Stanford

Mark E. Pepin, MD, MS, PhD

- Affiliate, Department Funds
- Fellow in Medicine - Med/Cardiovascular Medicine

Bio

BIO

Dr. Mark Pepin is a clinical fellow within the Division of Cardiovascular Medicine and Cardiovascular Research Institute at Stanford University Hospital. Born and homeschooled in rural South Carolina, he received a BS in chemical engineering at Clemson University, where he also competed on the NCAA Division 1 Cross Country and Track teams as a distance runner. He completed an MS in biomedical engineering at UC Davis, followed by an MD-PhD at the University of Alabama at Birmingham. Before entering residency training at Brigham and Women's Hospital, Dr. Pepin was awarded the Humboldt postdoctoral research fellowship to conduct research in Heidelberg, Germany where he studied myocardial epigenetics and metabolism in the context of cardiometabolic heart failure. He has received research funding through the NIH/NHLBI, German Cardiac Society (DGK), and German Center for Cardiovascular Research (DZHK). As a physician-scientist, Dr. Pepin aims to identify and leverage the epigenetic basis of cardiovascular disease to reverse its inherited and acquired forms. In his free time, he enjoys carpentry, running, and exploring the outdoors with his wife and their four children.

CLINICAL FOCUS

- Fellow
- Cardiovascular Medicine

HONORS AND AWARDS

- Emerging-Generation (E-Gen) Award, American Society for Clinical Investigation (ASCI) (2025)
- Young Investigator Award (YIA) in Basic Science, European Society of Cardiology, HFA World Congress (Belgrade, Serbia) (2025)
- "Melvin L. Marcus" Early Career Investigator Award in Cardiovascular Sciences Finalist, AHA Scientific Sessions 2025 (2025)
- K. Frank Austen Resident Research Award, Brigham and Women's Hospital, Harvard Medical School (2024)
- Future of Science Fund Awardee, Keystone Symposia (2023)
- "Tinsley R. Harrison" Award for Excellence in Internal Medicine, University of Alabama at Birmingham School of Medicine (2022)
- 2021 Article Impact Award, AJP Heart & Circ. Physiology (2021)
- Featured Graduate Researcher, UAB Annual Report (2020)
- UASOM Student Lifetime Achievement Award, UAB Best Medicine (2020)
- "Samuel B. Barker" Award, UAB Graduate School (2019)
- "William C. Stanley" Early Investigator Award, Society for Heart and Vascular Metabolism (2019)
- "William Featheringill" Young Investigator Award, UAB Comprehensive Cardiovascular Center (2017)
- Dean's Research Award, UAB School of Medicine (2016)
- All-ACC Student-Athlete Award, NCAA Division 1 Track & Cross Country (2010)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Elected Member, Physician-Scientist Development Committee, American Society of Clinical Investigation (ASCI) (2025 - present)
- Trainee Board Member, Society for Heart and Vascular Metabolism (2024 - present)

PROFESSIONAL EDUCATION

- MD, University of Alabama at Birmingham School of Medicine , Medicine (2022)
- PhD, University of Alabama at Birmingham , Biomedical Engineering (2019)
- MS, UC Davis , Biomedical Engineering (2013)
- BS, Clemson University , Chemical Engineering (2011)

Publications

PUBLICATIONS

- **Metabo-epigenetic circuits of heart failure: chromatin-modifying enzymes as determinants of metabolic plasticity.** *EMBO molecular medicine*
  Pepin, M. E., Gong, X., Schulze, A., Backs, J.
  2025

- **Nicotinamide Nucleoside Transhydrogenase (NNT) loss-of-function attenuates oxidative stress-associated myocardial fibrosis and diastolic dysfunction in cardiometabolic HFpEF**
  Pepin, M., Konrad, P., Bazgir, F., Maack, C., Nickel, A., Gorham, J., Hohl, M., Schreiter, F., Dewenter, M., Chaves Filho, A., Schulze, A., Karlstaedt, A., Frey, et al
  LIPPINCOTT WILLIAMS & WILKINS.2025

