285-93.
3. International Warfarin Pharmacogenetics Consortium, Klein TE, Altman RB, Eriksson N, Gage BF, et al. Estimation of the warfarin dose with clinical and pharmacogenetic data. *N Engl J Med*. 2009; 360:753-64.
4. Shah SV, Gage BF. Cost-effectiveness of dabigatran for atrial fibrillation. *Circulation* 2011; 123;2562-70.
5. Subherwal S, Peterson ED, Chen AY, Roe MT, Washam JB, Gage BF, Bach RG, et al. Admission international normalized ratio levels, early treatment strategies, and major bleeding risk among non-ST-segment-elevation myocardial infarction patients on home warfarin therapy: insights from the National Cardiovascular Data Registry. *Circulation* 2012;125:1414-23. Kimmel SE, French B, Kasner SE, Johnson JA, Anderson JL, Gage BF, Rosenberg YD, Eby CS, Madigan RA, McBane RB, Abdel-Rahman SZ, Stevens SM, Yale S, Mohler ER, III, Fang MC, Shah V, Horenstein RB, Limdi NA, Muldowney JA, III, Gujral J, Delafontaine P, Desnick RJ, Ortel TL, Billett HH, Pendleton RC, Geller NL, Halperin JL, Goldhaber SZ, Caldwell MD, Califf RM, Ellenberg JH. A pharmacogenetic versus a clinical algorithm for warfarin dosing. *N Engl J Med* 2013 December 12; 369(24):2283-93.
6. Depta JP, Patel JS, Novak E, Gage BF, Masrani SK, Raymer D, Facey G, Patel Y, Zajarias A, Lasala JM, Amin AP, Kurz HI, Singh J, Bach RG. Risk model for estimating the 1-year risk of deferred lesion intervention following deferred revascularization after fractional flow reserve assessment. *Eur Heart J* 2015 February 21; 36(8):509-15.
7. Sanfilippo KM, Wang TF, Gage BF, Liu W, Carson KR. Improving accuracy of International Classification of Diseases codes for venous thromboembolism in administrative data. *Thromb Res* 2015 April; 135(4):616-20

Key words: aging, atrial fibrillation, epidemiology, pharmacogenomics

Edward M. Geltman, MD

Professor of Medicine

Current Research Interests

- New pharmacologic agents for the management of systolic and diastolic heart failure
- Importance of biomarkers for predicting events for CHF

Representative Publications

1. Stolker JM, Heere B, Geltman EM, Schechtman KB, Peterson LR. Prospective comparison of ventilatory equivalent versus peak oxygen consumption in predicting outcomes of patients with heart failure. *Am J Cardiol* 2006; 97:1607-10.
2. Moazami N, Shah NR, Ewald GA, Geltman EM, Moorhead SL, Pasque MK. Should UNOS status 2 patients undergo transplantation? *Heart Surg Forum* 2006; 9:E823-7.
3. Geltman EM, Thomas S. What is the Optimal Angiotensin-Converting Enzyme Inhibitor Dose in Heart Failure? *Congestive Heart Failure* 2006; 12:213-218.
4. Joseph SM, Cedars AM, Ewald GA, Geltman EM, Mann DL. Acute decompensated heart failure: contemporary medical management. *Tex Heart Inst J* 2009; 36(6):510-20.
5. Foster ER, Cunnane KB, Edwards DF, Morrison MT, Ewald GA, Geltman EM, Zazulia AR. Executive dysfunction and depressive symptoms associated with reduced participation of people with severe congestive heart failure. *Am J Occup Ther* 2011; 65:306-313.
6. Brinkley DM, Novak E, Topkara VK, Geltman EM. Graft survival after cardiac transplantation for alcohol cardiomyopathy. *Transplantation* 2014; 94:465-469.
7. Wilen CB, Szymanski JJ, Hung S, Rajan A, Lavigne PM, Char DM, Geltman EM, Scott MG. Impact on patient management and outcome of switching between 2 contemporary sensitive cardiac troponin assays. *Clin Chem* June 2015; 61(6):870-876.
8. Schindler EI, Szymanski JJ, Hock KG, Geltman EM, Scott MG. Short- and long-term biologic variability of galectin-3 and other cardiac biomarkers in patients with stable heart failure and healthy adults. *Clin Chem* February 2016; 62(2):360-366.

Key words: diastolic function, heart failure, implantable devices

Marye J. Gleva, MD

Professor of Medicine

Current Research Interests

- Complications associated with cardiac implantable electronic devices
- Cardiac implantable electronic devices in congenital heart disease and left ventricular non-compaction cardiomyopathy
- Outcomes after atrial fibrillation ablation
- Increasing the participation of women in cardiovascular device trials

Representative Publications

1. Poole JE, Gleva MJ, Mela T, Chung MK, Uslan DK, Borge R, Gottipaty V, Shinn T, Dan D, Feldman LA, Seide H, Winston, SA, Gallagher JJ, Langberg JL, Mitchell K, Holcomb R. Complication Rates Associated with Pacemaker or Implantable Cardioverter-Defibrillator Generator Replacements and Upgrade Procedures: Results from the REPLACE Registry. *Circulation* 2010; 122:1553-1561.
2. Uslan DZ, Gleva MJ, Warren DK, Mela T, Chung MK, Gottipaty V, Borge R, Dan D, Shinn T, Mitchell K, Holcomb RG, Poole JE. Cardiac Implantable Electronic Device Replacement Infections and Prevention: Results from the REPLACE Registry. *PACE* 2012; 35: 81-87.
3. Jordan CP, Freedenberg V, Wang Y, Curtis JP, Gleva MJ, Berul CI. Implant and Clinical Characteristics for Pediatric and Congenital Heart Patients in the NCDR ICD Registry[®]. *Circulation: Arrhythmia and Electrophysiology* 2014; published online before print October 6, 2014, doi: 10.1161/CIRCEP.114.001841.
4. Gleva MJ and Poole JE. Bruise Control Infection Study, Bugs and Blood. *J Am Coll Cardiol* 2016; 67: 1309-1311.
5. Gleva MJ and Huddleston CB. Atrial arrhythmias after lung transplant: A call to action starting with the electrocardiogram. *J Thorac Cardiovasc Surg* 2016; 152:910-911.
6. Smith WM, Riddell F, Madon M, Gleva MJ. Comparison of diagnostic value using a small, single channel P-wave centric sternal ECG monitoring patch with a standard 3-lead Holter system over 24 hours. *Am Heart J* 2017; 185:67-73.
7. Gleva MJ and Poole JE. Prevention of Cardiac Implantable Electronic Device Infections: Update and Evaluation of The Potential Role for Capsulectomy or the Antibiotic Pouch. *J Atrial Fibrillation* 2017; 9(5).
http://www.jafib.com/published.php?type=full&id=1540&is=current_issue&f=full

Key words: atrial fibrillation, electrophysiology, implantable devices

John Gorcsan III, MD

Professor of Medicine

Current research interests:

- Quantifying cardiac mechanics with advanced echocardiographic technology
- Assessing effects of device therapy in heart failure patients
- Refining patient selection for cardiac resynchronization therapy
- Determining prognosis by right ventricular structure and function in patients with pulmonary hypertension

Representative Publications:

1. Haugaa KH, Marek JJ, Ahmed M, Ryo K, Adelstein EC, Schwartzman D, Saba S, **Gorcsan J**. Mechanical dyssynchrony after cardiac resynchronization therapy for severely symptomatic heart failure is associated with risk for ventricular arrhythmias. *J Am Soc Echocardiogr*. 2014;27:872-9.
2. Ryo K, Goda A, Onishi T, Delgado-Montero A, Tayal B, Champion HC, Simon MA, Mathier MA, Gladwin MT, **Gorcsan J**. Characterization of right ventricular remodeling in pulmonary hypertension associated with patient outcomes by 3-Dimensional wall motion tracking echocardiography. *Circ Cardiovasc Imaging*. 2015;8:e003176. DOI: 10.1161/CIRCIMAGING.114.003176.
3. **Gorcsan J**, Sogaard P, Bax J, Singh J, Abraham W, Borer J, Dickstein K, Gras D, Krum H, Brugada J, Robertson M, Ford I, Holzmeister J, Ruschitzka F. Association of persistent or worsened echocardiographic dyssynchrony with unfavorable clinical outcomes in heart failure patients with narrow QRS width: A subgroup analysis of the EchoCRT Trial. *Eur Heart J* 2016;37:49-59.
4. Lumens J, Tayal B, Walmsley J, Delgado-Montero A, Huntjens P, Schwartzman D, Althouse A, Delhaas T, Prinzen F, **Gorcsan J**. Differentiating electromechanical from non-electrical substrates of mechanical discoordination to identify responders to cardiac resynchronization therapy. *Circ Cardiovasc Imaging*. 2015 Sep;8(9):e003744.
5. Blauwet LA, Delgado-Montero A, Ryo K, Marek JJ, Alharethi R, Mather PJ, Modi K, Sheppard R, Thohan V, Pisarcik J, McNamara DM, **Gorcsan J**. Right ventricular function in peripartum cardiomyopathy at presentation is associated with subsequent left ventricular recovery and clinical outcomes. *Circ Heart Fail*. 2016 (5). pii: e002756.
6. Delgado-Montero A, Tayal B, Goda A, Ryo K, Marek JM, Sugahara M, Qi Z, Althouse AD, Saba S, Schwartzman D, **Gorcsan J**. Additive Prognostic value of echocardiographic global longitudinal and global circumferential strain to electrocardiographic criteria in heart failure patients undergoing cardiac resynchronization therapy. *Circ Cardiovasc Imaging* 2016 2016 (6). pii: e004241.
7. Tayal B, Sogaard P, Delgado-Montero A, Goda A, Saba S, Risum N, **Gorcsan J**. Interaction of left ventricular remodeling and regional dyssynchrony on long-term prognosis after cardiac resynchronization therapy. *J Am Soc Echocardiogr* 2017;30(3):244-250.

Key Words: echocardiography, heart failure, imaging, right heart failure

Jeffrey I. Gordon, MD

Dr. Robert J. Glaser Distinguished University Professor of Pathology and Immunology

Current Research Interests

- Genomic and metabolic foundations of the mutually beneficial relationship between gut microbes and humans
- Effects of diet, lifestyle, and biosphere on the human gut microbiome and the impact of these effects on human health and predisposition to disease
- Interventions designed to alter the gut microbial community to maximize health and reduce disease

Representative Publications

1. Faith, J.J., Guruge, J.L., Charbonneau, M., Subramanian, S., Seedorf, H., Goodman, A.L., Clemente, J.C., Knight, R., Heath, A.C., Leibel, R.L., Rosenbaum, M., and Gordon, J.I. The long-term stability of the human gut microbiota. *Science* 2013; 341: 1237439 doi: 10.1126/science.1237439.
2. Smith, M.I., Yatsunenکو, T., Manary, M.J., Trehan, I., Mkakosya, R., Cheng, J., Kau, A., Rich, S.S., Concannon, P., Mychaleckyj, J.C., Liu, J., Houpt, E., Li, J.V., Holmes, E., Nicholson, J., Knights, D., Ursell, L.K., Knight, R., and Gordon, J.I. Gut microbiomes of Malawian twin pairs discordant for kwashiorkor. *Science* 2013; 339: 548-554.
3. McNulty, N.P., Wu, M., Erickson, A.R., Martens, E.C., Pudlo, N.A., Muegge, B., Henrissat, B., Hettich, R.L., and Gordon, J.I. Effects of diet on resource utilization by a defined model human gut microbiota containing *Bacteroides cellulosilyticus* WH2, a symbiont with an extensive glyco biome, *PLoS Biology* 2013; 11: e1001637.
4. Ridaura, V.K., Faith, J.J., Rey, F.E., Cheng, J., Duncan, A.E., Kau, A.L., Lombard, V., Henrissat, B., Bain, J.R., Muehlbauer, M.J., Ilkayeva, O., Ursell, L.K., Clemente, J.C., Van Treuren, W., Walters, W.A., Newgard, C.B., Knight, R., Heath, A.C., and Gordon, J.I. Gut microbiota from twins discordant for obesity modulate metabolism in mice. *Science* 2013; 341: 1241214 doi: 10.1126/science.1241214.
5. Subramanian, S., Yatsunenکو, T., Huq, S., Haque, R., Mahfuz, M., Alam, M.A., Benezra, A., DeStefano, J., Meier, M.F., Muegge, B.D., Barratt, M.J., Zhang, Q., Province, M.A., Petri, W.A., Ahmed, T., and Gordon, J.I. Persistent gut microbiota immaturity in malnourished Bangladeshi children. *Nature* 2014; 509: 417-421 DOI: 10.1038/nature13421.
6. Faith, J.J., Ahern, P.P., Ridaura, V.K., Cheng, J., and Gordon, J.I. Identifying gut microbiome-host phenotype relationships using combinatorial communities in gnotobiotic mice, *Science Translational Medicine* 2014; 6: 220ra11.

Key words: human microbiome; ecology; systems biology; metabolism; obesity; childhood undernutrition; immunology; global health; prebiotics/probiotics/synbiotics; anthropology of microbes

Robert J. Gropler, MD

Professor of Radiology, Medicine, and Biomedical Engineering

Current Research Interests

- Imaging of myocardial metabolic remodeling using PET, magnetic resonance spectroscopy, and other modalities
- Development of new cardiovascular molecular imaging agents

Representative Publications

1. Zhengj, An H, Coggan AR, Zhang X, Bashir A, Muccigrosso D, Peterson LR, Gropler RJ. Noncontrast Skeletal Muscle Oximetry. *Magnetic Resonance in Medicine* 2014; 71:318-325.
2. Luehmann HP, Pressly ED, Detering L, Wang C, Pierce R, Woodard PK, Gropler RJ, Hawker CJ, Liu Y. PET/CT imaging of chemokine receptor CCR5 in vascular injury model using targeted nanoparticle. *J Nucl Med* 2014; 55:629-634.
3. Zheng J, An H, Coggan AR, Zhang X, Bashir A, Muccigrosso D, Peterson LR, Gropler RJ, Noncontrast skeletal muscle oximetry. *Magnetic Resonance in Medicine* 2014; 1:318-325.
4. Huang HJ, Isakow W, Byers DE, Engle JT, Griffin EA, Kemp D, Brody SL, Gropler RJ, Miller JP, Chu W, Zhou D, Pierce RA, Castro M, Mach RH, Chen DL. Imaging pulmonary iNOS expression with positron emission tomography. *J Nucl Med* 2014, Dec 18.
5. Chu W, Chepetan A, Zhou D, Shoghi KI, Xu J, Dugan LL, Gropler RJ, Mintun MA, Mach RH. Development of a PET radiotracer for non-invasive imaging of the reactive oxygen species, superoxide, in vivo. *Org Biomol Chjem*: 2014; 25:4421-31.2015;8:131-133.
6. Peterson LR, Herrero P, Coggan AR, Kisrieva-Ware Z, Saeed I, Dence C, Koudelis D, McGill JB, Lyons MR, Novak E, Davila-Roman VG, Waggoner AD, Gropler RJ. Type 2 diabetes, obesity, and sex difference affect the fate of glucose in the heart. *American Journal of Physiology*. 2015; 308:H1510-16.

