BIOGRAPHICAL SKETCH

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NAME: C. Noel Bairey Merz, MD

POSITION TITLE: Director and Professor of Medicine

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Chicago, Chicago, Il	B.A.	06/1977	Biological Sciences
Harvard Medical School, Boston, MA	M.D.	06/1981	Medicine
University of California, San Francisco, CA		06/1984	Medical Residency
Cedars-Sinai Medical Center, Los Angeles, CA		06/1985	Chief Medical Resident
Cedars-Sinai Medical Center, Los Angeles, CA		06/1986	Cardiology Fellowship
Cedars-Sinai Medical Center, Los Angeles, CA		06/1987	Chief Cardiology Fellow

A. Personal Statement

I am the Medical Director for the Barbra Streisand Women's Heart Center and the Preventive & Rehabilitative Cardiac Center at Cedars-Sinai Smidt Heart Institute. I have a broad background in cardiovascular and interdisciplinary coronary physiology, with specific expertise in diagnosis and treatment of coronary microvascular dysfunction (CMD) in women with symptoms/signs of ischemia and no obstructive coronary artery disease (INOCA). I am PI of the NHLBI-sponsored Women's Ischemia Syndrome Evaluation (WISE) studies, which have contributed the milestone acknowledged in the AHA Herrick Lecture on the role of CMD in women. As a professor of medicine at the Cedars-Sinai Smidt Heart Institute and the David Geffen UCLA School of Medicine, I have a proven track record of mentoring junior investigators on various cardiovascular studies and trials over the past 30 years.

B. Positions and Honors

Professional Positions

1982-84 Medical Residency, University of California, San Francisco, CA
1984-85 Chief Medical Resident, University of California, San Francisco, CA
1985-88 Clinical Cardiology Fellow, Cedars-Sinai Medical Center, Los Angeles, CA
1988-90 Assistant Director, Preventive and Rehabilitative Cardiac Center, CSMC, LA, CA
1990-91 Acting Director, Preventive and Rehabilitative Cardiac Center, CSMC, LA, CA
1991-Present Director, Preventive and Rehabilitative Cardiac Center, CSMC, LA, CA
1992-Present Attending Cardiologist, Cedars-Sinai Medical Center, Los Angeles, CA
1990-96 Assistant Clinical Professor of Medicine, UCLA School of Medicine, LA, CA
1997-2005 Associate Professor of Clinical Medicine, UCLA School of Medicine, LA, CA.

2001-Present Director and Endowed Chair, Women's Health Program, CSMC, LA, CA
2005-Present Professor of Medicine, David Geffen UCLA School of Medicine, LA, CA
2009-Present Professor of Medicine, Cedars-Sinai Heart Institute, Cedars-Sinai Medical Center, LA, CA

Awards and Other Professional Activities (partial listing)

1989 Fellow, American College of Cardiology
1990 Fellow, American Heart Association, Council on Clinical Cardiology
4/96 Representative, American College of Cardiology, Professional Labeling of Aspirin, FDA
1997-10 General Clinical Research Center, Scientific Advisory Committee, CSMC
1/97 Member, Over-the-Counter Advisory Panel, Professional Labeling of Aspirin, FDA
3/99-02 Chair, Prevention of Cardiovascular Disease Committee, American College of Cardiology (3-year term)
3/99-02 Member, Hypertensive Diseases Committee, American College of Cardiology (3-year term)
1998-03 Study Section Member, Risk Prevention Health Behavior – 2, National Institutes of Health
2002-07 Member, Board of Trustees, American College of Cardiology
2002-05 Member, National Cholesterol Education Program (NCEP), ATP III
2005-10 Chair, NIH/NHLBI BARI-2D DSMB
2008-12 Member, NHLBI Advisory Council
2008-2015 Member, NCEP – National Cholesterol Guidelines Panel
2016-2019 NIH-Office of Research in Women's Health Advisory Board
2020-Present Member, FDA Cardiovascular and Renal Drugs Advisory Committee

C. Contribution to Science

My early publications directly addressed the pathophysiological paradox of women with signs and symptoms of ischemic heart disease but no obstructive coronary artery disease. Funded by NIH-NHLBI, I direct the Women's Ischemia Syndrome Evaluation (WISE) studies which have identified a high prevalence and adverse prognosis of coronary microvascular dysfunction (CMD), and outlined the clinical phenotype useful to clinicians.