- **Assessing the quality of AI-generated clinical notes: validated evaluation of a large language model ambient scribe.** *Frontiers in artificial intelligence*
  Palm, E., Manikantan, A., Mahal, H., Belwadi, S. S., Pepin, M. E.
  2025; 8: 1691499

- **Dysregulated smooth muscle cell proliferation and gene expression underlie ACTA2 variant-associated aortopathy.** *American journal of physiology. Heart and circulatory physiology*
  Pepin, M. E., Mitchell, R. N., Gupta, R. M.
  2025

- **A pilot study on DNA methylation changes for non-invasive molecular diagnostics in heart failure.** *ESC heart failure*
  Benincasa, G., Cacciatore, F., Pepin, M. E., Curcio, F., Chiappetti, R., Wende, A. R., Coscioni, E., Napoli, C.
  2025

- **Mitochondrial NNT Promotes Diastolic Dysfunction in Cardiometabolic HFpEF.** *Circulation research*
  Pepin, M. E., Konrad, P. J., Nazir, S., Bazgir, F., Maack, C., Nickel, A., Gorman, J., Hohl, M., Schreiter, F., Dewenter, M., de Britto Chaves Filho, A., Schulze, A., Karlstaedt, et al
  2025

- **Integrative analysis of single-cell transcriptomics and genetic associations identify cell states associated with vascular disease.** *Atherosclerosis*
  Pepin, M. E., Schwartzman, W. E., Fang, S., Vellarikkal, S. K., Atri, D. S., Reddy, A., Xu, Q., Hamel, A. R., Billaud, M., Segrè, A. V., Gupta, R. M.
  2025; 403: 119108

- **High-resolution DNA methylation changes reveal biomarkers of heart failure with preserved ejection fraction versus reduced ejection fraction** *BASIC RESEARCH IN CARDIOLOGY*
  Benincasa, G., Pepin, M. E., Russo, V., Cacciatore, F., D'Alto, M., Argiento, P., Romeo, E., Chiappetti, R., Laezza, N., Wende, A. R., Schiattarella, G. G., Coscioni, E., La Montagna, et al
  2025; 120 (2): 347-361

- **The Role of Endothelial Cells in Atherosclerosis Insights from Genetic Association Studies** *AMERICAN JOURNAL OF PATHOLOGY*
  Pepin, M. E., Gupta, R. M.