Key words: molecular imaging, cardiac metabolism

[Richard Gross, MD, PhD](#)

Professor of Medicine, Chemistry, and Developmental Biology

Current Research Interests

- Metabolomics
- Diabetic Cardiomyopathy
- Heart Failure
- Phospholipases
- Signaling

Representative Publications

1. Mancuso, D.J., Sims, H.F., Han, X., Jenkins, C.M., Guan, S.P., Yang, K., Moon, S.H., Pietka, T., Abumrad, N., Schlesinger, P.H., and Gross, R.W. Genetic ablation of calcium-independent phospholipase A₂γ leads to alterations in mitochondrial lipid metabolism and function resulting in a deficient mitochondrial bioenergetic phenotype. *J. Biol. Chem.* 2007; 282:34611-34622. PMID: PMC2980283.
2. Moon, S.H., Jenkins, C.M., Mancuso, D.J., Turk, J., and Gross, R.W. Smooth muscle cell arachidonic acid release, migration, and proliferation are markedly attenuated in mice null for calcium-independent phospholipase A₂β. *J. Biol. Chem.* 2008; 283:33975-33987. PMID: PMC2590683.
3. Moon, S.H., Jenkins, C.M., Liu, X., Guan, S., Mancuso, D.J., and Gross, R.W. Activation of mitochondrial calcium-independent phospholipase A₂γ (iPLA₂γ) by divalent cations mediating arachidonate release and the production of downstream eicosanoids. *J. Biol. Chem.* 2012; 287:14880-14895. PMID: PMC3340231.
4. Moon, S.H., Jenkins, C.M., Kiebish, M.A., Sims, H.F., Mancuso, D.J., and Gross, R.W. Genetic ablation of calcium-independent phospholipases A₂γ (iPLA₂γ) attenuates calcium-induced opening of the mitochondrial permeability transition pore and resultant cytochrome C release. *J. Biol. Chem.* 2012; 287:29837-50. PMID: PMC3436185.
5. Kiebish, M.A., Yang, K., Liu, X., Mancuso, D.J., Zhao, Z., Sims, H.F., Cerqua, R., Cade, W.T., Han, X., and Gross, R.W. Dysfunctional Cardiac Mitochondrial Bioenergetic, Lipidomic, and Signaling in a Murine Model of Barth Syndrome. *J. Lipid Res.* 2013; 54:1312-1325. PMID: PMC3622326.

Key words: basic science, cardiac metabolism, diabetes, heart failure, lipid metabolism, molecular cardiology

Xuntian Jiang, PhD

Assistant Professor of Medicine

Current Research Interests

- Development and application of LC-MS/MS methods for metabolomics in biomarker screening and validation
- Development and application of LC-MS/MS methods for clinical diagnosis and clinical trial.
- Identification of unknown molecules from biological extracts by LC-MS/MS and interpretation of mass spectra
- Synthesis of heavy isotope-labeled small organic molecules as internal standards in quantification of target analytes

Representative Publications

1. Jiang X, Sidhu R, Porter FD, Yanjanin NM, Speak AO, te Vruchte DT, Platt FM, Fujiwara H, Scherrer DE, Zhang J, Dietzen DJ, Schaffer JE, Ory DS. A sensitive and specific LC-MS/MS method for rapid diagnosis of Niemann-Pick C1 disease from human plasma. *J Lipid Res* 2011; 52:1435-45.
2. Jiang H, Hsu FF, Farmer MS, Peterson LR, Schaffer JE, Ory DS, Jiang X. Development and validation of LC-MS/MS method for determination of very long acyl chain (C22:0 and C24:0) ceramides in human plasma. *Anal Bioanal Chem* 2013; 405:7357-65.
3. Sidhu R, Jiang H, Farhat NY, Carrillo-Carrasco N, Woolery M, Ottinger E, Porter FD, Schaffer JE, Ory DS, Jiang X. A validated LC-MS/MS assay for quantification of 24(S)-hydroxycholesterol in plasma and cerebrospinal fluid. *J Lipid Res*. 2015; 56:1222-33.
4. Maarup TJ, Chen AH, Porter FD, Farhat NY, Ory DS, Sidhu R, Jiang X, Dickson PI. Intrathecal 2-hydroxypropyl-beta-cyclodextrin in a single patient with Niemann-Pick C1. *Mol Genet Metab*. 2015; 116:75-9.
5. Jiang X, Ory DS. Towards a New Diagnostic Standard for Niemann-Pick C Disease. *EBioMedicine*. 2016; 4:18-9.
6. Jiang X, Sidhu R, Mydock-McGrane L, Hsu FF, Covey DF, Scherrer DE, Earley B, Gale SE, Farhat NY, Porter FD, Dietzen DJ, Orsini JJ, Berry-Kravis E, Zhang X, Reunert J, Marquardt T, Runz H, Giugliani R, Schaffer JE, Ory DS. Development of a bile acid-based newborn screen for Niemann-Pick disease type C. *Sci Transl Med*. 2016; 8:337ra63.

Key words: biomarkers, diagnostics, lipid metabolism

[Karen Joynt Maddox, MD](#)

Assistant Professor of Medicine, Washington University School of Medicine

Assistant Professor, Washington University Brown School of Social Work

Current Research Interests

- Improving the measurement of the quality and efficiency of physicians, hospitals and health systems
- Understanding the impact of policy interventions on health care, with a focus on value-based and alternative payment models
- Reducing disparities in care, with a focus on vulnerable populations including racial and ethnic minorities, individuals living in poverty, individuals with disabilities, frail elders, and those in rural areas

Representative Publications

1. Joynt KE, Orav EJ, Jha AK. Thirty-day readmission rates for Medicare beneficiaries by race and site of care. *JAMA* 2011; 305:675-81.
2. Joynt KE, Harris Y, Orav EJ, Jha AK. Quality of care and patient outcomes in critical access rural hospitals. *JAMA* 2011; 306:45-52.
3. Joynt KE, Blumenthal DM, Orav EJ, Resnic FS, Jha AK. Association of Public Reporting for Percutaneous Coronary Intervention With Utilization and Outcomes Among Medicare Beneficiaries With Acute Myocardial Infarction. *JAMA*. 2012; 308(14):1460-1468.
4. Joynt KE, Jha AK. Characteristics of Hospitals Receiving Penalties Under the Hospital Readmissions Reduction Program. *JAMA*. 2013; 309(4):342-343.
5. Joynt KE, Orav EJ, Jha AK. Mortality Rates for Medicare Beneficiaries Admitted to Critical Access and Non-Critical Access Hospitals from 2002 to 2010. *JAMA*. 2013; 309(13):1379-1387.
6. Joynt KE, Gawande AA, Orav EJ, Jha AK. The Contribution of Preventable Acute-Care Spending to Total Spending for High-Cost Medicare Patients. *JAMA*. 2013; 309(24):2572-2578.
7. Joynt KE, Orav EJ, Jha AK. Association between hospital conversions to for-profit status and clinical and economic outcomes. *JAMA*. 2014 Oct 22-29; 312(16):1644-52
8. Joynt KE, Chatterjee P, Orav EJ, Jha AK. Hospital Closures Had No Measurable Impact On Local Hospitalization Rates Or Mortality Rates, 2003-11. *Health Aff (Millwood)*. 2015 May 1; 34(5):765-72.
9. Joynt KE, Orav EJ, Zheng J, Jha AK. Public Reporting of Mortality Rates for Hospitalized Medicare Patients and Trends in Mortality for Reported Conditions. *Ann Intern Med*. 2016 Aug 2; 165(3):153-60.
10. Chen LM, Epstein AM, Orav EJ, Filice CE, Samson LW, Joynt Maddox KE. Association of Practice-level Social and Medical Risk with Performance in the Medicare Physician Value-based Payment Modifier Program. *JAMA* 2017 (In Press).

Key words: health policy, health services research, outcomes research, quality of care, hospital readmissions, women and minorities, disparities

Attila Kovacs, MD

Associate Professor of Medicine

Current Research Interests

- cardiovascular phenotyping in mice
- ultrasonic tissue characterization

Representative Publications

1. Kovacs A, Courtois MR, Weinheimer CJ, Posdamer SH, Wallace KD, Holland MR, Miller JG. Ultrasonic tissue characterization of the mouse myocardium: Successful in-vivo cyclic variation measurements. *J Am Soc Echocardiogr* 2004; 17:883-892.
2. Lavine KJ, Kovacs A, Ornitz DM. Hedgehog signaling is critical for maintenance of the adult coronary vasculature in mice. *J Clin Invest.* 2008; 118:2404-14.
3. Schaeffer PJ, Desantiago J, Yang J, Flagg TP, Kovacs A, Weinheimer CJ, Courtois M, Leone TC, Nichols CG, Bers DM, Kelly DP. Impaired contractile function and calcium handling in hearts of cardiac-specific calcineurin b1-deficient mice. *Am J Physiol Heart Circ Physiol.* 2009; 297:H1263-73.
4. Wagenseil JE, Ciliberto CH, Knutsen RH, Levy MA, Kovacs A, Mecham RP. Reduced Vessel Elasticity Alters Cardiovascular Structure and Function in Newborn Mice. *Circ Res.* 2009; 104:1217-24.
5. Metcalf JA, Ma X, Linders B, Wu S, Schambach A, Ohlemiller KK, Kovacs A, Bigg M, He L, Tollefsen DM, Ponder KP. A Self-inactivating gamma-Retroviral Vector Reduces Manifestations of Mucopolysaccharidosis I in Mice. *Mol Ther.* 2010; 18:334-42.
6. Schugar RC, Moll AR, Andre dD, Weinheimer CJ, Kovacs A, Crawford PA. Cardiomyocyte-specific deficiency of ketone body metabolism promotes accelerated pathological remodeling. *Mol Metab* 2014; 3(7):754-69.
7. Weinheimer CJ, Lai L, Kelly DP, Kovacs A. Novel mouse model of left ventricular pressure overload and infarction causing predictable ventricular remodelling and progression to heart failure. *Clin Exp Pharmacol Physiol* 2015; 42(1):33-40.
8. Kovacs A, Olah A, Lux A, Matyas C, Nemeth BT, Kellermayer D, Ruppert M, Torok M, Szabo L, Meltzer A, Assabiny A, Birtalan E, Merkely B, Radovits T. Strain and strain rate by speckle-tracking echocardiography correlate with pressure-volume loop-derived contractility indices in a rat model of athlete's heart. *Am J Physiol Heart Circ Physiol* 2015; 308(7):H743-H748.
9. Moon SH, Mancuso DJ, Sims HF, Liu X, Nguyen AL, Yang K, Guan S, Dilthey BG, Jenkins CM, Weinheimer CJ, Kovacs A, Abendschein DR, Gross RW. Cardiac myocyte-specific knockout of iPLA2gamma decreases oxidized fatty acids during ischemia/reperfusion and reduces infarct size. *J Biol Chem* 2016 July 23.

Key words: basic science, imaging, molecular cardiology, vascular biology

Sándor Kovács, Jr., MD, PhD

Professor of Medicine, Cell Biology and Physiology

Adjunct Professor of Physics and Biomedical Engineering

Current Research Interests

- Mathematical models of cardiac physiology and function/complexity theory
- Theoretical and applied cardiac physiology/pathophysiology
- Multimodal cardiac imaging: echo/magnetic resonance/catheterization/angiography

Representative Publications

1. Mossahebi S, Zhu S, Kovács SJ. Fractionating E-wave deceleration time into its stiffness and relaxation components distinguishes pseudonormal from normal filling. *Circulation: Cardiovascular Imaging*, 2015; 8(1). e002177.
2. Kovács SJ. Diastolic Function in Heart Failure. *Clinical Medicine Insights: Cardiology* 2015; 9(Suppl 1): 49-55. DOI: 10.4137/CMC.S18743
4. Arvidsson PM, Carlsson M, Kovács SJ., Hakan Arheden H. Atrioventricular plane displacement is NOT the sole mechanism of atrial and ventricular refill" *Am J Physiol-Heart and Circ Physiol, Perspective* 2015; 309(6):H1094-6.
5. Kazui T, Watanabe Y, Kovács SJ.,Lawrance CP, Greenberg JW, Schuessler JB, Damiano RJ Jr. The Impact of Six Weeks of Atrial Fibrillation on Atrial and Ventricular Chamber Properties and Function in a Porcine Model. *J Thor Cardiovasc Surg* 2015; 150(6):1602-8.
6. Chung C, Shmuylovich L, Kovács SJ. "What global diastolic function is, what it is not, and how to measure it." *Am J Physiol-Heart and Circ Physiol* 2015; Invited Review Article, DOI:10.1152/ajpheart.00436.
7. Nappo R, Degiovanni A, Bolzani V, Sartori C, Di Giovine G, Cerini P, Fossaceca R, Kovács SJ, Marino PN. Quantitative Assessment of Atrial Conduit Function: A New Index of Diastolic Dysfunction. *Clin Res in Cardiol* 2016; 105(1):17-28.
8. Arvidsson PM, Kovács SJ, Töger J, Borgquist R, Heiberg E, Carlsson M, and Arheden H. Vortex ring behavior provides the epigenetic blueprint for the human heart, *NATURE Scientific Reports* 2016; 6:22021 DOI: 10.1038/srep22021.
9. Kohli K, Kovács SJ. The Quest for Load-Independent Left Ventricular Chamber Properties: Exploring the Normalized Pressure-Volume Loop, *Physiological Reports* 2017; 5 (3), e13160, DOI: 10.14814/phy2.13160.
10. Maksuti E, Carlsson M, Arheden H, Kovács SJ, Broomé M, and Ugander M "Hydraulic forces contribute to left ventricular diastolic filling" *NATURE Scientific Reports* 2017; 7:43505 DOI: 10.1038/srep43505.

Key words: cardiac physiology, complexity theory, diastolic function, imaging, mathematical modeling

Ronald J. Krone, MD

Professor of Medicine

Current Research Interests

- Cardio-oncology (cardiac toxicity from cancer)
- Cardiac protection during doxorubicin therapy
- Cardiac imaging in cancer patients

Representative Publications

1. Krone RJ, Shaw RE, Klein LW, Blankenship JC, Weintraub WS on behalf of the American College of Cardiology - National Cardiovascular Data Registry. Ad Hoc Percutaneous Coronary Interventions (PCIs) in Patients with Stable Coronary Artery Disease – a study of prevalence, safety and variation in use from the American College of Cardiology National Cardiovascular Data Registry (ACC-NCDR). *Cathet Cardiovasc Intervent* 2006; 68:696-703.
2. Lenihan DJ, Krone RJ: Cardiac Disease in the Cancer Patient. *Progress Cardiovasc Dis* 2010; volume 53.
3. Krone RJ. Managing coronary artery disease in the cancer patient. *Prog Cardiovasc Dis* 2010; 53:149-56.
4. Krone RJ, Rao SV, Dai D, et al. Acceptance, panic, and partial recovery the pattern of usage of drug-eluting stents after introduction in the U.S. (a report from the American College of Cardiology/National Cardiovascular Data Registry). *JACC Cardiovasc Interv* 2010; 3:902-10.
5. Chan PS, Patel MR, Klein LW, Krone RJ, Dehmer GJ, Kennedy K, Nallamothu BK, Weaver WD, Masoudi FA, Rumsfeld JS, Brindis RG, Spertus JA. Appropriateness of Percutaneous Coronary Intervention. *JAMA*. 2011; 306:53-61.
6. Payvar S, Kim S, Rao SV, Krone R, Neely M, Paladugu N, Daggubati R. In-Hospital Outcomes of Percutaneous Coronary Interventions in Extremely Obese and Normal-Weight Patients: Findings From the NCDR (National Cardiovascular Data Registry). *J Am Coll Cardiol* 2013; 62:692-696.
7. Krone RJ, Althouse AD, Tamis-Holland J, Venkitachalam L, Campos A, Forker A, Jacobs AK, Ocampo S, Steiner G, Fuentes F, Pena Sing IR, Brooks MM, for the BARI 2D Study Group, Appropriate Revascularization in Stable Angina, Lessons from the BARI 2D Trial, *Canadian Journal of Cardiology* 2014; 30:1595-601

Key words: cardio-oncology, coronary artery disease, cardiomyopathy

Gregory M. Lanza, MD, PhD

Oliver M. Langenberg Distinguished Professor of the Science and Practice of
Medicine

