c OMB No. 0925-0001 and 0925-0002 (Rev. 9/17 Approved Through 3/31/2020)

BIOGRAPHICAL SKETCH

NAME: Arshed A. Quyyumi

eRA COMMONS USER NAME (credential, e.g., agency login): QUYYUMIA

POSITION TITLE: Professor of Medicine, Director, Emory Clinical Cardiovascular Research Institute

EDUCATION/TRAINING

| INSTITUTION AND LOCATION | DEGREE | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| London University, London, England  Guy’s Hospital Medical School, London, England  London University, London, England  Certification American Board of Internal Medicine  Certification ABIM Cardiovascular Subspecialty | BSc(Hons)  MBBS  MD | 1974  1977  1987  1990  2011 | Pharmacology  Medicine |

A. Personal Statement

I have been involved in clinical translational research in vascular diseases for over 30 years. As tenured Professor of Medicine and co-Director of the Emory Clinical Cardiovascular Research Institute (ECCRI) at Emory University School of Medicine, I have conducted several human studies in ischemic coronary syndromes, mechanisms of myocardial ischemia, metabolic disease influence of CVD, vascular endothelial dysfunction, and influence of stress on vascular disease. Translational research initiatives have included multiple –omic fields. I have also studied health disparities with respect to vascular diseases and have a strong track record of past and current funding in this field. I have established one of the nation’s largest bio-banks in cardiovascular diseases, the Emory Cardiovascular Biobank, that recruits subjects undergoing angiography, and includes samples from other population-based studies (MECA, MetaHealth and Predictive Health). We have >7500 subjects enrolled in this Biobank with angiographic, imaging, and biomarker data available, and have followed them up for more than 5 years. These data sets have allowed studies in health disparities, psychosocial and clinical risk factors of cardiovascular diseases, and discovery of novel regenerative, proteomic, transcriptomic, metabolomics, miRNA and genomic markers that drive adverse outcomes, with special reference to cardiometabolic diseases. I have also set up a vascular core laboratory that measures human vascular function including endothelial function, arterial stiffness and thickness and invasive peripheral and coronary vascular measurements. I have conducted several pharmacologic and mechanistic studies in humans and have a strong record of conducting clinical trials with novel therapies including regenerative medicine approaches in peripheral and coronary arterial disease. I have trained scores of pre- and post-doctoral fellows and am currently leading and involved with several training grants. Dr. Anish Shah has already provided a valuable pilot study of the Biobank, and I will continue to support him in his analysis of coronary disease and depression within this population.

**B. Positions and Honors**

**Professional Experience**

03/77 - 09/82 Internship and Residency training in Guy's and Royal Free Hospitals, London, UK

09/82 - 07/85 Fellow, Cardiology, National Heart Hospital, London, U.K.

08/85 - 07/86 Fellow, Cardiology, Massachusetts General Hospital, Boston, MA

07/86 - 07/88 Chief Resident, Cardiology Branch, National Institutes of Health, Bethesda, MD

08/88 - 09/01 Staff Physician/Sr. Investigator, Director, Cardiac Catheterization Laboratory, Cardiology Branch, National Heart, Lung, and Blood Institute, National Institutes of Health, MD.

09/01 -present Professor of Medicine, Director, Emory Clinical Cardiovascular Research Institute, Cardiology Division, Emory University School of Medicine, Atlanta, GA,

2016 Bruce Logue Endowed Chair for Cardiovascular Research

**Honors and Awards**

In last 15 years

2000 F.R.C.P. Elected as Fellow of the Royal College of Physicians, U.K.

2003 Recipient of the J Willis Hurst Teaching Award, Emory University Cardiology Department

2010 Member of Millipub Club (>1000 citations on two publications)

2015 Recipient R. Wayne Alexander award for research mentorship

**Editorial Boards and Reviewer**

VA Merit Review Subcommittee for Cardiovascular Diseases, 2001

NIH NRSA Study Section 2002

NIH Special Emphasis Panel Reviewer R21 Exploratory Bioengineering Research Grant 2003