a. Buchthal SD, den Hollander JA, **Bairey Merz CN**, Rogers WJ, Pepine CJ, Reichek N, Sharaf BL, Reis S, Kelsey SF, Pohost GM. Abnormal myocardial phosphorus-31 nuclear magnetic resonance spectroscopy in women with chest pain but normal coronary angiograms. New England Journal of Medicine 2000; 342:829-35. PMID: 10727587. PMCID: NA.
b. von Mering, GO, Arant, CB, Wessel, TR, McGorray, SP, **Bairey Merz, CN,** Sharaf, BL, Smith, KM, Olson, MB, Johnson, BD, Sopko, G, Handberg, E, Pepine, CJ, Kerensky, RA Abnormal coronary vasomotion as a prognostic indicator of cardiovascular events in women: results from the National Heart, Lung, and Blood Institute – Sponsored Women's Ischemia Syndrome Evaluation (WISE). Circulation 2004;109(6), 722-725. PMID: 14970106. PMCID: NA.
c. Pepine CJ, Anderson RD, Sharaf BL, Reis SE, Smith KM, Handberg EM, Johnson BD, Sopko G, **Bairey Merz CN**. Coronary Microvascular Reactivity to Adenosine Predicts Adverse Outcome in Women Evaluated for Suspected Ischemia: Results from the NHLBI Women's Ischemia Syndrome Evaluation (WISE) Study. J Am Coll Cardiol 2010; 55(25): 2825-32. PMCID: PMC2898523
d. AlBadri A, **Bairey Merz C N,** Johnson BD, Wei J, Mehta PK, Cook-Wiens G, Reis SE, Kelsey SF, Bittner V, Sopko G, Shaw LJ, Pepine CJ, Ahmed B. Impact of Abnormal Coronary Reactivity on Long-Term Clinical Outcomes in Women. Journal of the American College of Cardiology Feb 2019, 73 (6) 684-693; DOI: 10.1016/j.jacc.2018.11.040. PMCID: PMC6383871

2. In addition to the contributions described above, with a team of collaborators, I directly documented the mechanistic pathways for CMD using various pharmacologic probe intervention trials.
    a. Pauly DF, Johnson BD, Anderson RD, Handberg EM, Smith KM, Cooper-DeHoff RM, Sopko G, Sharaf BM, Kelsey SF, **Bairey Merz CN,** Pepine CJ. In women with symptoms of cardiac ischemia, non-obstructive coronary arteries, and microvascular dysfunction, ACE inhibition is associated with improved microvascular function: a double-blind randomized study from the NHLBI Women's Ischemia Syndrome Evaluation (WISE) Am Heart J 2011;162:678-84. PMCID: PMC3191889

b. **Bairey Merz CN,** Olson MB, McClure C, Yang YC, Symons J, Sopko G, Kelsey SF, Handberg E, Johnson BD, Cooper-DeHoff RM, Sharaf B, Rogers WJ, Pepine CJ. A randomized controlled trial of low-dose hormone therapy on myocardial ischemia in postmenopausal women with no obstructive coronary artery disease: Results from the National Institutes of Health/National Heart, Lung and Blood Institute-sponsored Women's Ischemia Syndrome Evaluation (WISE). Am Heart J 2010; 159:987. PMCID: PMC2918903
c. **Bairey Merz CN,** Handberg EM, Shufelt CL, Mehta PK, Minissian MB, Wei J, Thomson LE, Berman DS, Shaw LJ, Petersen JW, Brown GH, Anderson RD, Shuster JJ, Cook-Wiens G, Rogatko A, Pepine CJ. A randomized, placebo-controlled trial of late Na current inhibition (ranolazine) in coronary microvascular dysfunction (CMD): impact on angina and myocardial perfusion reserve. Eur Heart J. 2015; pii: ehv647. PMCID: PMC4872284
d. Denardo SJ, Wen S, Handberg EM, **Bairey Merz CN**, Sopko G, Cooper-DeHoff RM, Pepine CJ. Effect of Phosphodiesterase Type 5 Inhibition on Coronary Microvascular Dysfunction in Women: A Women's Ischemia Syndrome Evaluation (WISE) Ancillary Study. Clin Cardiol 2011; 34: pages 483-487. PMCID: PMC3151010