Current Research Interests

- Nanomedicine
- Targeted Drug Delivery
- Molecular Imaging
- Magnetic Resonance Imaging
- Echocardiography
- Spectral CT
- Photoacoustic Tomography

Representative Publications

1. Wagner EM, Jenkins J, Schmieder A, Eldridge L, Zhang Q, Moldobaeva A, Zhang H, Allen JS, Yang X, Mitzner W, Keupp J, Caruthers SD, Wickline SA, Lanza GM: Angiogenesis and airway reactivity in asthmatic brown Norway rats. *Angiogenesis* 2015; 18 (1): 1-11; PMID: 25149641 [PubMed – in process].
2. Wang K, Pan D, Schmieder AH, Senpan A, Caruthers SD, Cui G, Allen JS, Zhang H, Shen B, Lanza GM: Atherosclerotic neovasculature MR imaging with mixed manganese-gadolinium nanocolloids in hyperlipidemic rabbits. *Nanomedicine* 2015; 11 (3): 569-578. PMID: 25652897; PMCID: PMC4720435.
3. Soodgupta D, Pan D, Cui G, Senpan A, Yang X., Lu L, Weilbaecher, KN, Prochownik EV, Lanza GM, Tomasson, MH: Small molecule MYC inhibitor conjugated to integrin-targeted nanoparticles extends survival in a mouse model of disseminated multiple myeloma. *Mol Cancer Ther* 2015; 14 (6): 1286-1294. PMID: 25824336.
4. Pan D, Pham CT, Weilbaecher KN, Tomasson MH, Wickline SA, Lanza GM: Contact-facilitated drug delivery with Sn2 lipase labile prodrugs optimize targeted lipid nanoparticle drug delivery. *Wiley Interdiscip Rev Nanomed Nanobiotechnol* 2016; 8 (1):85–106. doi: 10.1002/wnan.1355. PMID: 26296541.
5. Esser AK, Schmieder AH, Ross MH, Xiang J, Su X, Cui G, Zhang H, Yang X, Allen JS, Williams T, Wickline SA., Pan D, Lanza GM, Weilbaecher KN: Dual-therapy with $\alpha\beta 3$ -targeted Sn2 lipase-labile fumagillin-prodrug nanoparticles and zoledronic acid in the Vx2 rabbit tumor model, *Nanomedicine* 2016; 12 (1): 201211;doi:10.1016/j.nano.2015.10.003. PMID: 26515754.

Key words: basic science, imaging, molecular cardiology, nanomedicine

[John M. Lasala, MD, PhD](#)

Professor of Medicine

Current Research Interests

- Interventional cardiology with complex coronary interventions
- Drug-eluting stents
- Percutaneous aortic valve replacement and mitral valve repair
- Structural heart/congenital heart defects

Representative Publications

1. Kirtane AJ, Doshi D, Leon MB, Lasala JM, Ohman EM, O'Neill WW, Shroff A, Cohen MG, Palacios IF, Beohar N, Uriel N, Kapur NK, Karpalotis D, Lombardi W, Dangas GD, Parikh MA, Stone GW, Moses JW. Treatment of Higher-Risk Patients with an Indication for Revascularization: Evolution Within the Field of Contemporary Percutaneous Coronary Intervention. *Circulation*. 2016 Aug 2; 134(5): 422-31. Doi: 10.1161/CIRCULATIONAHA.116.022061. PMID: 27482004.
2. Tepper S, Masood MF, Baltazar Garcia M, Pisani M, Ewald GA, Lasala JM, Bach RG, Singh J, Balsara KR, Itoh A. Left Ventricular Unloading by Impella Device Versus Surgical Vent During Extracorporeal Life Support. *Ann Thorac Surg*. 2017 Mar 24. Pii: S0003-4975(17)30039-5. Doi: 10.1016/j.athoracsur.2016.12.049. PMID: 28347536.
3. Henn MC, Percival T, Zajarias A, Melby SJ, Lindman BR, Quader N, Damiano RJ Jr, Moon MR, Lasala JM, Rao RS, Bell J, Damiano MS, Maniar HS. Learning Alternative Access Approaches for Transcatheter Aortic Valve Replacement: Implications for new Transcatheter Aortic Valve Replacement Centers. *Ann Thorac Surg*. 2017 May; 103(5): 1399-1405; doi: 10.1016/j.athoracsur.2016.08.068. PMID: 27765175
4. Sodhi N, Lasala JM. Mechanical Circulatory Support in Acute Decompensated Heart Failure and Shock. *Interv Cardiol Clin*. 2017 Jul; 6(3):387-405. Doi: 10.1016/j.iccl.2017.03.008.Review. PMID: 286000092
5. Vasquez AF, Zajarias A, Balzer DT, Lasala JM. (2016). Percutaneous Closure of Patent Foramen Ovale and Atrial Septal Defect. In EJ Topol & PS Teirstein (Eds.), *Textbook of Interventional Cardiology, 7th Edition* (pp. 747-770). Philadelphia, PA: Elsevier

Key words: coronary artery disease, interventional cardiology, valvular heart disease

[Kory J. Lavine, MD, PhD](#)

Assistant Professor in Medicine

Current Research Interests

- Immune mechanisms governing cardiac recovery and heart failure pathogenesis
- Precision Therapies for Dilated Cardiomyopathy
- Pathogenesis of primary graft dysfunction
- Role of macrophages in coronary development, collateral growth, and regeneration

Representative Publications

1. Lavine KJ, White AC, Park C, Smith CS, Choi K, Long F, Hui C, Ornitz DM. Fibroblast growth factor signals regulate a wave of Hedgehog activation that is essential for coronary vascular development. *Genes Dev.* 2006; 20(12): 1651-66.
2. Lavine KJ, Smith CS, Ornitz DM. Hedgehog signaling is essential for maintenance of the coronary vasculature in mice. *JCI.* 2008; 118(7): 2404-14.
3. Lavine KJ, Sintek M, Joseph S, Ewald G, Mann DM. Prognostic impact of collateral formation in coronary allograft vasculopathy. *Circ HF* 2013; 6(4): 773-84.
4. Lavine KJ, Kovacs A, Weinhemier C, Mann DL. Repetitive myocardial ischemia promotes coronary growth in the adult mammalian heart. *J Am Heart Assoc.* 2013; 2(5): e000343.
5. Epelman S, Lavine KJ, Beaudin AE, Sojka DK, Carrero JA, Calderon B, Brija T, Gautier EL, Ivanov S, Satpathy AT, Schilling JD, Schwendener R, Sergin I, Razani B, Forsberg EC, Yokoyama W, Unanue ER, Colonna M, Randolph GJ and Mann DL. Origin and lifecycle of cardiac macrophages subpopulations in steady state and inflammation. *Immunity*, 2014; 40(1): 91-104.
6. Epelman S, Lavine KJ, Randolph GJ. Origins and Functions of Tissue Macrophages. *Immunity*, 2014; 41(1): 21-35.
7. Lavine KJ, Epelman S, Uchida K, Weber KJ, Nichols CG, Schilling JD, Ornitz DM, Randolph GJ, Mann DL. Distinct cardiac macrophage subsets govern the response to cardiac injury in the neonatal and adult heart. *PNAS*, 2014; 111(45): 16029-34.
8. Leid JM, Carrelha J, Boukarabila H, Epelman S, Jacobsen SE, Lavine KJ. Primitive embryonic macrophages are required for coronary development and maturation. *Circ Res.* 2016; 118(10):1498-511.
9. Li W, Hsiao H, Higashikubo R, Saunders B, Bharat A, Goldstein D, Krupnick A, Gelman A, Lavine KJ*, Kreisel D*. Heart-resident CCR2+ macrophages promote neutrophil extravasation through TLR9-MyD88-CXCL5 signaling. *JCI Insight*. Accepted. *Co-senior authors.
10. Patel MD, Mohan J, Schneider C, Bajpai G, Purevjav E, Canter CE, Towbin J, Bredemeyer A, Lavine KJ. Pediatric and adult dilated cardiomyopathy represent distinct pathological entities. *JCI Insight* 2017; 2(14): Epub ahead of print.

Key words: heart failure, macrophage, transplant vasculopathy, coronary development, collateral circulation, cardiac recovery

Steven J. Lavine, MD

Professor of Medicine

Current Research Interests

- Diastolic function in heart failure
- Noninvasive determinants of survival in aortic regurgitation
- Shape of the LV outflow tract and its relation to ventricular geometry
- Determinants of survival and readmission in community hospital based cohorts with heart Failure

Representative Publications

1. Lavine SJ. Genesis of the restrictive filling pattern: Pericardial constraint or myocardial restraint. *J of Am Soc Echo* 2004; 17: 152-160.
2. Lavine SJ. Index of myocardial performance is afterload dependent in the normal and abnormal left ventricle. *J Am Soc Echocardiogr* 2005; 18: 342-50
3. Lavine SJ. Effect of heart rate and preload on the index of myocardial performance in the normal and abnormal left ventricle. *J Am Soc Echocardiogr* 2005; 18: 133-41.
4. Ortiz AA, Lavine SJ. The index of myocardial performance and aortic regurgitation: the influence of a volume overload lesion. *Anat. J Cardiol* 2006 Jun; 6(2):115-20.
5. Lavine SJ. Effect of changes in contractility on the index of myocardial performance in the dysfunctional left ventricle. *Cardiovasc Ultrasound*. 2006 Nov 17; 4:45.
6. Lavine SJ, Lavine JA. The effect of acute hypertension on left ventricular diastolic pressures in a canine model of left ventricular dysfunction with preserved ejection fraction and elevated LV filling pressures. *J Am Soc Echocardiogr*. 2006 Nov; 19(11):1350-8.
7. Mansouri V, Lavine SJ. Effect of external constraint on the index of myocardial performance in a canine model of left ventricular dysfunction. *Echocardiography*. 2007 Aug; 24(7):712-22.
8. Lavine SJ, Conetta DA. Comparison of the effect of pressure loading on left ventricular size, systolic and diastolic function in canines with left ventricular dysfunction with preserved and reduced ejection fraction. *Cardiovasc Ultrasound*. 2008 Nov 18; 6:57.
9. Lavine SJ, Walsh T. Exercise tolerance and the post exercise diastolic filling pattern in patients with the resting impaired relaxation. *Cardiology Research*, 2011, <http://cardiologyres.org/index.php/Cardiologyres/issue/view/8>
10. Babcock MJ, Lavine S, Strom JA, Bass TA, Guzman LA. Candidates for transcatheter aortic valve replacement: fitting the PARTNERS criteria. *Catheter Cardiovasc Interv*. 2013 Oct 1; 82(4):655-61.
11. Lavine SJ. Diastolic Filling Patterns and the Valsalva Maneuver, *Cardiology* 2014; 128:352-354
12. Lavine SJ, Al Balbissi KA. Reduced longitudinal function in chronic aortic regurgitation. *J Cardiovasc Ultrasound*. 2015 Dec; 23(4):219-27. doi: 10.4250/jcu.2015.23.4.219.
13. Lavine SJ, Al Balbissi KA. Adverse cardiac events and the impaired relaxation left ventricular filling pattern. *J Am Soc Echocardiogr*. 2016 Jul; 29(7):699-708. doi: 10.1016/j.echo.2016.02.008. Epub 2016 Mar 19.
14. Panchal HB, Veeranki SP, Bhatheja S, Barry N, Mahmud E, Budoff M, Lavine SJ, Mamudu HM, Paul TK. Fractional flow reserve using computed tomography for assessing coronary artery disease: a meta-analysis. *J Cardiovasc Med (Hagerstown)*. 2016 Sep; 17(9):694-700. doi:10.2459/JCM.0000000000000415.

Key words: aortic regurgitation, diastolic function, heart failure

Daniel J. Lenihan, MD

Professor of Medicine

Current Research Interests

- Biomarkers of disease process in Heart Failure, Amyloidosis, and Cardiotoxicity of Chemotherapy
- Optimal monitoring and treatment of cardiac disease in patients with cancer
- Best Practice for cardiac safety during cancer therapy
- Early phase clinical trials in Cardioprotection, Heart Failure, and Amyloidosis
- Fellowship training requirements for Cardio-Oncology

Representative Publications

1. Lenihan DJ, Osman A, Sriram V, Aitsebaomo J, Patterson C. Evidence for association of coronary sinus levels of hepatocyte growth factor and collateralization in human coronary disease. *Am J Physiol Heart Circ Physiol* 2003; 284:H1507-12.
2. Lenihan DJ, Alencar AJ, Yang D, Kurzrock R, Keating MJ, Duvic M. Cardiac toxicity of alemtuzumab in patients with mycosis fungoides/Sezary syndrome. *Blood* 2004; 104:655-8.
3. Ewer MS, Vooletich MT, Durand JB, Woods ML, Davis JR, Valero V, Lenihan DJ. Reversibility of trastuzumab-related cardiotoxicity: new insights based on clinical course and response to medical treatment. *J Clin Oncol* 2005; 23:7820-6.
4. Burjonrappa SC, Tong AT, Xiao LC, Johnson MM, Yusuf SW, Lenihan DJ. Cancer Patients with Markedly Elevated B-Type Natriuretic Peptide May Not Have Volume Overload. *American Journal Clinical Oncology* 2007; 30:3:287-293.
5. Khakoo AY, Kassiotis CM, Tannir N, Plana JC, Halushka M, Bickford C, Trent J, Champion JC, Durand JB, Lenihan DJ. Heart failure associated with sunitinib malate, a multi-targeted receptor tyrosine kinase inhibitor *Cancer* 2008; 112(11):2500-8.
6. Lenihan, D., T. Suter, et al. "Pooled analysis of cardiac safety in patients with cancer treated with pertuzumab." *Annals of oncology: official journal of the European Society for Medical Oncology / ESMO* 23(3): 791-800. Lenihan DJ, Cardinale DM. Late Cardiac Effects of Cancer Treatment. *Journal of Clinical Oncology* 2012; 30(30):3657-64.
7. Grandin, W., Ky, Bonnie, Cornell, R Frank, Carver, J, Lenihan, DJ. Patterns of Cardiac Toxicity associated with irreversible proteasome inhibition in the treatment of multiple myeloma. *Journal of Cardiac Failure* 2015; 21(2):138-44. PMID:25433360
8. Lenihan DJ, Stevens PL, Massey M, Piana JC, Araujo DM, Fanale MA, Fayad LE, Fisch MJ, Yeh ET. The Utility of Point-of-Care Biomarkers to Detect Cardiotoxicity During Anthracycline Chemotherapy: A Feasibility Study. *J Card Fail.* 2016; 6(22):433-8
9. Armenian SH, Lacchetti C, Barac A, Carver J, Constine LS, Denduluri N, Dent S, Douglas PS, Durand JB, Ewer M, Fabian C, Hudson M, Jessup M, Jones LW, Ky B, Mayer EL, Moslehi J, Oeffinger K, Ray K, Ruddy K, Lenihan D. Prevention and Monitoring of Cardiac Dysfunction in Survivors of Adult Cancers: American Society of Clinical Oncology Clinical Practice Guideline. *J Clin Oncol* 2017; 35(8):893-911. PMID:27918725.

