



The Cardiovascular Magnetic Resonance Imaging Program at the Brigham and Women's Hospital



Noninvasive Cardiovascular Imaging Section, Cardiovascular Division of Department of Medicine and Department of Radiology, Brigham and Women's Hospital, Harvard Medical School, 75 Francis St, Boston, MA 02115

Primary Focus

The cardiovascular magnetic resonance imaging lab at the Brigham and Women's Hospital focuses on new methods of assessing physiological markers of the myocardial that facilitate the early detection of cardiac conditions, monitoring of therapeutic interventions, and the real-world impact of CMR on patient management. The primary focus is on magnetic resonance imaging given its versatility in quantitative assessment of cardiac structure, function, tissue characteristics, and metabolism of the heart. Our lab was founded in 2001, and offers a platform for multicenter collaboration.

Current Members 2017

On the picture from left to right: **Yin Ge, MD, Kyoichi Kaneko, MD; Christoph Gräni, MD;** imaging fellows; **Ayaz Aghayev, MD, CMR Attending Yuna L. Choi, BSc, Core lab manager Raymond Y. Kwong, MD, MPH, Director of CMR;** **Ron Blankstein, MD (CMR Attending); Patrycja Z. Galazka, MD, Sarv Priya, MD, Navkaranbir Bajaj, MD, Imaging fellows**

Other members:

Michael Jerosch-Herold, PhD, Director of Medical Physics; Michael L. Steigner, MD, CMR Attending; Marcelo F. DiCarli, MD, Section Chief, Noninvasive CV Imaging; Kana Fujikura, MD; Tomas S. Vita, MD, Imaging fellow, Kathleen Cheng, Core lab manager



Past Members

Anna K. Y. Chan, MBBS, Division of Cardiology, Department. of Medicine, The Chinese University of Hong Kong
Carmen W. S. Chan, MBBS, Division of Cardiology, Department of Medicine, Hong Kong University, Hong Kong
Eric Larose, MD, FRCPC, Assistant Professor, Laval University Medical School, Quebec City, Canada.
Afshin Farzaneh-Far, MD, Director of Cardiovascular MRI, Assistant Professor of Clinical Medicine & Radiology, University of Illinois at Chicago
Kevin Steel, DO, Assistant Professor, United States Air Force Health Services, San Antonio, Texas
Nicolao Tzemos, MD, Assistant Professor of Medicine, University of Glasgow, Scotland
Caroline Daly, MD, Assistant Professor of Medicine, St. James's Hospital, University of Dublin Trinity College, Ireland.
Krishna Nallamshetty, MD, Assistant Professor of Radiology, University of South Florida, Tampa, FL
Shuaib M. Abdullah, MD, Assistant Professor of Medicine, University of Texas Southwestern Medical Center, Dallas
Otavio Coelho-Filho, MD, Faculty of Medical Sciences, State University of Campinas (Unicamp), Campinas, Brazil
Eri Watanabe, MD, PhD, Assistant Professor of Medicine, Tokyo Women's Medical University, Japan
Francois-Pierre Mongeon, MD, Assistant Professor of Medicine, Université de Montréal, Montreal Heart Institute, Canada