2024; 194 (4): 499-509

- **Deep phenotyping of two pre-clinical mouse models and a cohort of RBM20 mutation carriers reveals no sex-dependent disease severity in RBM20 cardiomyopathy.** *American journal of physiology. Heart and circulatory physiology*
  Lennermann, D. C., Pepin, M. E., Grosch, M., Konrad, L., Kemmling, E., Hartmann, J., Nolte, J. L., Clauder-Munster, S., Kayvanpour, E., Sedaghat-Hamedani, F., Haas, J., Meder, B., van den Boogaard, et al
  2022
- **Fostering a diverse regional community of physician-scientist trainees** *JOURNAL OF THE NATIONAL MEDICAL ASSOCIATION*
  Pepin, M. E., Souder, P., Weaver, A. N., Lorenz, R. G., Yacoubian, T., Seay, R. L.
  2022; 114 (3): 251-257
- **A novel curricular framework to develop grant writing skills among MD-PhD students** *JOURNAL OF CLINICAL AND TRANSLATIONAL SCIENCE*
  Souder, J. P., Pepin, M. E., Seay, R. L., Lorenz, R. G., Geisler, W. M., Yacoubian, T.
  2022; 6 (1): e54
- **A case of "smoldering" immune-mediated thrombotic thrombocytopenic purpura manifesting as recurrent cardioembolic stroke** *CLINICAL CASE REPORTS*
  Pepin, M. E., Saca, E., Kwon, S. Y., May, J.
  2021; 9 (10): e04850
- **Racial and socioeconomic disparity associates with differences in cardiac DNA methylation among men with end-stage heart failure** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*
  Pepin, M. E., Ha, C., Potter, L. A., Bakshi, S., Barchue, J. P., Asaad, A., Pogwizd, S. M., Pamboukian, S., Hidalgo, B. A., Vickers, S. M., Wende, A. R.
  2021; 320 (5): H2066-H2079
- **The human aortic endothelium undergoes dose-dependent DNA methylation in response to transient hyperglycemia** *EXPERIMENTAL CELL RESEARCH*
  Pepin, M. E., Schiano, C., Miceli, M., Benincasa, G., Mansueto, G., Grimaldi, V., Soricelli, A., Wende, A. R., Napoli, C.
  2021; 400 (2): 112485
- **Increased Glucose Availability Attenuates Myocardial Ketone Body Utilization** *JOURNAL OF THE AMERICAN HEART ASSOCIATION*
  Brahma, M. K., Ha, C., Pepin, M. E., Mia, S., Sun, Z., Chatham, J. C., Habegger, K. M., Abel, E., Paterson, A. J., Young, M. E., Wende, A. R.
  2020; 9 (15): e013039
- **Differential DNA Methylation Encodes Proliferation and Senescence Programs in Human Adipose-Derived Mesenchymal Stem Cells** *FRONTIERS IN GENETICS*
  Pepin, M. E., Infante, T., Benincasa, G., Schiano, C., Miceli, M., Ceccarelli, S., Megiorni, F., Anastasiadou, E., Della Valle, G., Fatone, G., Faenza, M., Docimo, L., Nicoletti, et al
  2020; 11: 346
- **The SETD6 Methyltransferase Plays an Essential Role in Hippocampus-Dependent Memory Formation** *BIOLOGICAL PSYCHIATRY*
  Webb, W. M., Irwin, A. B., Pepin, M. E., Henderson, B. W., Huang, V., Butler, A. A., Herskowitz, J. H., Wende, A. R., Cash, A. E., Lubin, F. D.
  2020; 87 (6): 577-587
- **Dysregulation of the Mitochondrial Proteome Occurs in Mice Lacking Adiponectin Receptor 1** *FRONTIERS IN ENDOCRINOLOGY*
  Pepin, M. E., Koentges, C., Pfeil, K., Gollmer, J., Kersting, S., Wiese, S., Hoffmann, M. M., Odening, K. E., von zur Muehlen, C., Diehl, P., Stachon, P., Wolt, D., Wende, et al
  2019; 10: 872
- **DNA methylation reprograms cardiac metabolic gene expression in end-stage human heart failure** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*
  Pepin, M. E., Drakos, S., Ha, C., Tristani-Firouzi, M., Selzman, C. H., Fang, J. C., Wende, A. R., Wever-Pinzon, O.
  2019; 317 (4): H674-H684
- **Gamification: an Innovative Approach to Reinforce Clinical Knowledge for MD-PhD Students During Their PhD Research Years** *MEDICAL SCIENCE EDUCATOR*
  Pepin, M. E., Webb, W. M., Boppana, S., Weaver, A. N., Seay, R. L., Dempsey, D. M., Willig, J. H., Geisler, W. M., Lorenz, R. G.
  2019; 29 (3): 739-747

- **Prolactin Receptor Signaling Regulates a Pregnancy-Specific Transcriptional Program in Mouse Islets** *ENDOCRINOLOGY*
  Pepin, M. E., Bickerton, H. H., Bethea, M., Hunter, C. S., Wende, A. R., Banerjee, R. R.
  2019; 160 (5): 1150-1163

- **Epigenetics in the development of diabetic cardiomyopathy** *EPIGENOMICS*
  Pepin, M. E., Wende, A. R.
  2019; 11 (5): 469-472

- **Genome-wide DNA methylation encodes cardiac transcriptional reprogramming in human ischemic heart failure** *LABORATORY INVESTIGATION*
  Pepin, M. E., Ha, C., Crossman, D. K., Litovsky, S. H., Varambally, S., Barchue, J. P., Pamboukian, S. V., Diakos, N. A., Drakos, S. G., Pogwizd, S. M., Wende, A. R.
  2019; 99 (3): 371-386

- **Resident macrophages reprogram toward a developmental state after acute kidney injury** *JCI INSIGHT*
  Lever, J. M., Hull, T. D., Boddu, R., Pepin, M. E., Black, L. M., Adedoyin, O. O., Yang, Z., Traylor, A. M., Jiang, Y., Li, Z., Peabody, J. E., Eckenrode, H. E., Crossman, et al
  2019; 4 (2)