Key words: cardio-oncology, biomarkers, amyloidosis, heart failure, practice improvement

[Kathryn Lindley, MD](#)

Assistant Professor of Medicine

Current Research Interests

- Women's Heart Disease
- Heart Disease in Pregnancy
- Peripartum cardiomyopathy
- Contraception in women with heart disease
- Cardiovascular sequelae of pre-eclampsia

Representative Publications

1. Lindley KJ, Ravichandran AK, Schilling J, Joseph SM. Antibody-Mediated Rejection of the Heart in the Setting of Autoimmune Demyelinating Polyneuropathy: A Case Report and Review of the Literature. *Case Reports in Cardiology* 2012. Article ID 639284. doi:10.1155/2012/639284.
2. Lindley KJ, Conner SN, Cahill AG. Adult Congenital Heart Disease in Pregnancy. *Obstet Gynecol Surv.* 2015; 70(6):397-407.
3. Lindley KJ, Madden T, Cahill AG, Ludbrook PA, Billadello JJ. Contraceptive Use and Unintended Pregnancy in Women With Congenital Heart Disease. *Obstetrics and Gynecology* 2015; 126(2): 363-9.
4. Lindley KJ, Conner SN, Cahill AG, Madden T. Contraception and Pregnancy Planning in Women With Congenital Heart Disease. *Curr Treat Options Cardiovasc Med.* 2015 Nov; 17(11):50.
5. Ji J, Posenau JT, Lindley KJ, Braverman AC. Dissecting the Dilemma: Uncontrolled Hypertension in a Pregnant Patient. *Am J Med.* 2016;129(5):e1-3.
6. Sintek MA, Sparrow CT, Mikuls TR, Lindley KJ, Bach RG, Kurz HI, Novak E, Singh J. Repeat revascularisation outcomes after percutaneous coronary intervention in patients with rheumatoid arthritis. *Heart* 2016;102(5):363-9.
7. Mehta LS, Beckie TM, DeVon HA, Grines CL, Krumholz HM, John MN, Lindley KJ, Vaccarino V, Wang TY, Watson KE, Wenger NK. Acute Myocardial Infarction in Women: A Scientific Statement From the American Heart Association. *Circulation* 2016;133:916-47.
8. Lindley KJ, Conner SN, Cahill AG, Novak E, Mann DL. Impact of Preeclampsia on Clinical and Functional Outcomes in Women with Peripartum Cardiomyopathy. *Circ Heart Fail.* 2017 Jun; 10(6).

Key words: women and minorities, pregnancy, cardiomyopathy

Thomas M. Maddox, MD, MSc

Professor of Medicine

Director, Health Systems Innovation Lab, Washington University School of Medicine/BJC Healthcare

Current Research Interests

- Healthcare delivery innovation
- Cardiac and general health services research
- Cardiac and general quality of care and outcomes research

Representative Publications:

1. Maddox TM, Stanislawski M, Grunwald GK, Bradley SM, Ho PM, Tsai TT, Patel MR, Sandhu A, Valle J, Magid DJ, Leon B, Bhatt DL, Fihn SD, Rumsfeld JS. Non-Obstructive Coronary Artery Disease and Risk of Myocardial Infarction. *JAMA*. 2014 Nov 5; 312(17):1754-63.
2. Maddox TM, Borden WB, Tang F, Virani SS, Oetgen WJ, Mullen B, Chan PS, Casale PN, Douglas PS, Masoudi FA, Farmer SA, Rumsfeld JS. Implications of the 2013 ACC/AHA Cholesterol Guidelines for Adults in Contemporary Cardiovascular Practice: Insights from the NCDR[®] PINNACLE Registry[®]. *J Am Coll Cardiol*. 2014 Dec 2; 64(21):2183-92.
3. Maddox TM, Plomondon ME, Petrich M, Tsai TT, Gethoffer H, Noonan G, Gillespie B, Box T, Fihn SD, Jesse RL, Rumsfeld JS. A National Clinical Quality Program for Veterans Affairs Catheterization Laboratories (From the VA Clinical Assessment, Reporting, and Tracking [CART] Program). *Am J Cardiol*. 2014 Dec 1; 114(11):1750-7.
4. Rumsfeld JR, Joynt KE, Maddox TM. Big Data Analytics To Improve Cardiovascular Quality and Outcomes of Care: Promise and Challenges. *Nature Reviews Cardiology*. 2016 Jun; 13(6):350-9.
5. Hsu JC, Akao M, Abe M, Anderson KL, Avezum A, Glusenka N, Kohsaka S, Lane DA, Lip GY, Ma CS, Masoudi FA, Potpara TS, Siong TW, Turakhia MP, Tse HF, Rumsfeld JS, Maddox TM. International Collaborative Partnership for the Study of Atrial Fibrillation (INTERAF): Rationale, Design, and Initial Descriptives. *J Am Heart Assoc*. 2016 Nov 2; 5(11).
6. Maddox TM, Albert NM, Borden WB, Curtis LH, Ferguson TB, Kao DP, Marcus GM, Peterson ED, Redberg R, Rumsfeld JS, Shah ND, Tchong JE, and On behalf of the American Heart Association Council on Quality of Care and Outcomes Research; Council on Cardiovascular Disease in the Young; Council on Clinical Cardiology; Council on Functional Genomics and Translational Biology; and Stroke Council. The Learning Healthcare System and Cardiovascular Care: A Scientific Statement From the American Heart Association. *Circulation*. 2017 Apr 4; 135(14):e826-e857.
7. Maddox TM, Tang F, Downs JR, Masoudi FA, Virani SS, Daugherty SL, Rumsfeld JS. Applicability of the IMPROVE-IT Trial to Current Patients With Acute Coronary Syndrome: An NCDR Research to Practice Project. *JAMA Intern Med*. 2017 Apr 24.
8. Marzec LN, Wang J, Shah ND, Chan PS, Ting HH, Gosch KL, Hsu JC, Maddox TM. Influence of Direct Oral Anticoagulants on Rates of Oral Anticoagulation for Atrial Fibrillation. *J Am Coll Cardiol*. 2017 May 23; 69(20):2475-2484.

Key words: healthcare innovation, health services research, quality of care, outcomes research

Majesh Makan, MD

Professor of Medicine

Current Research Interests:

- 3-dimensional echo and transesophageal echo
- Echocardiographic assessment of right ventricular function
- 2-dimensional speckle Doppler and strain rate imaging
- Quantification of mitral regurgitation severity

Representative Publications:

1. Rasalingam R, Johnson SN, Bilhorn KR, Huang PH, Makan M, Moazami N, Pérez JE: Transthoracic Echocardiographic Assessment of Continuous-Flow Left Ventricular Assist Devices: Review Paper. *J Am Soc Echocardiogr* 2011; 24:2,135-148.
2. Ren J, Rich MW, Makan M: Right Ventricular Outflow Tract Obstruction by Lymphoma: Case Series and Review of the Literature. *Echocardiography* 2011; (10): 1164-7.
3. Sadhu J, Makan M, Rich MW: Prognostic Utility of Left Atrial Volume Index in Older Patients with Heart Failure and Moderate or Severe Mitral Regurgitation. Presented as a poster abstract at Annual Scientific meeting of HFSA, September 2011.
4. Rasalingam R (Editor), Makan M, Pérez JE (Associate Editors): *The Washington Manual of Echocardiography*. Lippincott Williams and Wilkins, Wolters Kluwer, 2012.
5. Makan M, Johnson SN: The Role of Contrast Echocardiography. IN: *The Washington Manual of Echocardiography*. Edited by Rasalingam R, Makan M and Pérez JE. Lippincott Williams and Wilkins, Wolters Kluwer, pp. 31-41, 2012.
6. Manzanal A, Ruiz L, Madrazo J, Makan M, Pérez JE: Fundamental Role of Echocardiography in the Diagnosis of Inverted Tako-Tsubo Cardiomyopathy. *Texas Heart Inst J* 2013; 40:1,56-59.
7. Makan M: Tako-Tsubo Cardiomyopathy and The Echocardiographic Diagnosis: A Single Center Experience (in preparation).
8. Saghir M, Makan M: Echocardiography. IN: *The Washington Manual: The Cardiology Subspecialty Consult Series*. Third Edition. Edited by Cuculich PS and Kates AM. Lippincott Williams and Wilkins, Wolters Kluwer, pp. 381-388, 2014.
9. Quader N (Editor), Makan M, Pérez JE (Associate Editors): *The Washington Manual of Echocardiography*. 2nd Edition, Lippincott Williams and Wilkins, Wolters Kluwer, 2016.
10. Makan M: The Role of Contrast Echocardiography. IN: *The Washington Manual of Echocardiography*. 2nd Edition. Edited by Quader N, Makan M and Pérez JE. Lippincott Williams and Wilkins, Wolters Kluwer, pp. 31-41, 2016.
11. Tyson T, Lindley K, Makan M: Congenital Heart Disease. IN: *The Washington Manual of Echocardiography*, 2nd Edition. Edited by Quader N, Makan M and Perez JE. pp. 242-268, 2016.
12. Adamo L, Perry A, Novak E, Makan M, Lindman BR, Mann DL. Abnormal Global Longitudinal Strain Predicts Future Deterioration of Left Ventricular Function in Heart Failure Patients With a Recovered Left Ventricular Ejection Fraction. *Circ Heart Fail*. 2017; 10:e003788 (in press).

Key Words: echocardiography, imaging, valvular heart disease

Douglas L. Mann, MD

Professor of Medicine, Cell Biology and Physiology
Lewin Chair and Chief, Cardiovascular Division

Current Research Interests

- Cardiac inflammation and innate immunity
- LV remodeling and reverse LV remodeling
- Heart failure, clinical trials, and circulatory assist devices
- Translational research (T1 or T2)

Representative Publications

1. Yang KC, Yamada KA, Patel AY, Topkara VK, Ewald GA, Mann DL, Nerbonne JM. Deep RNA sequencing reveals dynamic regulation of myocardial noncoding RNA in failing human heart and remodeling with mechanical circulatory support. *Circulation*, 2014; 129: 1009-1021. PMID:24429688.
2. Epelman S, Lavine KJ, Beudin A, Sojka DK, Brija T, Carrero JA, Calderon B, Gautier EL, Ivanov S, Satpahy AT, Schwendener R, Schilling JD, Forsberg S, Yokoyama, Unanue, ER, Colonna M, Randolph GJ, Mann DL. Embryonic and Adult-Derived Resident Cardiac Macrophages Are Maintained through Distinct Mechanisms at Steady State and during Inflammation. *Immunity* 2014; 40: 91-104. PMID:24439267 NIHMSID # 551984.
3. Lavine KJ, Epelman S, Uchida K, Weber KJ, Nichols CG, Schilling JD, Ornitz DM, Randolph GJ, Mann DL: Distinct macrophage lineages contribute to disparate patterns of cardiac recovery and remodeling in the neonatal and adult heart. *Proc Natl Acad Sci U S A* 2014; 111:16029-16034. PMID:25349429 PMCID:PMC423456.
4. Anker SD, Coats AJ, Cristian G, Dragomir D, Pusineri E, Piredda M, Bettari L, Dowling R, Volterrani M, Kirwan BA, Filippatos G, Mas JL, Danchin N, Solomon SD, Lee RJ, Ahmann F, Hinson A, Sabbah HN, Mann DL. A prospective comparison of alginate-hydrogel with standard medical therapy to determine impact on functional capacity and clinical outcomes in patients with advanced heart failure (AUGMENT-HF trial). *Eur Heart J* 2015; 36:2297-309. PMID: 26082085 PMCID:PMC4561351.
5. Topkara VK, Chambers KT, Yang KC, Tzeng KP, Evans S, Weinheimer C, Kovacs A, Robbins J, Barger P, Mann DL. Functional significance of the discordance between transcriptional profile and left ventricular structure/function during reverse remodeling. *JCI Insight* 2016; 1:e86038. NIHMSID 777086.
6. Gold MR, Van Veldhuisen DJ, Hauptman PJ, Borggrefe M, Kubo SH, Lieberman RA, Milasinovic G, Berman BJ, Djordjevic S, Neelagaru S, Schwartz PJ, Starling RC, Mann DL. Vagus Nerve Stimulation for the Treatment of Heart Failure: The INOVATE-HF Trial. *J Am Coll Cardiol* 2016; 68: 149-160.
7. Hartupee J, Mann DL. Neurohormonal activation in heart failure with reduced ejection fraction. *Nat Rev Cardiol* 2017; 14:30-38 PMCID: PMC5286912.

Key words: basic science, heart failure, translational research

James G. Miller, PhD

Albert Gordon Hill Professor of Physics, Medicine, and Biomedical Engineering

Current Research Interests

- Echocardiography
- Myocardial tissue characterization with ultrasound
- Basic Science

Representative Publications

1. Nelson AM, Hoffman JJ, Anderson CC, Holland MR, Nagatani Y, Mizuno K, Matsukawa M, and Miller JG. "Determining attenuation properties of interfering fast and slow ultrasonic waves in cancellous bone." J Acoust Soc Am 2011; 130:2233-2240.
2. Sanjiv Kaul; James G. Miller; et al. "A suggested roadmap for cardiovascular ultrasound research for the future", Journal of the American Society of Echocardiography 2011; 24(4):455-464.
3. Hoffman JJ, Nelson AM, Holland MR, and Miller JG. "Cancellous bone fast and slow waves obtained with Bayesian probability theory correlate with porosity from computer tomography." J Acoust Soc Am 2012; 132:1830-1837.
4. Milne ML, Singh GK, Miller JG, and Holland MR, "Echocardiographic-Based Assessment of Myocardial Fiber Structure in Individual, Excised Hearts." Ultrasonic Imaging 2012; 34:129-141.
5. Hoffman JJ, Nelson AM, Holland MR, and Miller JG. "Cancellous bone fast and slow waves obtained with Bayesian probability theory correlate with porosity from computer tomography." J Acoust Soc Am 2012; 132:1830-1837.
6. Pellikka PA, Douglas PS, Miller JG, et al. "American Society of Echocardiography Cardiovascular Technology and Research Summit: A Roadmap for 2020." J Am Soc Echocardiogr 2013; 26:325-338.
7. Groopman AM, Katz JI, Holland MR, Fujita F, Matsukawa M, Mizuno K, Wear KA, Miller JG. "Conventional, Bayesian, and Modified Prony's methods for characterizing fast and slow waves in equine cancellous bone." J. Acoust.Soc.Am. 2015; 138:594-604.
8. M.Milne, G.K.Singh, J.G.Miller, K.A.Wallace, M.R.Hollad, "Toward 3-D Echocardiographic Determination of Regional Myofiber Structure", Ultrasound Med.Biol. 2016; 42:607-18.

Key words: echocardiography, imaging

Jeanne M. Nerbonne, Ph.D.