Major Selected Publications

- Kwong RY, Petersen SE, Schulz-Menger J, Arai AE, Bingham SE, Chen Y, Choi YL, Cury RC, Ferreira VM, Flamm SD, Steel K, Bandettini P, Martin ET, Nallamshetty L, Neubauer S, Raman S, Schelbert EB, Valeti US, Cao J, Reichel N, Young A, Fexon L, Pivovarov MS, Ferrari V, Simonetti OP. The Global Cardiovascular Magnetic Resonance Registry (GCMR) of the Society for Cardiovascular Magnetic Resonance (SCMR): Its Goals, Rationale, Data Infrastructure, and Current Developments *J Cardiovasc Magn Reson*. 2016 (In press)
- Heydari B, Abdullah SA, Pottala J, Shah RV, Abbasi SA, Mandry D, Francis SA, Lumish H, Ghoshhajra BB, Hoffmann U, Appelbaum E, Feng JH, Blankstein R, Steigner M, McConnell JP, Harris W, Antman EM, Jerosch-Herold M, Kwong RY. Effect of Omega-3 Acid Ethyl Esters on Left Ventricular Remodeling After Acute Myocardial Infarction: The OMEGA-REMODEL Randomized Clinical Trial. *Circulation*. 2016 Aug 2;134(5):378-91
- Shah RV, Heydari B, Coelho-Filho O, Abbasi S, Feng JH, Neilan TG, Francis S, Blankstein R, Steigner M; Jerosch-Herold M, Kwong RY. Vasodilator Stress Perfusion Cardiac Magnetic Resonance Imaging is Feasible and Prognostic in Obese Patients. *JACC Cardiovasc Imaging*. 2014 May;7(5):462-72.
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- Blankstein R, Osborne M, Naya M, Waller A, Kim CK, Murthy VL, Kazemian P, Kwong RY, Tokuda M, Skali H, Padera R, Hainer J, Stevenson WG, Dorbala S, Di Carli MF. Cardiac Positron Emission Tomography Enhances Prognostic Assessments of Patients with Suspected Cardiac Sarcoidosis. *J Am Coll Cardiol*. 2013 Oct 1.
- Coelho-Filho OR, Shah RV, Mitchell R, Neilan TG, Moreno H Jr, Simonson B, Kwong RY, Rosenzweig A, Das S, Jerosch-Herold M. Quantification of cardiomyocyte hypertrophy by cardiac magnetic resonance: implications for early cardiac remodeling. *Circulation*. 2013 Sep 10;128(11):1225-33
- Neilan TG, Shah RV, Abbasi SA, Farhad H, Groarke JD, Dodson JA, Coelho-Filho O, McMullan CJ, Heydari B, Michaud GF, John RM, van der Geest R, Steigner ML, Blankstein R, Jerosch-Herold M, Kwong RY. The Incidence, Pattern, and Prognostic value of Left Ventricular Myocardial Scar by Late Gadolinium Enhancement in Patients with Atrial Fibrillation. *J Am Coll Cardiol*. 2013 Aug 14. Pii: S0735-1097(13)03878-3.
- Mongeon FP, Jerosch-Herold M, Coelho-Filho OR, Blankstein R, Falk RH, Kwong RY. Quantification of Extracellular Matrix Expansion by CMR in Infiltrative Heart Disease. *JACC Cardiovasc Imaging* 2012;5(9):897-907.
- Ho CY, López B, Coelho-Filho OR, Lakdawala NK, Cirino AL, Jarolim P, Kwong RY, González A, Colan SD, Seidman JG, Díez J, Seidman CE. Myocardial fibrosis as an early manifestation of hypertrophic cardiomyopathy. *N Engl J Med*. 2010;363(6):552-63.
- Steel K, Broderick R, Gandla V, Larose E, Resnic F, Jerosch-Herold M, Brown KA, Kwong RY. Complementary Prognostic Values of Stress Myocardial Perfusion and Late Gadolinium Enhancement Imaging by Cardiac Magnetic Resonance in Patients with Known or Suspected Coronary Artery Disease. *Circulation*. 2009; 120(14): 1390-1400.

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Loic Bière, MD, PhD, Assistant teacher, Department of Cardiology, University Hospital of Angers, France

Major Current Projects

The Global CMR Registry (GCMR) aims to promote the collaboration of CMR programs worldwide in setting imaging and reporting standards, assessing diagnostic impact on patient care, and determining the cost-effectiveness of CMR imaging. It will be the largest collective body of evidence reflecting current clinical applications in patient care, which healthcare payers and governing bodies alike can rely on for acquiring metrics such as testing appropriateness, common indications, and diagnostic effectiveness. The registry will also be able to follow changes over time in patient impact brought about by new technical developments.

The OMEGA REMODEL Trial. A randomized control clinical trial of CMR was used to assess LV remodeling. We demonstrated a beneficial effect for high-dose omega-3 fatty acids treatment on adverse left ventricular remodeling after acute myocardial infarction in patients receiving guideline-based therapies. This finding was supported by the attenuation of concurrent fibrosis within noninfarcted myocardium and lower levels of systemic biomarkers of myocardial inflammation and cardiac fibrosis.

The ISCHEMIA Trial is an NIH-funded trial with the primary goal of testing the hypothesis that patients with moderate ischemia evident on cardiac imaging can have improved cardiac outcome when randomized to optimal medical therapy and coronary revascularization, over optimal medical therapy alone. **The HCMR trial** is a NIH-funded trial assessing 2,750 HCM patients using CMR for cardiac morphology and structures, biomarkers and genetic profiles. The BWH serves as the imaging core lab for these studies.

The Myocarditis cohort study is a retrospective study with the aim to evaluate the incremental benefit of cardiac magnetic resonance imaging tissue characterization onto clinical risk profiling in patients with myocarditis.

In the dilated Cardiomyopathy Cohort Study we tested the hypothesis that diffuse fibrosis estimated by extracellular volume fraction (ECV) effectively risk stratifies for major heart failure outcomes in patients clinically diagnosed with non-ischemic dilated cardiomyopathy.