3. Working to explore links between CMD and the new female dominated epidemic of heart failure with preserved ejection fraction (HFpEF), I have conducted study evaluating the detection, diagnosis and management of ischemic heart disease (IHD) in women using cardiac magnetic resonance imaging (CMRI), to evaluate subendocardial myocardial perfusion, as well as myocardial fibrosis, diastolic function, and metabolic status (spectroscopy).
    a. Thomson, LE, Wei, J., Agarwal, M, Haft-Baradaran, A, Shufelt, C, Mehta, PK., Gill, EB, Johnson, BD, Kenkre, T., Handberg, EM, Li, D, Sharif, B, Berman, DS, Petersen, JW, Pepine, CJ, **Bairey Merz, CN.** Cardiac magnetic resonance myocardial perfusion reserve index is reduced in women with coronary microvascular dysfunction. A National Heart, Lung, and Blood Institute – sponsored study from the Women's Ischemia Syndrome Evaluation. Circulation Cardiovascular Imaging 2015; *8(4)*, pii: e002481. doi: 10.1161/CIRCIMAGING.114.002481. PMCID: PMC4375783
    b. Wei J, Nelson MD, Szczepaniak EW, Smith L, Mehta PK, Thomson LE, Berman DS, Li D, **Bairey Merz CN**, Szczepaniak LS. Myocardial Steatosis as a Possible Mechanistic Link between Diastolic Dysfunction and Coronary Microvascular Dysfunction in Women. Am J Physiol Heart Circ Physiol 2015; ajpheart.00612.2015. doi: 10.1152/ajpheart.00612.2015. PMCID: PMC4865076
    c. Nelson MD, Sczdepaniak LS, Wei J, Haftbaradaren A, Bharadway M, Sharif B, Mehta PK, Zhang X, Thomson LE, Berman DS, Li D, **Bairey Merz CN**, Diastolic dysfunction in women with signs and symptoms of ischemia in the absence of obstructive coronary artery disease: a hypothesis-generating study, Circ Cardiovasc Imaging 2014; (3):510-6. PMCID: PMC4031259.
    d. Wei J, Bakir M, Darounian N, Li Q, Landes S, Mehta PK, Shufelt CL, Handberg EM, Kelsey SF, Sopko G, Pepine CJ, Petersen JW, Berman DS, Thomson LEJ, **Bairey Merz CN**. Myocardial Scar Is Prevalent and Associated With Subclinical Myocardial Dysfunction in Women With Suspected Ischemia But No Obstructive Coronary Artery Disease: From the Women's Ischemia Syndrome Evaluation-Coronary Vascular Dysfunction Study. Circulation. 2018 Feb 20;137(8):874-876. doi: 10.1161/CIRCULATIONAHA.117.031999. No abstract available. PMCID: PMC5823279

4. Aiming to translate our findings to the bedside, I have investigated feasible approaches to risk assessment, diagnosis and treatment of ischemic heart disease in women.
    a. Doyle M, Pohost GM, Bairey Merz CN, Shaw LJ, Sopko G, Rogers WJ, Sharaf BL, Pepine CJ, Vidos DA, Rayarao G, Tauxe L, Kelsey SF, McNair D, Biederman RWW. Improved diagnosis and prognosis using Decisions Informed by Combining Entities (DICE): results from the NHLBI-sponsored Women's Ischemia Syndrome Evaluation (WISE). Cardiovasc Diagn Ther. 2013 Dec;3(4):216-27. doi: 10.3978/j.issn.2223-3652.2013.10.07 PMCID: PMC3878119.
    b. Sedlak T, Herscovici R, Cook-Wiens G, Handberg E, Wei J, Shufelt C, Bittner V, Reis SE, Reichek N, Pepine C, Bairey Merz CN. Predicted Versus Observed Major Adverse Cardiac Event Risk in Women with Evidence of Ischemia and No Obstructive Coronary Artery Disease: A Report From WISE (Women's Ischemia Syndrome Evaluation). J Am Heart Assoc. 2020 Apr 7;9:e013234. doi:10.1161/JAHA.119.013234, PMCID: PMC7428651.
    c. Weng L, Taylor KD, Chen YI, Sopko G, Kelsey SF, Bairey Merz CN, Pepine CJ, Miller VM, Rotter JI, Gulati M, Goodarzi MO, Cooper-DeHoff RM. Genetic Loci Associated With Nonobstructive

Coronary Artery Disease in Caucasian Women. Physiol Genomics. 2015 Nov 3: physiolgenomics. PMCID: PMC4757024.

d. Rambarat CA, Elgendy IY, Handberg EM, Bairey Merz CN, Wei J, Minissian MB, Nelson MD, Thomson LEJ, Berman DS, Shaw LJ4, Cook-Wiens G, Pepine CJ. Late sodium channel blockade improves angina and myocardial perfusion in patients with severe coronary microvascular dysfunction: Women's Ischemia Syndrome Evaluation-Coronary Vascular Dysfunction ancillary study, Int J Cardiol. 2019 Feb 1;276:8-13. doi: 10.1016/j.ijcard.2018.09.081. Epub 2018 Sep 26 PMCID: PMC6324974.