Professor of Medicine, Alumni Endowed Professor of Molecular Biology and Pharmacology in Developmental Biology and Medicine
Director, Center for Cardiovascular Research

Current Research Interests

- Molecular determinants of voltage-gated ion channel diversity, expression, distribution and functioning in cardiac and neuronal cells
- Inherited and acquired membrane excitability disorders in the cardiovascular and nervous systems
- Ion channels is the regulation of circadian rhythms
- Molecular mechanisms contributing to electrical remodeling in physiological and pathological cardiac hypertrophy

Representative Publications

1. Yang, K.C., Yamada, K.A., Patel, A.Y., Topkara, V.K., Ewald, G.A., Mann, D.L., and Nerbonne, J.M. Deep RNA sequencing reveals dynamic regulation of myocardial non-coding RNAs in the failing human heart and remodeling with mechanical circulatory support. *Circulation* 2014; 129: 1009-1021.
2. Boczek, N.J., Ye, D., Wang, W., Johnson, E.K., Crotti, L., Teskr, D.J., Dagradi, F., Mizusawa, Y., Torchio, M., Alders, M., Guidicessi, J.R., Wilde, A.A., Schwarz, P.J., Nerbonne, J.M., and Ackerman, M.J. Characterization of SEMA3A-encoded semaphorine as a naturally occurring Kv4.3 protein inhibitor and its contribution to Brugada Syndrome. *Circulation Research* 2014; 115: 460-469.
3. Bosch, M.K., Carrasquillo, Y., Ransdell, J.L., Kanakmedala, A., Ornitz, D.M., and Nerbonne, J.M. Intracellular FGF14 (iFGF14) is required for spontaneous and evoked firing in cerebellar Purkinje neurons and for motor coordination and balance. *Journal of Neuroscience* 2015; 35: 6752-6769.
4. Peyronnet, R., Nerbonne, J.M., and Kohl, P. Cardiac mechano-gated ion channels and arrhythmias. *Circulation Research* 2016; 118: 311-329.
5. Yang, K.-C., and Nerbonne, J.M. Mechanisms contributing to myocardial potassium diversity, regulation and remodeling. *Trends in Cardiovascular Medicine* 2016; 26: 209-218.
6. Hueneke, R., Adenwala, A., Mellor, R., Seidman, J.G., Seidman, C.E., and Nerbonne, J.M. Early remodeling of repolarizing K⁺ currents in the $\alpha\text{MHC}^{403/+}$ mouse model of hypertrophic cardiomyopathy. *Journal of Molecular and Cellular Cardiology* 2017; 103: 93-101.
7. Ransdell, J.L., Dranoff, E., Lau, B., Lo, W.-L., Donermeyer, D.L., Allen, P.M., and Nerbonne, J.M. Loss of Nav β 4-mediated regulation of sodium currents in Purkinje neurons disrupts firing and impairs motor coordination and balance. *Cell Reports* 2017; 19: 532-544.
8. Hermanstyn, T.D., Granados-Fuentes, D., Mellor, R., Herzog, E.D., and Nerbonne, J.M. Acute *in vivo* “knockdown” of Kv4.1 modulates neuronal firing rates and clock gene expression in the suprachiasmatic nucleus and disrupts circadian rhythms in behavior. *eNeuro* 2017; 4: pii: eNeuro.0377-16.2017.
9. Chaimvimonvat, N., Chen-Izu, Y., Clancy, C.E., Deschenes, I., Dobrev, D., Heijman, J., Izu, L., Qu, Z., Ripplinger, C.M., Vandenberg, J.I., Weiss, J.N., Koren, G., Banyasz, T., Grandi, E., Sanguinetti, M.C., Bers, D.M., and Nerbonne, J.M. Potassium currents in the heart: Functional roles in repolarization, arrhythmia and therapeutics. *Journal of Physiology* 2017; 595: 2229-2252.

Key words: Ion channels, electrophysiology, molecular genetics, proteomics, arrhythmias, hypertrophy, remodeling

Colin G. Nichols, PhD

Carl Cori Professor of Cell Biology and Physiology

Director of the Center for the Investigation of Membrane Excitability Diseases

Current Research Interests

- Ion channels and cardiac arrhythmias
- ion channels and cardiovascular disease
- Ion channels and blood pressure control

Representative Publications

1. Flagg TP, Kurata HT, Masia R, Caputa G, Magnuson MA, Lefer DJ, Coetzee WA, Nichols CG. Differential structure of atrial and ventricular KATP: atrial KATP channels require SUR1. *Circ Res*. 2008 Dec 5; (12):1458-65.
2. Li A, Knutsen RH, Zhang H, Osei-Owusu P, Moreno-Dominguez A, Harter TM, Uchida K, Remedi MS, Dietrich HH, Bernal-Mizrachi C, Blumer KJ, Mecham RP, Koster JC, Nichols CG. Hypotension due to Kir6.1 gain-of-function in vascular smooth muscle. *J Am Heart Assoc*. 2013 Aug 23; 2(4):e000365. doi: 10.1161/JAHA.113.000365.
3. Zhang HX, Silva JR, Lin YW, Verbsky JW, Lee US, Kanter EM, Yamada KA, Schuessler RB, Nichols CG. Heterogeneity and function of K(ATP) channels in canine hearts. *Heart Rhythm*. 2013 Oct; 10(10):1576-83. doi: 10.1016/j.hrthm.2013.07.020. Epub 2013 Jul 17.
4. Nichols CG, Singh GK, Grange DK. KATP channels and cardiovascular disease: suddenly a syndrome. *Circ Res*. 2013 Mar 29; 112(7):1059-72.
5. Silva JR, Cooper P, Nichols CG. Modeling K_{ATP}-dependent excitability in pancreatic islets. *Biophys J* 2014 November 4; 107(9):2016-26.
6. Marshall BA, Green RP, Wambach J, White NH, Remedi MS, Nichols CG. Remission of severe neonatal diabetes with very early sulfonylurea treatment. *Diabetes Care* 2015 March; 38(3):e38-e39.
7. Levin MD, Zhang H, Uchida K, Grange DK, Singh GK, Nichols CG. Electrophysiologic consequences of K_{ATP} gain of function in the heart: Conduction abnormalities in Cantu syndrome. *Heart Rhythm*. 2015 Jun 30; pii: S1547-5271(15)00816-4.
8. Henn MC, Janjua MB, Zhang H, Kanter EM, Makepeace CM, Schuessler RB, Nichols CG, Lawton JS. Diazoxide Cardioprotection Is Independent of Adenosine Triphosphate-Sensitive Potassium Channel Kir6.1 Subunit in Response to Stress. *J Am Coll Surg* 2015 August; 221(2):319-25.
9. Wang S, Vafabakhsh R, Borschel WF, Ha T, Nichols CG. Structural dynamics of potassium-channel gating revealed by single-molecule FRET. *Nat Struct Mol Biol* 2016 January; 23(1):31-6.

Key words: arrhythmias, basic science, cardiac development, electrophysiology, hypertension, ion channels

Amit Noheria, MBBS, SM

Assistant Professor of Medicine

Current Research Interests

- Catheter-based treatments of cardiac arrhythmias
- Arrhythmias in congenital heart disease
- Cardiac resynchronization therapy
- Non-invasive electrophysiologic mapping

Representative Publications

1. Noheria A, Kumar A, Wylie JV, Josephson ME. "Catheter ablation vs antiarrhythmic drug therapy for atrial fibrillation: a systematic review." *Arch Intern Med*. 2008 Mar 24; 168(6):581-6.
2. Noheria A, Roshan J, Kapa S, Srivathsan K, Packer DL, Asirvatham SJ. Migraine headaches following catheter ablation for atrial fibrillation. *J Interv Card Electrophysiol*. 2011 Apr; 30(3):227-32.
3. Noheria A, DeSimone CV, Lachman N, et al. "Anatomy of the Coronary Sinus and Epicardial Coronary Venous System in 620 Hearts: An Electrophysiology Perspective." *J Cardiovasc Electrophysiol*. 2013 Jan; 24(1):1-6.
4. Noheria A, Patel SM, Mirzoyev S, et al. "Decreased Postoperative Atrial Fibrillation Following Cardiac Transplantation: The Significance of Autonomic Denervation." *Pacing Clin Electrophysiol*. 2013 Jun; 36(6):741-7.
5. Noheria A, Teodorescu C, Uy-Evanado A, et al. "Distinctive profile of sudden cardiac arrest in middle-aged vs. older adults: A community-based study." *Int J Cardiol*. 2013 Oct 9; 168(4):3495-9.
6. Noheria A, Deshmukh AJ, Asirvatham SJ. "Ablating Premature Ventricular Complexes: Justification, techniques and Outcomes." *Methodist Debaquey Cardiovasc J*. 2015 Apr-Jun; 11(2):109-20.
7. Noheria A, Syed FF, DeSimone CV, Asirvatham SJ. "Optimization of Stroke Prophylaxis Strategies in Nonvalvular AF - Drugs, Devices or Both?" *J Atr Fibrillation*. 2015 Aug-Sep; 8(2):71-80.
8. Noheria A, Asirvatham SJ, McLeod CJ. "Unusual Atrioventricular Reentry Tachycardia in Congenitally Corrected Transposition of Great Arteries: A Novel Site for Catheter Ablation." *Circ Arrhythm Electrophysiol*. 2016 Jan-Feb; 16(1):34-9.
9. Noheria A, Ponamgi SP, Desimone CV, et al. "Pulmonary embolism in patients with transvenous cardiac implantable electronic device leads." *Europace*. 2016 Feb; 18(2):246-52.
10. Noheria A, Shrader P, Piccini JP, et al. "Rhythm Control Versus Rate Control and Clinical Outcomes in Patients with Atrial Fibrillation: Results from ORBIT-AF." *JACC Clin Electrophysiol*, 2016 Apr; 2(2),221-9.
11. Noheria A, van Zyl M, Scott LR, et al. Single-site ventricular pacing via the coronary sinus in patients with tricuspid valve disease. *Europace*. 2017 (in press).

Key words: arrhythmias, atrial fibrillation, ventricular tachycardia, ventricular fibrillation, cardiac resynchronization therapy, cardioembolic stroke, adult congenital heart disease

[Daniel S. Ory, M.D.](#)

Alan A. and Edith L. Wolff Professor of Medicine, Cell Biology and Physiology

Current Research Interests

- Cholesterol biology
- Atherosclerosis and diabetes
- Niemann-Pick C disease
- Small RNA regulation of metabolism

Representative Publications

1. Bielska A*, Olsen B*, Mydock L, Krishnan K, Baker N, Schlesinger P, Covey D, Ory DS. Side-Chain Oxysterols Modulate Cholesterol Accessibility through Membrane Remodeling. *Biochemistry* 2014; 53, 3042-3051. PMID: PMC4020583.
2. Praggastis M, Tortelli B, Zhang J, Fujiwara H, Sidhu R, Chacko A, Chen Z, Lieberman AP, Davidson C, Walkley SU, Pipalia NH, Maxfield FR, Schaffer JE, and Ory DS. A murine Niemann-Pick C1 (NPC1) I1061T knockin model recapitulates the pathological features of the most prevalent human disease allele, *J Neuroscience*, 2015; 35:8091-8106. PMID: PMC4444535.
3. Jinn S, Brandis KA, Ren, A, Chacko A, Dudley-Rucker N, Fujiwara H, Jiang H, Olsen BN, Schaffer JE, and Ory DS. snoRNA U17 regulates cellular cholesterol trafficking, *Cell Metabolism*, 2015; 21:855-867. PMID: PMC4456254.
4. Jiang X, Sidu R, Mydock L, Hsu F-F, Covey DF, Scherrer DE, Earley B, Gale SE, Farhat N, Porter FD, Dietzen DJ, Orsini JJ, Berry-Kravis E, Zhang X, Reunert J, Thorsten Marquardt J, Runz H, Giugliani R, Schaffer JE, and Ory DS. Development of a Bile Acid-Based Newborn Screen for Niemann-Pick C Disease. *Sci Trans Med* 2016 May 4; 8(337):337ra63. PMID: PMC5316294.
5. Wei X, Song H, Yin L, Rizzo M, Yang L, Sidhu R, Miller MJ, Ory DS, Semenkovich CF. Endogenous lipid synthesis orchestrates membrane microdomain assembly to promote diet-induced diabetes. *Nature* 2016; 539:294-298.
6. Castellano BM, Thelen AM, Moldavski O, Feltes M, van der Welle REN, Mydock-McGrane L, Jiang X, van Eijkeren RJ, Davies OB, Louie SM, Perera RM, Covey D, Nomura DK, Ory DS, and Zoncu R. Lysosomal cholesterol activates mTORC1 via an SLC38A9-Niemann-Pick C1 signaling complex. *Science* 2017; 355:1306-1311.

Key words: atherosclerosis, cholesterol, diabetes, lipid metabolism, RNA

Julio E. Pérez, MD

Professor of Medicine

Current Research Interests

- Echocardiographic assessment of ventricular function
- Applications of contrast echocardiography and myocardial perfusion imaging
- Applications of myocardial strain measurements

Representative Publications

1. Boyer JK, Thanigaraj S, Schechtman K, Pérez JE: Prevalence of ventricular diastolic dysfunction in asymptomatic, normotensive patients with diabetes mellitus. *Am J Cardiol* 2004; 93:870-875.
2. Zajarias A, Thanigaraj S, Lasala J, Pérez, JE: Predictors and clinical outcomes of residual shunt in patients undergoing percutaneous transcatheter closure of patent foramen ovale. *J Invasive Cardiol* 2006; 18:533-537.
3. Mulvagh SL, Rakowski H, Vannan MA, Abdelmoneim SS, Becher H, Bierig SM, Burns PN, Castello R, Coon PD, Hagen ME, Jollis JG, Kimball TR, Kitzman DW, Kronzon I, Labovitz AJ, Lang RM, Mathew J, Moir WS, Nagueh SF, Pearlman AS, Pérez JE, Porter TR, Rosenbloom J, Strachan GM, Thanigaraj S, Wei K, Woo A, Yu EH, Zoghbi WA: American Society of Echocardiography Consensus Statement on the Clinical Applications of Ultrasonic Contrast Agents in Echocardiography. *J Am Soc Echocardiogr* 2008; 21:1179-1201.
4. Vargas-Barrón J, Roldán FJ, Romero-Cárdenas A, Molina-Carrión M, Vázquez-Antona CA, Zabalgoitia M, Martínez Rios MA, Pérez JE: Dissecting intramyocardial hematoma: Clinical presentation, pathophysiology, outcomes and delineation by echocardiography. *Echocardiography* 2009; 26:254-261.
5. Lindman BR, Arnold SV, Madrazo JA, Zajarias A, Johnson SN, Pérez JE, Mann DL: The Adverse Impact of Diabetes Mellitus on Left Ventricular Remodeling and Function in Patients with Severe Aortic Stenosis. *Circ Heart Fail* 2011; 4:286-292.
6. Rasalingam R, Johnson SN, Bilhorn KR, Huang PH, Makan M, Moazami N, Pérez JE: Transthoracic echocardiographic assessment of continuous-flow left ventricular assist devices. *J Am Soc Echocardiogr* 2011; 24(2):135-148.
7. Rasalingam R (Editor), Makan M, Pérez JE (Associate Editors): *The Washington Manual of Echocardiography*. Lippincott Williams and Wilkins, Wolters Kluwer, 2012.
8. Manzanal A, Ruiz L, Madrazo J, Makan M, Pérez JE: Inverted Takotsubo Cardiomyopathy and the Fundamental Diagnostic Role of Echocardiography. *Tex Heart Inst J* 2013; 40(1):56-9.
9. Quader N (Editor), Makan M, Pérez JE (Associate Editors): *The Washington Manual of Echocardiography*. 2nd Edition, Lippincott Williams and Wilkins, Wolters Kluwer, 2016.