NHLBI Clinical and Integrative Cardiovascular Science (CICS) study section 2004-2009

NHLBI Clinical Trials Study Section 2009-2013; Ad hoc member 2013-present

Editorial Board Member: Journal of the American College of Cardiology 1997-2010; American Journal of Cardiology 1999-present; Journal of Cardiovascular Therapeutics; Circulation Research

**C. Contribution to Science**

1. After the discovery of endothelial nitric oxide, co-investigators and I performed several seminal studies in the human coronary and peripheral vasculature in vivo to demonstrate the contribution of basal and stimulated nitric oxide to resting vascular tone, to endothelium-dependent vasodilation, and to exercise-induced vasodilation, and to platelet function. We subsequently described the contribution of endothelium-dependent hyperpolarizing factor (EDHF) in the human forearm circulation. Differences in NO and EDHF activities in Blacks and various disease states were investigated and a variety of interventions including angiotensin antagonists were shown to improve vascular NO bioactivity.
   1. **Quyyumi AA**, Dakak N, Andrews NP, Husain S, Arora S, Gilligan DM, Panza JA, Cannon RO III. Nitric oxide activity in the human coronary circulation: Impact of risk factors for coronary atherosclerosis. J Clin Invest 1995;95:1747-1755. PMID: 7706483. PMCID: PMC295695.
   2. **Quyyumi AA**, Dakak N, Andrews NP, Gilligan DM, Panza JA,Cannon RO III. Contribution of nitric oxide to metabolic vasodilation in the human heart. Circulation 1995;92:320-326. PMID: 7634444.
   3. Ozkor MA, Murrow JR, Rahman AM, Kavtaradze N, Lin J, Manatunga A, **Quyyumi AA.** Endothelium-derived hyperpolarizing factor determines resting and stimulated forearm vasodilator tone in health and in disease. Circulation 2011;123(20):2244-53. PMID: 21555712. PMCID: PMC3407597.
   4. Ozkor MA, Rahman AM, Murrow JR, Kavtaradze N, Lin J, Manatunga A, Hayek S, **Quyyumi** **AA.** Differences in Vascular Nitric Oxide and Endothelium-Derived Hyperpolarizing Factor Bioavailability in Blacks and Whites. Arterioscler Thromb Vasc Biol 2014; 34(6):1320-7. PMID: 24675657 PMCID: PMC4138537.
2. We have a large database of patients undergoing cardiac catheterization, the Emory cardiovascular biobank that has been a source for multiple projects ranging from investigation of psychosocial and environmental risks for adverse cardiovascular outcomes, development of multi-biomarker risk scores, -omics research, and impact of risk factors including diabetes and other novel measures such as regenerative capacity on cardiovascular outcomes.
   1. Kelli HM, Kim JH, Samman Tahhan A, Liu C, Ko YA, Hammadah M, Sullivan S, Sandesara P, Alkhoder AA, Choudhary FK, Gafeer MM, Patel K, Qadir S, Lewis TT, Vaccarino V, Sperling LS, **Quyyumi AA**. Living in Food Deserts and Adverse Cardiovascular Outcomes in Patients With Cardiovascular Disease. J Am Heart Assoc. 2019 Feb 19;8(4):e010694. doi: 10.1161/JAHA.118.010694. PMID: 30741595.
   2. Kim JH, Hayek SS, Ko YA, Liu C, Samman Tahhan A, Ali S, Alkhoder A, Gafeer MM, Choudhary F, Bhimani R, Delawalla S, Choudhary M, Hartsfield DJ, Bliwise DL, Quyyumi AA. Sleep Duration and Mortality in Patients With Coronary Artery Disease. Am J Cardiol. 2018 Dec 18. pii: S0002-9149(18)32213-6. doi: 10.1016/j.amjcard.2018.11.057. PMID: 30598240.