Complete List of Published Work in MyBibliography:
http://www.ncbi.nlm.nih.gov/sites/myncbi/c..bairey merz.1/bibliography/41141744/public/?sort=date&direction=ascending

D. Research Support

Ongoing Research Support

U54 AG065141 Cheng, Bairey Merz (MPI) 07/01/2020 – 06/30/2025
The Microvascular Aging and Eicosanoids – Women's Evaluation of Systemic Aging Tenacity (MAE-WEST) ("You are never too old to become younger!") Specialized Center for Research Excellence (SCORE)
The major goal is to transform the prevailing understanding of sex differences in microvascular and chronic multi-organ diseases and, in turn, enable effective interventions through inter-disciplinary science, education, and advocacy.
Role: Co-PI

R01 HL146158 Bairey Merz (PI) 05/01/2019 – 02/29/2024
Women's Ischemia Syndrome Evaluation (WISE) - Mechanisms of Coronary Microvascular Dysfunction Leading to Pre-Heart Failure with Preserved Ejection Fraction (HFpEF)
The major goals of this project are to investigate the mechanisms of CMD leading to pre-HFpEF.
Role: PI

PR150224P1 (DoD) Pepine, Bairey Merz (MPI) 09/15/2017 - 08/30/2021
Ischemia-Intensive Medical Treatment Reduce Events in Women with Non-Obstructive CAD
The goal of this project is to evaluate intensive medical therapy with high dose potent statin and ACEi or angiotensin-renin blocker vs. primary guideline medical therapy strategy symptomatic patients with ischemia and no obstructive CAD.
Role: Co-PI

R01 AG053332 Cedars (PI) 09/30/2017 – 05/31/2023
Longitudinal Evaluation of Ovarian Aging and Cardiovascular Risk
The goal of this tudy is to utilize a well-characterized multi-ethnic population of reproductive aged women for longitudinal evaluation of OVC risks. This subaward is to provide guidance/training for UCSF to set up PAT system and 175 PAT testing core lab QC readings.
Role: Site PI / PAT QC Core PI

R01 HL151266 Tamarappoo (PI) 09/01/2020 – 08/31/2024
Effect of Intensive Medical Treatment on Quantified Coronary Artery Plaque Components with Serial Coronary CTA in Women with Non-Obstructive CAD
The goal of this study is to quantify the impact of IMT on plaque composition and inflammation and its relation to clinical improvement in women with ischemic symptoms and nonobstructive CAD.
Role: Co-I

1R01 HL153430-01 Sharif (PI) 07/15/2020 – 03/31/2025
Noninvasive Testing of Coronary Microvascular Reactivity Using High-resolution Free-breathing MRI

This project brings together multiple interdisciplinary investigators with a strong collective track record in developing cardiac imaging strategies to advance a Noninvasive approach for determining CMD severity based on the MRI-derived stress MBF gradient.
Role: Co-I

W81XWH1810709 (DoD) Jefferies (PI) 09/15/2018 – 09/14/2021
Inflammation and metabolic reprogramming of Lupus Monocytes - Mechanisms of the Pathobiology of Lupus Cardiovascular Disease
The major goals of this project are to investigate the mechanisms of the pathobiology of lupus cardiovascular disease.
Role: Co-I

Completed Research Support
R01HL124649 Li (PI) 05/01/2015 –02/29/2020
Whole-Heart Myocardial Blood Flow Quantification Using MRI
The major goal of this project is to develop free breathing, whole-heart, high resolution myocardial perfusion MRI.
Role: Co-I

R44HL135889 Henry (Site PI) 09/20/2017 – 05/31/2020
NHLBI/ Subcontract to Caladrius Biosciences
Exploratory Clinical Study to Evaluate the Potential Bioactivity of CLBS14 in Patients with Coronary Microvascular Dysfunction
The major goals of this project are to evaluate the safety and potential bioactivity of CLBS14 in patients with coronary microvascular dysfunction and without obstructive coronary artery disease.
Role: Co-I

Sanofi US Services, Inc. Bairey Merz (National & Site PI) 12/1/2017 – 11/30/20 (early term)
A Randomized Double-Blind Placebo-Controlled Parallel Arm Dose Titration Study to Assess the Effects of SAR407899 in Patients with Microvascular Angina
The major goals of this project are to evaluate the effects of SAR407899 in patients with microvascular angina.
Role: National PI & Site PI

R01 HL096119 Li (PI) 07/01/2015 – 06/30/2020
3D MRI Characterization of High-Risk Carotid Artery Plaques without Contrast Media
The major goal of this project is to develop a non-invasive magnetic resonance imaging method to identify carotid atherosclerotic plaques that have a high probability of causing neurovascular events such as stroke or transient ischemic attack.
Role: Co-I

U10 HL119991 Parker (PI) 10/07/2013 - 04/30/2018
NIH/NHLBI/RTI1-312-0214047-51644L
Pregnancy as a Window to Future Cardiovascular Health: Adverse Pregnancy
The major goals of this project are to leverage the extensive phenotypic information about adverse pregnancy outcomes (APO) on the large nuMoM2b cohort to systematically elucidate aspects of cardiovascular risk associated with APOs and improve the health of women with a history of APOs.
Role: Consultant