Key words: echocardiography, imaging

[Linda R. Peterson, MD](#)

Professor of Medicine and Radiology

Current Research Interests

- Nutritional treatments for myocardial and skeletal muscle
- Lipidomics
- Effects of obesity and diabetes on cardiac metabolism, structure, and function
- Insulin resistance

Representative Publications

1. Lin CH, Kurup S, Herrero P, Schechtman KB, Eagon JC, Klein S, Dorn GW II, Gropler RJ, Alan D. Waggoner, Peterson LR. Myocardial oxygen consumption change predicts left ventricular relaxation improvement in obese humans after weight loss. *Obesity* 2011; 19:1804-12.
2. Peterson LR, Saeed IM, McGill JB, Herrero P, Schechtman KB, Gunawaradena R, Recklein C, Coggan AR, DeMoss AJ, Dence CS, Jamal A, Gropler RJ. Sex and type 2 diabetes: obesity-independent effects on left ventricular substrate metabolism and relaxation in humans. *Obesity* 2011; 19:1804-12.
3. Lyons MR, Peterson LR, McGill JB, Herrero P, Coggan A, Saeed IM, Recklein C, Schechtman KB, Gropler RJ. Impact of sex on the heart's metabolic and functional responses to diabetic therapies. *Am J Physiol* 2013; 305(11):H1584-91.
4. Coggan AR, Leibowitz JL, Kadkhodayan A, Thomas DT, Ramamurthy S, Anderson-Spearie C, Waller S, Farmer M, Peterson LR. Effect of acute dietary nitrate intake on maximal knee extensor speed and power in healthy men and women. *Nitric Oxide: Biol and Chem* 2015; 48:16-21. (<http://dx.doi.org/doi:10.1016/j.niox.2014.08.014>).
5. Coggan AR, Leibowitz JL, Anderson Spearie C, Kadkhodayan A, Thomas DP, Ramamurthy S, Mahmood K, Park S, Waller S, Farmer M, Peterson LR. Acute dietary nitrate intake improves muscle contractile function in patients with heart failure: a double-blind, placebo-controlled, randomized trial. *Circ Heart Fail* 2015; 8:914-20.
6. Kadkhodayan A, Lin CH, Coggan AR, Kisrieva-Ware Z, Schechtman KB, Joseph SM, Dávila-Román VG, Gropler RJ, Dence C, Harrison K, Peterson LR. Sex affects myocardial blood flow and fatty acid substrate metabolism in humans with nonischemic heart failure. *J Nucl Cardiol* 2016; (in press).
7. Airhart S, Cade WT, Jiang H, Coggan AR, Racette SL, Anderson Spearie C, Waller S, O'Connor R, Bashir A, Ory D, Schaffer JE, Novak E, Farmer M, Korenblat K, McGill JB, Dávila-Román VG, Leibowitz JL, Javidan-Nejad C, Peterson LR. A diet rich in medium-chain fatty acids improves systolic function and alters the lipidomic profile in patients with type 2 diabetes. *J Clin Endocrinol Metab* 2016; 101(2):504-12 (<http://press.endocrine.org/doi/10.1210/jc.2015-3292>).
8. Bashir A, Bohnert KL, Reeds D, Peterson LR, Bittel AJ, de las Fuentes L, Pacak CA, Byrne BJ, Cade WT, Impaired cardiac and skeletal muscle bioenergetics in children, adolescents, and young adults with Barth syndrome. *Physiol Rep* 2017; 5:e13130(1-12). PMID: 28196853.

Key words: cardiac metabolism, inorganic nitrate, lipidomics, diabetes, obesity, skeletal and cardiac muscle performance, heart failure

[Nishath Quader, MD](#)

Assistant Professor of Medicine

Current Research Interests

- Valvular heart disease: Aortic valve, Mitral valve, Tricuspid valve
- Structural heart disease
- 3D echocardiography
- Echocardiographic assessment of left and right ventricular function and strain analysis

Representative Publications

1. Worsening left ventricular apical peak strain early after right ventricular pacing. Quader N, Jalal U, Raslan S, Srivathsan K, Wilansky S, Unzek S, Chandrasekran K, Mookadam F. *Ultrasound Med Biol*. 2013.
2. Quader N, Katta P, Najib M, Chaliki H. Effect of mitral inflow pattern on diagnosis of severe mitral regurgitation in patients with chronic organic mitral regurgitation. *J Cardiovascular Ultrasound* 2013; 21 (4): 65-70.
3. Quader N, Rigolin VH. Two and three-dimensional echocardiography for pre-operative assessment of mitral valve regurgitation. *Cardiovascular Ultrasound* 2014; Oct 25; 12: 42.
4. Quader N, Davidson CD, Rigolin V. Percutaneous closure of perivalvular mitral prosthetic leak closures: How should interventionalists and the echocardiographers communicate. *Journal of the American Society of Echocardiography*. 2015; 28(5) 497-508.
5. Quader N, Wilansky S. "Women and Coronary Artery Disease". *Coronary Artery Disease*. Ed. Willerson JT, Holmes DR. 2015; 167-180.
6. Quader N, McGee E, Rigolin V. Intraoperative Echocardiography in Infective Endocarditis. *ASE Comprehensive Echocardiography*. 2nd Edition.
7. Quader N, Chaliki H. Visual assessment of severity of aortic valve stenosis and valve calcification on 2D echocardiography compared to hemodynamic evaluations and CT derived aortic valve calcium scores. In press.

Key words: Valvular and structural heart disease, 3D echocardiography

Babak Razani, MD, PhD

Assistant Professor of Medicine and Pathology/Immunology

Current Research Interests

- Mechanisms of atherosclerosis and risk factors for cardiovascular disease (particularly obesity and insulin resistance) - emphasis on the role of macrophages
- Focus on emerging cellular pathways critical for cardiometabolic disease and atherosclerotic progression
 - dysfunction in autophagy
 - lysosomal dysfunction
 - activation of inflammasomes
 - inclusion body formation
- Disorders of cardiac metabolism in heart failure (with emphasis on De novo Lipogenesis)
- Novel therapeutics in cardiovascular disease (emphasis on nanoparticles)

Representative Publications

1. Sergin I, Evans TD, and Razani B. Degradation and beyond: The macrophage lysosome as a nexus for nutrient sensing and processing in atherosclerosis. *Curr Opin Lipidol.* 2015; 26: 394-404.
2. Block RC and Razani B. Options to consider when treating Lysosomal Acid Lipase deficiency. *J Clin Lipidol.* 2016; 10: 1280-1281.
3. Sergin I, Bhattacharya S, Emanuel R, Esen E, Stokes CJ, Evans TD, Arif B, Curci JA, and Razani B. Inclusion bodies enriched for p62 and polyubiquitinated proteins in macrophages protect against atherosclerosis. *Science Signaling.* 2016; 9: ra2.
4. Evans TD, Sergin I, Zhang X, and Razani B. Modulating oxysterol sensing to control macrophage apoptosis and atherosclerosis. *Circulation Research.* 2016; 119: 1258-1261.
5. Leng S, Iwanowycz S, Saaoud F, Wang J, Wang Y, Sergin I, Razani B, and Fan D. Ursolic acid enhances macrophage autophagy and attenuates atherosclerosis. *J Lipid Res.* 2016; 57: 1006-16.
6. Evans TD, Sergin I, Zhang X, and Razani B. Target Acquired: Selective autophagy in cardiometabolic disease. *Science Signaling.* 2017; 10: eaag2298.
7. Block RC and Razani B. Linking Lysosomal Acid Lipase insufficiency to the development of cryptogenic cirrhosis. *Atherosclerosis.* 2017; 262: 140-142.
8. Sergin I, Bhattacharya S, Evans TD, Zhang X, Stokes CJ, Holloway KB, Micevych PS, Javaheri A, Crowley JR, Ballabio A, Schilling JD, Epelman S, Weihl CC, Diwan A, Fan D, Zayed MA, and Razani B. Exploiting macrophage autophagy-lysosomal biogenesis as a therapy for atherosclerosis. *Nature Communications.* 2017; 8: 15750.
9. Block RC and Razani B. Linking Lysosomal Acid Lipase insufficiency to the development of cryptogenic cirrhosis. *Atherosclerosis.* 2017; 262: 140-142.

Key words: atherosclerosis, cardiac metabolism, insulin resistance, macrophage, autophagy, lysosomes, basic science, translational research, lipid metabolism, obesity, vascular biology

Katherine M. Reeder, PhD, RN

Adjunct Assistant Professor of Medicine (voluntary),
Research Associate Professor at Goldfarb School of Nursing, Barnes-Jewish
College

Current Research Interests

- Self-management of Chronic Cardiovascular Disease
- Symptom Management in Chronic Heart Failure
- Transitional Care for Re-hospitalization Prevention
- Post-hospital Discharge Environment
- Social Networks in Symptom Management & Decision-making
- Treatment-seeking Behavior

Representative Publications

1. Reeder, K. M., Ercole, P.M., Peek, G.M., & Smith, C.E. Symptom perceptions and self-care behaviors in patients who self-manage heart failure. *Journal of Cardiovascular Nursing*, 2013; DOI: 10.1097/JCN.0000000000000117.
2. Coyan, G., Reeder, K. M., & Vacek, J. L. Long-term diet and exercise outcomes following coronary artery bypass graft surgery: A systematic review and call to action. *The Physician and Sportsmedicine* 2014; 42(2), 119-129.
3. Smith, C. E., Piamjariyakul, U., Wick, J. A., Spertus, J. A., Russell, C., Dalton, K. M., Elyachar, A., Vacek, J. L., Reeder, K. M., Nazir, N., & Ellerbeck, E. F. Multidisciplinary group clinic appointments: The Self-Management and Care of Heart Failure (SMAC-HF) trial. *Circulation: Heart Failure* 2014; PMID: 25236883
6. Reeder, K. M., Sims, J. L., & Peek, G. M. Self-management of heart failure in the post-discharge environment: A harbinger of hospital readmission or effective symptom self-care? *Heart & Lung: The Journal of Acute and Critical Care* 2014; 43(4), 380.
7. Ramoutar, D., Pazdernik, V. K., Beasley, B. T., & Reeder, K. M. Congruence of speckle tracking echocardiography and magnetic resonance imaging assessment of left ventricular ejection fraction. *Journal of the American Osteopathic Association* (2015; pending).
8. American Heart Association (2015). Friends and social networks valued by patients with heart failure and health care providers. American Heart Association Meeting Report News Release. Abstract 125 (K. M. Reeder, PhD, RN) and 241 (A. Sahay, PhD). Proceedings from American Heart Association Quality of Care and Outcomes Research conference – 2015.
9. American Heart Association (2015). Friends and social networks valued by heart failure patients and health care providers American Heart Association Meeting Report - Abstract 125 and 241 Interview. <http://newsroom.heart.org/news/friends-and-social-networks-valued-by-heart-failure-patients-and-health-care-providers>.

Key words: heart failure, self-management, health care seeking behavior, hospital readmission, community-based Interventions

Stacey L. Rentschler, MD, PhD

Assistant Professor of Medicine, Developmental Biology, and Biomedical Engineering

Current Research Interests

- Transcriptional and epigenetic basis of arrhythmias
- Development of the cardiac conduction system
- Reprogramming cardiomyocytes to pacemaker-like cells
- Notch and Wnt signaling
- Human organotypic slice culture as a translational platform

Representative publications

1. Rentschler S, Vaidya DM, Tamaddon H, Degenhardt K, Sassoon D, Morley GE, Jalife J, Fishman GI. Visualization and functional characterization of the developing murine cardiac conduction system. *Development* 2001; 128:1785-92
2. Rentschler S, Zander J, Burns K, France D, Levine R, Porter G, Rivkees SA, Morley GE, Fishman GI. Neuregulin-1 promotes formation of the murine cardiac conduction system. *PNAS* 2002; 99:10464-9.
3. Rentschler S, Harris BS, Kuznekoff L, Jain R, Manderfield L, Lu M, Morley GE, Patel VV, Epstein JA. Notch Signaling Regulates Murine Atrioventricular Conduction and Formation of Accessory Pathways. *JCI*, 2011; 121(2):525-33.
4. Rentschler S*, Yen AH, Lu J, Petrenko NB, Lu MM, Manderfield, LJ, Patel VV, Fishman GI, Epstein JA. Myocardial Notch Signaling Reprograms Cardiomyocytes to a Conduction-Like Phenotype. *Circulation*, 2012; 126(9):1058-66. *corresponding author
5. Gillers B, Aly H, Chiplunkar A, Valenta T, Basler K, Efimov I, Boukens B, Rentschler S. Canonical Wnt Signaling Regulates Atrioventricular Junction Programming and Electrophysiological Properties. *Circulation Research*, 2015; 116(3):398-406.
6. Meyers, JD, Jay, PY, Rentschler, S. Reprogramming the conduction system: Onward toward a biological pacemaker. *Trends in Cardiovascular Medicine*. 2016; 26(1):14-20.
7. Kang C, Qiao Y, Li G, Baechle K, Camellitti P, Rentschler S, Efimov IR. Human Organotypic Cultured Cardiac Slices: New Platform For High Throughput Preclinical Human Trials. *Scientific Reports*, 2016; 6:28798.
8. Khandekar A*, Springer S*, Wang W, Hicks S, Weinheimer C, Diaz-Trelles R, Nerbonne JM, Rentschler S. Notch-mediated Epigenetic Regulation of Voltage-Gated Potassium Currents. *Circulation Research*, 2016; 119(12):1324-1338.
9. Qiao Y*, Lipovsky C*, Hicks S, Bhatnagar S, Li G, Khandekar A, Guzy R, Woo KV, Nichols CG, Efimov IR, Rentschler S. Transient Notch Activation Induces Long-term Gene Expression Changes Leading to Sick Sinus Syndrome in Mice. *Circulation Research* 2017; in press.

Key words: basic science, cardiac development, molecular cardiology, electrophysiology, arrhythmias, conduction system, reprogramming, epigenetics, translational research

Michael W. Rich, MD

Professor of Medicine

Current Research Interests

- Cardiovascular disease in the elderly, esp. heart failure, atrial fibrillation, coronary artery disease, valvular heart disease, hypertension, epidemiology, and prevention
- Cardiovascular aging, including interventions designed to slow the aging process
- Heart failure disease management

Representative Publications

1. Forman DE, Rich MW, Alexander KP, et al. Cardiac care for older adults: time for a new paradigm. *J Am Coll Cardiol* 2011; 57(18):1801-1810.
2. Fleg JL, Forman DE, Berra K, Bittner V, Blumenthal JA, Chen MA, Cheng S, Kitzman DW, Maurer MS, Rich MW, Shen WK, Williams MA, Zieman SJ. Secondary prevention of atherosclerotic cardiovascular disease in older adults: a scientific statement from the American Heart Association. *Circulation* 2013; 128:2422-2446.
3. Ades PA, Keteyian SJ, Balady GJ, Houston-Miller N, Kitzman DW, Mancini DM, Rich MW. Cardiac rehabilitation exercise and self-care for chronic heart failure. *J Am Coll Cardiol HF* 2013; 1(6):540-547.
4. Whellan DJ, Goodlin SJ, Dickinson MG, Heidenreich PA, Jaenicke C, Gattis-Stough W, Rich MW. End-of-life care in patients with heart failure. *J Cardiac Failure* 2014; 20:121-134.
5. Rich MW. Secondary prevention of cardiovascular disease in older adults. *Prog Cardiovasc Dis* 2014; 57:168-175. Published online ahead of print March 14, 2014. Available at: <http://dx.doi.org/10.1016/j.pcad.2014.03.006>
6. Jurgens CY, Goodlin S, Dolansky M, Ahmed A, Fonarow GC, Boxer R, Arena R, Blank L, Buck HG, Cranmer K, Fleg JL, Lampert RJ, Lennie TA, Lindenfeld J, Piña IL, Semla TP, Trebbien P, Rich MW. Heart failure management in skilled nursing facilities: a scientific statement from the American Heart Association and the Heart Failure Society of America. *Circ Heart Fail* 2015; 8(3):655-687.
7. Rich MW, Chyun DA, Skolnick AH, et al. Knowledge gaps in cardiovascular care of the older adult population. A Scientific Statement from the American Heart Association, American College of Cardiology, and American Geriatrics Society. *J Am Coll Cardiol* 2016; 67(20):2419-40 and *Circulation* 2016; 133(21):2103-22.
8. Stewart S, Riegel B, Boyd C, Ahamed Y, Thompson DR, Burrell LM, Carrington MJ, Coats A, Granger BB, Hides J, Weintraub WS, Moser DK, Dickson VV, McDermott CJ, Keates AK, Rich MW. Establishing a pragmatic framework to optimise health outcomes in heart failure and multimorbidity (ARISE-HF): A multidisciplinary position statement. *Int J Cardiol* 2016; 212:1-10.
9. Kim DH, Rich MW. Patient-centered care of older adults with cardiovascular disease and multiple chronic conditions. *Can J Cardiol* 2016;32:1097-1107.
10. Fohtung RB, Novak E, Rich MW. Effect of new oral anticoagulants on prescribing practices for atrial fibrillation in older adults. *J Am Geriatr Soc* 2017. (in press)