   3. Samman-Tahhan AS, Hammadah M, Kelli HM, Kim JH, Sandesara PB, Alkhoder A, Kaseer B, Gafeer MM, Topel ML, Hayek SS, O'Neal WT, Obideen M, Ko YA, Liu C, Hesaroieh I, Mahar EA, Vaccarino V, Waller EK, Quyyumi AA. Circulating Progenitor Cells and Racial Differences: A Possible Contribution to Health Disparity. Circ Res. 2018 Jun 21. pii: CIRCRESAHA.118.313282. doi: 10.1161/CIRCRESAHA.118.313282. PMID: 29930146.
   4. Ghasemzadeh N, Brooks MM, Vlachos H, Hardison R, Sikora S, Sperling L, Quyyumi AA, Epstein SE. An Aggregate Biomarker Risk Score Predicts High Risk of Near-Term Myocardial Infarction and Death: Findings From BARI 2D (Bypass Angioplasty Revascularization Investigation 2 Diabetes). J Am Heart Assoc. 2017 Jul 3;6(7). pii: e003587. doi: 10.1161/JAHA.116.003587. PMID: 28673897.
3. I have investigated vascular function non-invasively in health and disease states, studied health disparities, and several lifestyle and drug interventions. We have a vascular laboratory that routinely measures endothelial function with brachial artery reactivity, arterial stiffness measurements and peripheral arterial tonometry for measuring microcirculatory function. We have shown impairments in vascular stiffness and microvascular function in Blacks compared to Whites, have shown circadian variations in these measures and prognostic value of coronary vascular endothelial function in subjects with CAD.
   1. A.Patel RS, Al Mheid I, Morris AA, Ahmed Y, Kavtaradze N, Ali S, Dabhadkar K, Brigham K, Hooper WC, Alexander RW, Jones DP, Quyyumi AA. Oxidative stress is associated with impaired arterial elasticity. Atherosclerosis 2011; 218(1):90-5. PMID: 21605864. PMCID: PMC4059070
   2. Al Mheid I, Patel R, Murrow J, Morris A, Rahman A, Fike L, Kavtaradze N, Uphoff I, Hooper C, Tangpricha V, Alexander RW, Brigham K, **Quyyumi AA.** Vitamin D status is associated with arterial stiffness and vascular dysfunction in healthy humans. J Am Coll Cardiol 2011; 58(2):186-92. PMID: 21718915. PMCID: PMC3896949.
   3. Morris AA, Patel RS, Binongo JN, Poole J, Mheid IA, Ahmed Y, Stoyanova N, Vaccarino V, Din-Dzietham R, Gibbons GH, **Quyyumi A**. Racial differences in arterial stiffness and microcirculatory function between black and white americans. J Am Heart Assoc 2013;2(2):e002154. PMID: 23568343. PMCID: PMC3647269.
   4. Hayek SS, Poole JC, Neuman R, Morris AA, Khayata M, Kavtaradze N, Topel ML, Binongo JG, Li, Q, Jones DP, Walker EK, **Quyyumi AA**. Differential effects of Nebivolol and Metoprolol on arterial stiffness, circulating progenitor cells, and oxidative stress. J Am Soc Hypertens 2015; 9(3):206-13. PMID: 25681236.
4. I have also been funded by NIH grants to investigate novel biomarkers of cardiovascular diseases. These include markers of thiol oxidative stress, genomic markers, metabolomics, transcriptomic and regenerative markers. We have shown that multimarker risk scores employing these markers are highly predictive of future adverse cardiovascular events in subjects with CAD. We have shown that circulating CD34+ progenitor cell counts are predictive of cardiovascular events suggesting that impaired regenerative capacity increase risk.