- **Glucagon Receptor Signaling Regulates Energy Metabolism via Hepatic Farnesoid X Receptor and Fibroblast Growth Factor 21** *DIABETES*
  Kim, T., Nason, S., Holleman, C., Pepin, M., Wilson, L., Berryhill, T. F., Wende, A. R., Steele, C., Young, M. E., Barnes, S., Drucker, D. J., Finan, B., DiMarchi, et al
  2018; 67 (9): 1773-1782

- **Glucagon-Receptor Signaling Regulates Mitochondrial Bioenergetics via Hepatic Farnesol X Receptor**
  Kim, T., Nason, S., Antipenko, J. P., Vestri, C. S., Smith-Johnston, K., Pepin, M. E., Wende, A. R., Finan, B., Dimarchi, R., Perez-Tilve, D., Moellering, D. R., Habegger, K. M.
  AMER DIABETES ASSOC.2018

- **Antiretroviral therapy potentiates high-fat diet induced obesity and glucose intolerance** *MOLECULAR METABOLISM*
  Pepin, M. E., Padgett, L. E., McDowell, R. E., Burg, A. R., Brahma, M. K., Holleman, C., Kim, T., Crossman, D., Kutsch, O., Tse, H. M., Wende, A. R., Habegger, K. M.
  2018; 12: 48-61

- **Class-Wide Access to a Commercial Step 1 Question Bank During Preclinical Organ-Based Modules: A Pilot Project** *ACADEMIC MEDICINE*
  Banos, J. H., Pepin, M. E., Van Wagoner, N.
  2018; 93 (3): 486-490

- **Gene expression analysis to identify mechanisms underlying heart failure susceptibility in mice and humans** *BASIC RESEARCH IN CARDIOLOGY*
  Koentges, C., Pepin, M. E., Muesse, C., Pfeil, K., Alvarez, S., Hoppe, N., Hoffmann, M. M., Odening, K. E., Sossalla, S., Zirlik, A., Hein, L., Bode, C., Wende, et al
  2018; 113 (1): 8

- **Glucose transporter 4-deficient hearts develop maladaptive hypertrophy in response to physiological or pathological stresses** *AMERICAN JOURNAL OF PHYSIOLOGY-HEART AND CIRCULATORY PHYSIOLOGY*
  Wende, A. R., Kim, J., Holland, W. L., Wayment, B. E., O'Neill, B. T., Tuinei, J., Brahma, M. K., Pepin, M. E., McCrory, M. A., Luptak, I., Halade, G. V., Litwin, S. E., Abel, et al
  2017; 313 (6): H1098-H1108

- **My Sweetheart Is Broken: Role of Glucose in Diabetic Cardiomyopathy** *DIABETES & METABOLISM JOURNAL*
  Brahma, M. K., Pepin, M. E., Wende, A. R.
  2017; 41 (1): 1-9

- **Diabetes and Glucose Alone Regulate Cardiac ABAT Levels**
  Pepin, M. E., Wende, A. R.
  FEDERATION AMER SOC EXP BIOL.2016

- **Regulation of Myocardial Ketone Oxidative Proteins by Increased O-GlcNAcylation**
  Brahma, M. K., McCrory, M. A., Paterson, A. J., Pepin, M. E., Young, M. E., Wende, A. R.
  FEDERATION AMER SOC EXP BIOL.2016

- **Inhibition of Myostatin Signaling through Notch Activation following Acute Resistance Exercise** *PLOS ONE*
  MacKenzie, M. G., Hamilton, D., Pepin, M., Patton, A., Baar, K.
  2013; 8 (7): e68743
- **Reversible control of electrochemical properties using thermally-responsive polymer electrolytes**
  Kelly, J. C., Pepin, M., Huber, D. L., Bunker, B. C., Roberts, M. E.
  AMER CHEMICAL SOC.2012
- **Reversible Control of Electrochemical Properties Using Thermally-Responsive Polymer Electrolytes** *ADVANCED MATERIALS*
  Kelly, J. C., Pepin, M., Huber, D. L., Bunker, B. C., Roberts, M. E.
  2012; 24 (7): 886-+