Key words: aging, atrial fibrillation, epidemiology, heart failure, prevention

Yoram Rudy, PhD

Fred Saigh Distinguished Professor of Engineering; Professor of Biomedical Engineering, Medicine, Cell Biology & Physiology, Radiology, and Pediatrics Director, Cardiac Bioelectricity and Arrhythmia Center (CBAC)

Current Research Interests

- Mechanisms of cardiac arrhythmias
- Noninvasive imaging (ECGI) of cardiac arrhythmias in patients

Representative Publications

1. T.J. O'Hara, L. Virág, A. Varró, Y. Rudy, "Simulation of the undiseased human cardiac ventricular action potential: Model formulation and experimental validation" *PLoS Computational Biology* 2011; 7(5): e1002061.doi:10.1371/ journal.pcbi.1002061
2. P. Li, Y. Rudy, "A Model of Canine Purkinje Cell Electrophysiology and Ca²⁺ Cycling: Rate Dependence, Triggered Activity and Comparison to Ventricular Myocyte" *Circulation Research* 2011; 109:71-79.
3. Y. Wang, P.S. Cuculich, J. Zhang, K. A. Desouza, R. Vijayakumar, J. Chen, M. N. Faddis, B.D. Lindsay, T. W. Smith, Y. Rudy, "Noninvasive Electroanatomic Mapping of Human Ventricular Arrhythmias Using ECG Imaging (ECGI)" *Science Translational Medicine* 2011 (31 August); Volume 3 (issue 98):191-200 (98ra84).
4. A. Nekouzadeh and Y. Rudy, "Continuum Molecular Simulation of Large Conformational Changes during Ion-Channel Gating" *PLoS ONE* 2011; 6(5): e20186. doi:10.1371/journal.pone.0020186. PMID: 21625456; PMCID: PMC3098872.
5. Y. Rudy, "Mathematical modeling of complex biological systems: From genes and molecules to organs and organisms: Heart" In: Edward H. Egelman , editor: *Comprehensive Biophysics, Volume 9, Simulation and Modeling*. Harel Weinstein volume editor. Oxford: Academic Press, 2012; pp. 268-327.
6. Y. Rudy, "Noninvasive Electrocardiographic Imaging of Arrhythmogenic Substrates in Humans" *Circulation Research*, 2013; 112:863-874.
7. R. Vijayakumar, J. Silva, K. Desouza, R. Abraham, M. Strom, F. Sacher, G.F. Van Hare, M. Haïssaguerre, D.M. Roden, Y. Rudy, "Electrophysiologic Substrate in Congenital Long QT Syndrome: Noninvasive Mapping with Electrocardiographic Imaging (ECGI)" *Circulation* 2014; 130:1936-1943. PMID: 25294783; PMCID: PMC4245321
8. J. Zhang, F. Sacher, K. Hoffmayer, T. O'Hara, M. Strom, P. Cuculich, J. Silva, D. Cooper, M. Faddis, M. Hocini, M. Haissaguerre, M. Scheinman, Y. Rudy, "The Cardiac Electrophysiologic Substrate Underlying the ECG Phenotype and Electrogram Abnormalities in Brugada Syndrome Patients" *Circulation* 2015; 131:1950-1959. PMID: 25810336.

Key words: basic science, electrocardiography, electrophysiology

Jean E. Schaffer, MD

Virginia Minnich Distinguished Professor of Medicine

Current Research Interests

- Role of small non-coding RNAs in metabolic (lipotoxic and oxidative) stress
- Pathophysiological responses of the heart to the diabetic environment
- Metabolomic biomarkers for heart disease
- Lipids as a therapeutic target for cardiovascular disease in diabetics

Representative Publications

1. Michel CI, Holley CL, Scruggs BS, Sidhu R, Brookheart RT, Listenberger LL, Behlke M, Ory DS, Schaffer JE. Small nucleolar RNAs, U32, U33, and U35 are critical mediators of metabolic stress. *Cell Metab* 2011; 14: 33-44. PMID: PMC3138526.
2. Scruggs BS, Michel CI, Ory DS, Schaffer JE. Smd3 regulates intronic non-coding RNA biogenesis. *Mol Cell Biol* 2012, 32: 4092-4103. PMID: PMC34573401. Scruggs BS, Michel CI, Ory DS, Schaffer JE. Smd3 regulates intronic non-coding RNA biogenesis. *Mol Cell Biol* 2012; 32: 4092-4103. PMID: PMC3457340.
3. Schilling J, Machkovech H, Kim AHJ, Schwendener R, Schaffer JE. Macrophages modulate cardiac function in lipotoxic cardiomyopathy. *Am J Physiol* 2012; 303: H1366-H1373. PMID: PMC3532539.
4. Jiang H, Fong-Fu H, Farmer MS, Peterson LR, Schaffer JE, Ory DS, and Jiang X. Development and validation of LC-MS/MS method for determination of very long acyl chain (C22:0 and C24:0) ceramides in human plasma. *Anal Bioanal Chem* 2013; 405:7357-7365. PMID: PMC3766747.
5. Holley CL, Li MW, Scruggs BS, Matkovich SJ, Ory DS, Schaffer JE. Cytoplasmic snoRNAs are dynamically regulated by NADPH oxidase. *J Biol Chem* 2015; 290: 11741-11748. PMID: PMC4416874.
6. Jinn S, Brandis KA, Ren, A, Chacko A, Dudley-Rucker N, Fujiwara H, Jiang H, Olsen BN, Schaffer JE, and Ory DS. snoRNA U17 regulates cellular cholesterol trafficking. *Cell Metab* 2015; 2:855-867. PMID: PMC4456254.
7. Caputa G, Zhao S, Guerrero AE, Ory DS, Duncan JG, Schaffer JE. RNASET2 is required for oxidative stress-mediated cell death. *Cell Death & Differentiation*, 2015; 23:347-357. PMID: PMC4716297.
8. Lee J, Harris AN, Holley CL, Mahadevan J, Pyles KD, Lavagnino Z, Scherer DE, Fujiwara H, Sidhu R, Zhang J, Huang SCC, Piston DW, Remedi MS, Urano F, Ory DS, Schaffer JE. Rpl13a small nucleolar RNAs regulate systemic glucose metabolism. *J Clin Invest* 2016; 126: 4616-4625. PMID: PMC5127695.

Key words: basic science, cardiac metabolism, diabetes, heart failure, lipid metabolism, RNA

Joel D. Schilling, MD, PhD

Assistant Professor of Medicine

Current Research Interests

- Macrophage biology in post-MI remodeling and heart failure
- Macrophage dysfunction in diabetes and obesity
- The interplay between macrophage metabolism and effector function
- Diabetic cardiovascular disease

Representative Publications

1. Schilling JD, Kelly DP. The PGC-1 Cascade as a Therapeutic Target for Heart Failure. *J Mol Cell Cardiol.* Oct 1, 2010.
2. Schilling JD, Lai L, Sambandam, N, Dey C, Leone TL, and Kelly DP. Toll-like Receptor-Mediated Inflammatory Signaling Reprograms Cardiac Energy Metabolism by Repressing Peroxisome Proliferator-activated receptor α Coactivator 1 (PGC-1) Signaling. *Circulation Heart Failure.* 2011 May.
3. Schilling JD and Mann DL. Diabetic Cardiomyopathy: Bench to Bedside. *Heart Fail Clin.* 2012 Oct; 8(4):619-31. PMID:22999244
4. Schilling JD, Machkovech H, Kim A, Schwendener, R, and Schaffer JE. Macrophages Modulate Cardiac Function in Lipotoxic Cardiomyopathy. *Am J Physiol Heart Circ Physiol.* 2012 Dec; 303(11):H1366-73. PMID: 23042950.
5. Schilling JD, Machkovech H, He L, Diwan A, Schaffer JE. TLR4 Activation Under Lipotoxic Conditions Leads to Synergistic Macrophage Cell Death Through a TRIF-Dependent Pathway. *J Immunol.* 2013 Feb; 190(3). PMID: 23275600
6. Schilling JD, Machkovech H, He L, Sidhu R, Fujiwara H, Weber K, Ory DS, and Schaffer, JE. Palmitate and LPS trigger Synergistic Ceramide Production in Primary Macrophages. *J Biol Chem.* 2013 Feb 1; 288(5):2923-32. PMID: 23250746
7. Weber, K and Schilling JD. The Lysosome Mediates Metabolic-Inflammatory Crosstalk in
8. Primary Macrophages. *J. Biol Chem.* 2014 March 28; 289(13):9158-71.
9. Schilling JD. The Mitochondria in Diabetic Heart Failure: from pathogenesis to therapeutic promise. *Antioxid Redox Signal.* 2015; PMID: 25761843.
10. He L, Weber KJ, and Schilling JD. Glutamine Modulates Macrophage Lipotoxicity. *Nutrients.* 2016 Apr; 12 (4). PMID: 27077881.

Key words: basic science, cardiac metabolism, macrophage, diabetes, heart failure

Clay F. Semenkovich, MD

Professor of Medicine, Cell Biology and Physiology

Current Research Interests

- Lipid metabolism
- Atherosclerosis
- Diabetes

Representative Publications

1. Bernal-Mizrachi C et al. Vascular respiratory uncoupling increases blood pressure and atherosclerosis. *Nature* 2005; 435:502-506.
2. Schneider J et al. ATM-dependent suppression of stress signaling reduces vascular disease in metabolic syndrome. *Cell Metabolism* 2006; 4:377-389.
3. Chakravarthy M et al. Brain fatty acid synthase activates PPAR α to maintain energy homeostasis. *J. Clin. Invest.* 2007; 117:2539-2552.
4. Chakravarthy M et al. Identification of a physiologically relevant endogenous ligand for PPAR α in liver. *Cell* 2009; 138:476-488.
5. Schneider J et al. Macrophage fatty acid synthase deficiency decreases diet-induced atherosclerosis. *J. Biol. Chem.* 2010; 285:23398-23409.
6. Hsu FF, Lodhi IJ, Turk J, Semenkovich CF. Structural distinction of diacyl-, alkylacyl, and alk-1-enylacyl glycerophosphocholines as [M - 15]⁻ ions by multiple-stage linear ion-trap mass spectrometry with electrospray ionization. *J Am Soc Mass Spectrom* 2014 August; 25(8):1412-20.
7. Lodhi IJ, Wei X, Yin L, Feng C, Adak S, Abou-Ezzi G, Hsu FF, Link DC, Semenkovich CF. Peroxisomal lipid synthesis regulates inflammation by sustaining neutrophil membrane phospholipid composition and viability. *Cell Metab* 2015 January 6; 21(1):51-64.
8. Izawa T, Rohatgi N, Fukunaga T, Wang QT, Silva MJ, Gardner MJ, McDaniel ML, Abumrad NA, Semenkovich CF, Teitelbaum SL, Zou W. ASXL2 Regulates Glucose, Lipid, and Skeletal Homeostasis. *Cell Rep* 2015 June 16; 11(10):1625-37
9. Semenkovich CF. Insulin Resistance and a Long, Strange Trip. *N Engl J Med* 2016 April 7; 374(14):1378-9.

Key words: atherosclerosis, basic science, diabetes, lipid metabolism

Jasvinder Singh, MD

Associate Professor of Medicine

Current Research Interests

- Interventional cardiology, especially complex interventions
- Outcomes from intervention procedures
- Stent design
- Coronary Physiology
- FFR/IVUS

Representative Publications

1. Patel Y, Depta JP, Patel JS, Masrani SK, Novak E, Zajarias A, Kurz HI, Lasala JM, Bach RG, Singh J. Impact of intravascular ultrasound on the long-term clinical outcomes in the treatment of coronary ostial lesions. *Catheter Cardiovasc Interv*. 2013 Jun 1. 34. PMID: 23728924.
2. Castillo-Sang MA, Prasad SM, Singh J, Ewald GA, Silvestry SC: Thirty-Five Day Impella 5.0 Support via Right Axillary Side Graft Cannulation for Acute Cardiogenic Shock. *Innovations(Phila)*. 2013 Jul-Aug; 8(4):307-9. PMID 24145977.
3. Depta JP, Patel JS, Novak E, Masrani SK, Raymer D, Facey G, Patel Y, Zajarias A, Lasala JM, Singh J Bach RG, Kurz H: Outcomes of Coronary stenosis deferred revascularization for borderline versus non-borderline fractional flow reserve valves. *Am J Cardiol*. 2014 June 1; 113(11):1788-93.
4. Diaz-Miron JL, Dillon PA, Saini A, Balzer DT, Singh J, Kolovos NS, Duncan JG, Keller MS: Left Main Coronary Artery Dissection in Pediatric Sport-Related Chest Trauma. *J Emer Med* 2014 Jun 10; pii: S0736-4679(14)00391-6.
5. Depta JP, Patel JS, Novak E, Gage BF, Masrani SK, Raymer D, Facey G, Patel Y, Zajarias A, Lasala JM, Amin AP, Kurz HI, Singh J, Bach RG. Risk model for estimating the 1-year risk of deferred lesion intervention following deferred revascularization after fractional flow reserve assessment. *Eur Heart J* 2015 February 21; 36(8):509-15.
6. Sintek MA, Sparrow CT, Mikuls TR, Lindley KJ, Bach RG, Kurz HI, Novak E, Singh J. Repeat revascularisation outcomes after percutaneous coronary intervention in patients with rheumatoid arthritis. *Heart* 2016 March; 102(5):363-9.
7. Davies JE, Sen S, Dehbi HM, Al-Lamee R, Petraco R, Nijjer SS, Bhindi R, Lehman SJ, Walters D, Sapontis J, Janssens L, Vrints CJ, Khashaba A, Laine M, Van Belle E, Krackhardt F, Bojara W, Going O, Härle T, Indolfi C, Niccoli G, Ribichini F, Tanaka N, Yokoi H, Takashima H, Kikuta Y, Erglis A, Vinhas H, Canas Silva P, Baptista SB, Alghamdi A, Hellig F, Koo BK, Nam CW, Shin ES, Doh JH, Brugaletta S, Alegria-Barrero E, Meuwissen M, Piek JJ, van Royen N, Sezer M, Di Mario C, Gerber RT, Malik IS, Sharp ASP, Talwar S, Tang K, Samady H, Altman J, Seto AH, Singh J, Jeremias A, Matsuo H, Kharbanda RK, Patel MR, Serruys P, Escaned J. Use of the Instantaneous Wave-free Ratio or Fractional Flow Reserve in PCI. *N Engl J Med*. 2017 May 11; 376(19):1824-1834.
8. Tepper S, Masood MF, Baltazar Garcia M, Pisani M, Ewald GA, Lasala JM, Bach RG, Singh J, Balsara KR, Itoh A. Left Ventricular Unloading by Impella Device Versus Surgical Vent During Extracorporeal Life Support. *Ann Thorac Surg*. 2017 Mar 24; pii: S0003-4975(17)30039-5. doi: 10.1016/j.athoracsur.2016.12.049, in press.