   1. Hayek SS, Sever S, Ko YA, Trachtman H, Awad M, Wadhwani S, Altintas MM, Wei C, Hotton AL, French AL, Sperling LS, Lerakis S, **Quyyumi AA**, Reiser J. Soluble Urokinase Receptor and Chronic Kidney Disease. N Engl J Med. 2015;12: 373(20):1916-25. PMID: 26539835. PMCID: PMC4701036
   2. Patel RS, Li Q, Patel RS, Li Q, Ghasemzadeh N, Eapen DJ, Moss LD, Janjua AU, Manocha P, Al Kassem H, Veledar E, Samady H, Taylor WR, Zafari AM, Sperling L, Vaccarino V, Waller EK, **Quyyumi AA**. Circulating CD34+ Progenitor Cells and Risk of Mortality in a Population with Coronary Artery Disease. Circ Res 2015;16:116(2):289-97. PMID: 25323857. PMCID: PMC4715427.
   3. Eapen DJ, Manocha P, Patel RS, Hammadah M, Veledar E, Wassel C, Nanjundappa RA, Sikora S, Malayter D, Wilson PW, Sperling L, **Quyyumi AA**, Epstein SE. Aggregate Risk Score Based on Markers of Inflammation, Cell Stress, and Coagulation is an Independent Predictor of Adverse Cardiovascular Outcomes. J Am Coll Cardiol 2013; 23: 62(4):329-37. PMID: 23665099. PMCID: PMC4066955.
   4. Patel RS, Sun YV, Hartiala J, Veledar E, Su S, Sher S, Liu YX, Rahman A, Patel R, Rab ST, Vaccarino V, Zafari AM, Samady H, Tang WH, Allayee H, Hazen SL, **Quyyumi AA**. Association of a genetic risk score with prevalent and incident myocardial infarction in subjects undergoing coronary angiography. Circ Cardiovasc Genet 2012; 5(4):441-9. PMID: 22767652. PMCID: PMC3459582.
5. I have conducted several Phase I and Phase II clinical trials to investigate the value of cell therapies in coronary and peripheral arterial diseases. For example, we conducted Phase I and II studies using granulocyte macrophage colony stimulating factor (GM-CSF) to treat patients with peripheral arterial disease and claudication in an NIH funded trial. Other studies have examined the role of increasing doses of bone marrow-derived CD34+ cells in the treatment of acute ST elevation myocardial infarction.
   1. **Quyyumi AA,** Vasquez A, Kereiakes D, Klapholz M, Schaer GL, Abdel-Latif A, Frohwein S, Henry TD, Schatz RA, Dib N, Toma C, Davidson CJ, Barsness GW, Shavelle D, Cohen M, Poole J, Moss TJ, Hyde P, Kanakaraj A, Druker V, Chung A, Junge C, Preti RA, Smith RL, Mazzo DJ, Pecora A, Losordo DW. PreSERVE-AMI: A randomized, double-blind, placebo-controlled clinical trial of intracoronary administration of autologous CD34+ cells in patients with left ventricular dysfunction post STEMI. Circ Res. 2016 Nov 7. pii: CIRCRESAHA.115.308165. PMID:” 27821724.
   2. Subramaniyam V, Waller EK, Murrow JR, Manatunga A, Lonial S, Kasirajan K, Sutcliffe D, Harris W, Taylor WR, Alexander RW, **Quyyumi AA**. Bone marrow mobilization with granulocyte macrophage colony-stimulating factor improves endothelial dysfunction and exercise capacity in patients with peripheral arterial disease. American Heart Journal 2009; 158(1):53-60. PMID: 19540392
   3. Poole J, Mavromatis K, Binongo JN, Khan A, Li Q, Khayata M, Rocco E, Topel M, Zhang X, Brown C, Corriere MA, Murrow J, Sher S, Clement S, Ashraf K, Rashed A, Kabbany T, Neuman, R, Morris A, Ali A., Hayek S, Oshinski J, Yoon YS, Waller EK, **Quyyumi AA**. Effect of Progenitor Cell Mobilization With Granulocyte-Macrophage Colony-Stimulating Factor in Patients With Peripheral Artery Disease: A Randomized Clinical Trial. JAMA 2013; 25:310(24):2631-9. PMID: 24247554

**Complete List of Published Work in MyBibliography:** <http://www.ncbi.nlm.nih.gov/pubmed/?term=quyyumi%2C+a> Selected from >400.

D. Research Support

**Ongoing Research Support**

**1. South-East Enrollment Center (SEEC)**

Principal Investigator: Michael Zwick Co-Investigator: Arshed A. Quyyumi

Agency:  NIH/Sub to University of Miami Type:  UG3/UH3 Period 2017-2019

Create a central repository by engaging subjects from the Emory Healthcare system for the Precision Medicine Initiative (PMI).

**2. Granulocyte-Macrophage Colony Stimulated Factor (GM-CSF) in Peripheral Arterial Disease**

Principal Investigator: Arshed A. Quyyumi

Agency: NIH;NHLBI Type: 1R61HL138657-02 Period: 2017-2022

The trial aims to investigate whether administration of GM-CSF will improve claudication in patients with peripheral arterial disease.

**3. Georgia Diabetes Translation Research Center**

Principal Investigator: Venkat Co-Investigator Core Project Leader: Arshed A. Quyyumi

Agency:  NIH Type:  1P30DK111024-03S1                   Period 2016-2020

The Core lead by Dr Quyyumi in this Diabetes Center grant is to support health disparity implementation research in prevention or treatment of diabetes.

**4. Expectations of Discrimination and CVD risk in African-American Women**

Principal Investigator: Tene Lewis Co-Investigator: Arshed A. Quyyumi

Agency:  NIH Type:  1 R01 HL130471-04                   Period 2016-2019

The main goals of these projects research is designed to determine whether a novel, racism-related stressor “expectations of racism” is a risk factor for early CVD in African-American women.

**5. Social Stressors, Inflammation**

Principal Investigator: Tene Lewis Co-Investigator: Arshed A. Quyyumi

Agency:  NIH Type:  1R01AR070898-03                   Period 2016-2021

The main goal of these projects research is designed to determine Social Stressors and Atherosclerosis in African-American Women with Lupus.

**6. Adverse effects of RBC transfusions. A unifying hypothesis**

Principal Investigator: John Roback; Co- Investigator: Arshed A. Quyyumi

Agency: NIH; NHLBI Type: 5R01HL095479-08 Period: 2014-2019

The mail goal is to study the effects on nitric oxide of old and fresh blood transfusions.

**7. Hypertension Angiotensin Receptor Blockers and Cognition; Effects and Mechanism**

Principal Investigator: Ihab Hajjar; Co-Investigator: Arshed A. Quyyumi

Agency: NIA Type: 5R01AG042127-06 Period: 2013-2019

Main goal is to investigate the effects of candesartan on executive function decline and on change in cerebral perfusion, cerebrovascular reserve and microvascular brain injury.

**8. The role of the renin-angiotensin-endothelial pathway in AD**

Co-Principal Investigators: Arshed A. Quyyumi; Ihab Hajjar

Agency: NIH: NIA Type 3RF1AG051633-01S2 Period: 2015-2020

The main goal of this project research is to identify the contribution of vascular dysfunction and its associated molecular mechanisms related to the endothelial and angiotensin pathways in AD.

**9. Diverse Roles of Reactive Oxygen Species and Inflammation in Vascular Disease**

Principal Investigator: K. Griendling; Co-Investigator: Arshed A. Quyyumi

Agency: NIH: NHLBI 2P01HL086773-08 Period: 2015-2020

The main goals are to better understand how specific proteins regulate, or are regulated by, reactive oxygen species and inflammation, with the goal of developing novel targeted therapeutic strategies for atherosclerosis.

**10. PTSD and Ischemic Heart Disease Progression: A Longitudinal Twin Study**

Co-Principal Investigators: Viola Vaccarino; Arshed A. Quyyumi

Agency: NIH Type: 1R01HL125246-04 Period 2015-2019

Oversee the progenitor cell assays, vascular function and inflammatory measures in a longitudinal twin study.