Key words: coronary artery disease, interventional cardiology

Timothy W. Smith, MD, DPhil

Associate Professor of Medicine

Current Research Interests

- Techniques of ICD/pacemaker implantation
- New approaches to therapy (especially ablation) of ventricular tachycardia
- Prevention of sudden death and ICD utilization
- Electrocardiography and ECG education
- Cardiac Resynchronization

Representative Publications

1. Cooper JA, Latacha MP, Soto GE, Garmany RG, Gleva MJ, Chen J, Faddis MN, Smith TW. The Azygos Defibrillator Lead For Elevated Defibrillation Thresholds: Implant Technique, Lead Stability, and Patient Series. *Pacing and Clinical Electrophysiology* 2008; 31:1405-1410.
2. Cooper DH, Cuculich PS, Cooper AR, Smith TW. Fluoroscopic Markers to Guide Extrathoracic Subclavian Vein Access for Implantation of Pacemaker and Defibrillator Leads [Abstract]. *Heart Rhythm* 2010; 7(5S): S247.
3. Latacha M, Memon NB, Cuculich PS, Hertel J, Wang Y, Rudy Y, Smith TW, Pathologic Examination after Epicardial Ablation of Ventricular Tachycardia in Cardiac Sarcoidosis. *Heart Rhythm* 2010; 7: 705-707.
4. Cuculich PS and Smith TW. Featured Arrhythmia: An Irregular Wide Complex Rhythm: What is the Mechanism? *Heart Rhythm* 2010; 7:1514-1515.
5. Wang Y, Cuculich PS, Zhang J, Desouza KA, Vijayakumar R, Chen J, Faddis MN, Lindsay BD, Smith TW, Rudy Y. Noninvasive Electroanatomic Mapping of Human Ventricular Arrhythmias with Electrocardiographic Imaging (ECGI). *Science Translational Medicine* 2011; 3: 1-10.
6. Memon NB, Briceno DF, Torres-Russotto D, Chen J, Smith TW. Speech-Induced Atrial Tachycardia: An Unusual Presentation of Supraventricular Tachycardia. *Journal of Cardiovascular Electrophysiology* 2013; 24: 1412-1415.
7. Fansler DR, Smith TW. Rotors: Linking VF and VT? *Heart Rhythm* 2013 December; 10(12):1917-8.
8. Coverstone E, Sheehy J, Kleiger RE, Smith TW. The postimplantation electrocardiogram predicts clinical response to cardiac resynchronization therapy. *Pacing Clin Electrophysiol* 2015 May; 38(5):572-80
9. Zhang J, Cooper DH, Desouza KA, Cuculich PS, Woodard PK, Smith TW, Rudy Y. Electrophysiologic Scar Substrate in Relation to VT: Noninvasive High-resolution Mapping and Risk Assessment with ECGI. *Pacing Clin Electrophysiol* 2016 May 16.

Key words: arrhythmias, electrocardiography, electrophysiology

Phyllis K. Stein, PhD

Associate Professor of Medicine

Current Research Interests

- Heart rate variability (HRV) and outcomes in different populations and in association with genetic disorders in humans and animals
- Application of novel non-linear HRV methods (*e.g.*, multiscale entropy) to detect patterns of neurocardiac integration not detectable using standard HRV measures
- Detection of sleep-disordered breathing, circadian rhythm disorders, and sinoatrial node dysfunction from ambulatory ECG recordings
- Clinical applications of HRV from bedside monitoring in the NICU and PICU

Representative Publications

1. Stein PK, Domitrovich PP, Hui N, Rautaharju P, Gottdiener J. Sometimes higher heart rate variability is not better heart rate variability: results of graphical and nonlinear analyses. *J Cardiovasc Electrophysiol.* 2005; 16(9):954-9.
2. Stein PK, Barzilay JI, Chaves PHM, Mistretta SQ, Domitrovich PP, Gottdiener JS, Rich MW, Kleiger RE. Novel Measures of Heart Rate Variability Predict Cardiovascular Mortality in Older Adults Independent of Traditional Cardiovascular Risk Factors: The Cardiovascular Health Study. *J Cardiovasc Electrophysiol.* 2008; 19:1169-74.
3. Stein PK, Deedwania P. Usefulness of abnormal heart rate turbulence to predict cardiovascular mortality in high-risk post-acute myocardial infarction patients from the EPHEsus study. *Am J Cardiol* 2009; 103:1495-99.
4. Stein PK, Barzilay JI, Chaves PH, Domitrovich PP, Gottdiener JS. Heart rate variability and its changes over 5 years in older adults. *Age Ageing* 2009; 38(2):212-8.
5. Stein PK, Sanghavi D, Sotoodehnia N, Siscovick DS, Gottdiener J. Association of Holter-based measures including T-wave alternans with risk of sudden cardiac death in the community dwelling elderly: the Cardiovascular Health Study. *J Electrocardiol* 2010; 43(3):251-9.
6. Stein PK, Deedwania P. New York Heart Association functional class influences of the impact of diabetes on cardiac autonomic function. *J Electrocardiol.* 2010; 43(5):379-84.
7. Stein PK, Barzilay JI. Relationship of abnormal heart rate turbulence and elevated CRP to cardiac mortality in low, intermediate, and high-risk older adults. *J Cardiovasc Electrophysiol.* 2011; 22:122-7.
8. Stein PK, Pu Y. Heart rate variability, sleep and sleep disorders. *Sleep Med Rev.* 2012; 16(1):47-66.
9. Stein PK, Soare A, Meyer TE, Cangemi R, Holloszy JO, Fontana L. Caloric Restriction May Reverse Age-Related Autonomic Decline in Humans. *Aging Cell. Aging Cell.* 2012; 11(4):644-50.
10. Bodapati RK, Kizer JR, Kop WJ, Kamel H, Stein PK. Addition of 24-hour Heart Rate Variability Parameters to the CHS Stroke Risk Score and Prediction of Incident Stroke: The Cardiovascular Health Study. *JAMA* 2017 Jul 21; 6(7). pii: e004305. doi: 10.1161/JAHA.116.004305.

Key words: aging, ambulatory ECG, autonomic function assessment, cardio-oncology, cardiovascular epidemiology, circadian rhythms, dementia, depression, depression and trauma, diabetes, epidemiology, heart failure, heart rate variability, hypertension, risk factors, sleep disorders, women and minorities

[Nathan Stitzel, MD, PhD](#)

Assistant Professor of Medicine and Genetics

Current Research Interests

- Genetics of Mendelian cardiovascular disease
- Genetics of complex cardiovascular disease
- Clinical application of genetics

Representative Publications

1. Stitzel NO, MacRae CA. A clinical approach to inherited premature coronary artery disease. *Circ Cardiovasc Genet* 2014; 7(4):558-64.
2. Stitzel NO, Won HH, Morrison AC, et al. Inactivating mutations in NPC1L1 and protection from coronary heart disease. *N Engl J Med* 2014; 371(22): 2072-82.
3. Mega JL, Stitzel NO, Smith JG, et al. Genetic risk, coronary heart disease events, and the clinical benefit of statin therapy: an analysis of primary and secondary prevention trials. *Lancet*. In press (2015).
4. Do R, Stitzel NO, Won H-H, et al. Exome sequencing identifies rare LDLR and APOA5 alleles conferring risk for myocardial infarction. *Nature* 2015; 518(7537):102-6.
5. Stitzel NO, Stirrups KE, Masca NG, et al. Coding variation in ANGPTL4, LPL, and SVEP1 and the risk of coronary disease. *N Engl J Med*. 2016; 374(12):1134-44.
6. Lee VS, Halabi CM, Hoffman E, Carmichael N, Leshchiner I, Lian CG, Bierhals AJ, Vuzman D, Mecham RP, Frank NY, Stitzel NO. Loss of function mutation in LOX causes thoracic aortic aneurysm and dissection in humans. *Proc Natl Acad Sci*. In press. (2016).

Key words: atherosclerosis, basic science, genetics, translational research

[Carla J. Weinheimer, MS](#)

Associate Professor of Medicine

Current Research Interests

- Mouse cardiovascular phenotyping through surgery, hemodynamic evaluations, imaging, and histology
- Models of ischemic disease and heart failure in mice

Representative Publications

1. Weinheimer CJ, Kovacs A, Courtois MA, and Mansfield C: In-Vivo Physiologic Evaluation of Murine Cardiovascular Phenotypes. In: Textbook of Cardiovascular Molecular Imaging. Edited by Robert Gropler, Albert Sinusas, David Glover, and Heinrich Taegtmeyer. July, 2007.
2. Ma X, Liu H, Foyil SR, Godar RJ, Weinheimer CJ, Hill JA, Diwan A: Impaired Autophagosome Clearance Contributes to Cardiomyocyte Death in Ischemia-Reperfusion Injury. *Circulation* 2012; 125(25):3170-3181.
3. Cilvik SN, Wang JI, Lavine K, Uchida K, Castro A, Gierasch C, Weinheimer CJ, Kovacs A, Nichols CG, Ornitz DM: Fibroblast growth factor receptor 1 signaling in adult cardiomyocytes increases contractility and results in a hypertrophic cardiomyopathy, *PLOS One* 2013; 8(12): e82979.
4. Schugar RC, Moll AR, D'Avignon DA, Weinheimer CJ, Kovacs A, Crawford PA: Cardiomyocyte-specific deficiency of ketone body metabolism promotes accelerated pathological remodeling following pressure overload. *Molecular Metabolism* 2014; 3(7):754-769.
5. Weinheimer CJ, Ling L, Kelly DP, Kovacs A: A Novel Murine Model of Left Ventricular Pressure Overload and Infarction Causing Predictable Ventricular Remodeling and Progression to Heart Failure, *Clinical and Experimental Pharmacology and Physiology* 2015; 42(1):33-40.

Key words: cardiovascular phenotyping, novel surgical models, heart failure, ischemia, imaging, molecular cardiology

Pamela K. Woodard, MD

Professor of Radiology and Biomedical Engineering

Current Research Interests

- Molecular Imaging of atherosclerosis
- Cardiac MRI
- Cardiac CT – coronary CT angiography

Representative Publications

1. Liu Y, Abendschein D, Woodard GE, Rossin R, McCommis K, Zheng J, Welch MJ, Woodard PK. Molecular Imaging of Atherosclerotic Plaque with ⁶⁴Cu-Labeled Natriuretic Peptide and Positron Emission Tomography. *J Nucl Med* 2010; 51(1):85-91.
2. Hoffmann U, Truong QA, Schoenfeld DA, Chou ET, Woodard PK, Nagurney JT, Pope JH, Hauser TH, White CS, Weiner SG, Kalanjian S, Mullins ME, Mikati I, Peacock WF, Zakroysky P, Hayden D, Goehler A, Lee H, Gazelle GS, Wiviott SD, Fleg JL, Udelson JE; ROMICAT-II Investigators. Coronary CT angiography versus standard evaluation in acute chest pain. *N Engl J Med* 2012 Jul 26; 367(4):299-308.
3. Stillman AE, Gatsonis C, Lima JAC, Black WC, Cormack J, Gareen I, Hoffman U, Liu T, Mavromatis K, Schnall MD, Udelson JE, Woodard PK. Rationale and design of the Randomized Evaluation of patients with Stable angina Comparing Utilization of noninvasive Examinations (RESCUE) Trial. *American Heart Journal* 2016; 179:19-28.
4. Nie X, Laforest R, Elvington A, Randolph GJ, Zheng J, Voller T, Abendschein DR, Suzanne Lapi SE, and Woodard PK. PET/MR imaging of hypoxic atherosclerosis using ⁶⁴Cu-ATSM in a rabbit model. *J Nuc Med* 2016 Dec; 57(12):2006-2011.
5. Cury RC, Abbara S, Achenbach S, Agatston A, Berman D, Budoff M, Dill K, Jacobs J, Maroules C, Rubin G, Rybicki FJ, Schoepf J, Shaw L, Stillman A, White C, Woodard PK, Leipsic J. CAD-RADSTM Coronary Artery Disease - Reporting and Data System. An expert consensus document of the Society of Cardiovascular Computed Tomography (SCCT), the American College of Radiology (ACR) and the North American Society for Cardiovascular Imaging (NASCI). Endorsed by the American College of Cardiology. *J Cardiovasc Comput Tomogr*. 2016 Jun 13 [Epub ahead of print]. Simultaneously published, *J Am Coll Radiol* 2016 Dec; 13(12 Pt A):1458-1466.e9.
6. Woodard PK, Liu Y, Pressly ED, Luehmann HP, Detering L, Sultan DE, Laforest R, McGrath AJ, Gropler RJ, Hawker CJ. Design and Modular Construction of a Polymeric Nanoparticle for Targeted Atherosclerosis Positron Emission Tomography Imaging: A Story of 25% ⁶⁴Cu-CANF-Comb. *Pharm Res* 2016 Oct; 33(10):2400-10.
7. Zayed MA, Harring SD, Abendschein DR, Vemuri C, Lu D, Detering L, Liu Y, Woodard PK. Natriuretic Peptide Receptor-C is Up-Regulated in the Intima of Advanced Carotid Artery Atherosclerosis. *J Med Surg Pathol* 2016 Jul; 1(3). pii: 131.

Key words: atherosclerosis, cardiac MRI, cardiac CT, molecular imaging

Alan Zajarias, MD

Associate Professor of Medicine

Associate Professor in Surgery (Cardiothoracic)

Current Research Interests

- Transcatheter aortic valve implantation (TAVI)
- Use of CT for procedural planning of TAVI
- Echocardiographic assessment of RV function in patients with pulmonary hypertension undergoing TAVI for aortic stenosis
- Racial differences in aortic stenosis
- Mitral regurgitation and outcomes in patients with cardiomyopathy
- Patient selection and procedural outcomes in patients undergoing TAVI

Representative Publications

1. Kodali SK, Williams MR, Smith CR, Svensson LG, Webb JG, Makkar RR, Fontana GP, Dewey TM, Thourani VH, Pichard AD, Fischbein M, Szeto WY, Lim S, Greason KL, Teirstein PS, Malaisrie SC, Douglas PS, Hahn RT, Whisenant B, Zajarias A, Wang D, Akin JJ, Anderson WN, Leon MB; PARTNER Trial Investigators. Two-year outcomes after transcatheter or surgical aortic-valve replacement. *N Engl J Med* 2012 May 3; 366(18):1686-95.
2. Lindman BR, Maniar HS, Jaber WA, Lerakis S, Mack MJ, Suri RM, Thourani VH, Babaliaros V, Kereiakes DJ, Whisenant B, Miller DC, Tuzcu EM, Svensson LG, Xu K, Doshi D, Leon MB, Zajarias A. Effect of tricuspid regurgitation and the right heart on survival after transcatheter aortic valve replacement: insights from the Placement of Aortic Transcatheter Valves II inoperable cohort. *Circ Cardiovasc Interv* 2015 Apr; 8(4). pii: e002073. doi: 10.1161/CIRCINTERVENTIONS.114.002073.
3. Paradis JM, Maniar HS, Lasala JM, Kodali S, Williams M, Lindman BR, Damiano RJ Jr, Moon MR, Makkar RR, Thourani VH, Babaliaros V, Xu K, Ayele GM, Svensson L, Leon MB, Zajarias A. Clinical and Functional Outcomes Associated With Myocardial Injury After Transfemoral and Transapical Transcatheter Aortic Valve Replacement: A Subanalysis From the PARTNER Trial (Placement of Aortic Transcatheter Valves). *JACC Cardiovasc Interv* 2015 Sep; 8(11):1468-79. doi: 10.1016/j.jcin.2015.06.018.
4. Leon MB, Smith CR, Mack MJ, Makkar RR, Svensson LG, Kodali SK, Thourani VH, Tuzcu EM, Miller DC, Herrmann HC, Doshi D, Cohen DJ, Pichard AD, Kapadia S, Dewey T, Babaliaros V, Szeto WY, Williams MR, Kereiakes D, Zajarias A, Greason KL, Whisenant BK, Hodson RW, Moses JW, Trento A, Brown DL, Fearon WF, Pibarot P, Hahn RT, Jaber WA, Anderson WN, Alu MC, Webb JG; PARTNER 2 Investigators. Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients. *N Engl J Med* 2016 Apr 28; 374(17):1609-20. doi: 10.1056/NEJMoa1514616. Epub 2016 Apr 2.

Key words: aortic stenosis, interventional cardiology, valvular heart disease