**11. Impact of a Technology-based eintervention on Cardiovascular Health among blacks**

Co-Principal Investigators: Arshed Quyyumi; Herman Taylor

Agency: AHA Type: 15SFCRN23910003 Period: 2015-2019

The main goal of this study is to identify community, individual and biological factors that promote resilience to cardiovascular disease in African Americans.

**12. Emory Cardiovascular Biobank**

Principal Investigator: Arshed A. Quyyumi

Agency: Emory Clinical Cardiovascular Research Institute Period: 2004-2019

Exploring biomarkers of CHD risk in a large, ethnically/racially diverse population from Emory University hospital and affiliated hospitals/clinics.

**13. MIBS: Mental Stress Ischemia: Biofeedback Study**

Site PI: Arshed A. Quyyumi

Agency: University of Alberta RES#0016825 Period: 2015-2020

Evaluate the effects of biofeedback on myocardial blood flow using PET.

**14. Serious Hazards of Transfusion & Cellular Therapies: Mechanisms and Intervention**

Co PI: Arshed A. Quyyumi; John Roback

Agency: NIH;NHLBI 5P01HL086773-09 Period: 2015-2020

This P01 investigates non-infectious adverse effects of blood transfusion.

**15. Healing Hearts, Mending Minds in Older Persons Living with HIV**

Co PI: Arshed A. Quyyumi; Waldrop-Valverde, Gary

Agency: NIH R01NR014973 Period: 2015-2019

Study of efficacy of the Let’s Move Program on vascular function.

**16.** **Emory Specialized Center of Research Excellence (SCORE) on Sex Differences**

Principal Investigator: Igho Ofotokun; Co-Investigator: Arshed A Quyyumi

Agency: NIH National Institute of Aging U54AG062334-01 Period: 2018-2023

Evauate subclinical cardiovascular disease in women with HIV.

**17. Mechanism of microvascular and sensory nerve dysfunction in non-hispanic Blacks**

Principal Investigator: Geoffrey Wong; Site PI: Arshed A. Quyyumi

Agency: NIH;NHLBI1R01HL141205-01GA State SubSP00013297 Period: 2018-2022

The main aims for this award is 1) determine the contribution of NO to cutaneous microvascular vasodilation in NT and PreHT NHB and NHW, and 2) determine the contribution of ET-1 to cutaneous microvascular vasodilation in NT and PreHT NHB and NHW.

**Completed Research Support**

**1. Phase II study: Mobilization of progenitor cells in peripheral arterial disease**

Principal Investigator: Arshed A. Quyyumi

Agency: NIH Type: 1RC2HL101515-01 Period: 2009-2013

Major goal is to determine whether granulocyte macrophage colony stimulating factor will improve claudication and endothelial dysfunction by mobilizing progenitor cells in patients with peripheral arterial disease.

**2. Mental Stress Ischemia-Prognosis and Genetic Influences**

Principal Investigator: Arshed A. Quyyumi

Agency: NIH Type: 5P01HL101398-05 Period: 2009-2016

To study the vascular and ischemic effects of mental stress in patients with coronary artery disease.

**3. Metabolomics of subclinical and clinical cardiovascular disease**

Co-Principal Investigator: Dean P. Jones; Co-Principal Investigator: Arshed A. Quyyumi

Agency: NIH Type: 1P20HL113451-04 Period: 2012-2017

The main goal of this study is to investigate Metabolomics of cardiovascular phenotypes.

**4. Mental Stress and Myocardial Ischemia after MI: Sex Differences and Mechanisms**

Principal Investigator: Viola Vaccarino; Co-Investigator: Arshed A. Quyyumi

Agency: NIH Type: 1 R01 HL109413-03 Period 2012-2017

To evaluate myocardial ischemia due to psychological stress in young women after recent MI

**5.Heart Failure Clinical Trials Network.**

Principal Investigator: Andrew Smith; Co-Investigator: Arshed A. Quyyumi

Agency: NIH; NHLBI 5U10HL110302-04 Period 2012-2018

Perform trials on subjects with heart failure as part of the NHLBI network.