CURRICULUM VITAE

Steven A. Fisher M.D.

Professor, Department of Medicine

University of Maryland School of Medicine

April 21, 2016

20 Penn Street, #HSFII S12a Married to Cindy Fisher with 3 children

Baltimore, MD 21201

410-706-4534

email: SFisher1@medicine.umaryland.edu

**EDUCATION**

1978 B.A. Central High School of Philadelphia

1982 B.S. University of Pennsylvania

Majors in biology and anthropology. Graduated cum laude

1986 M.D. University of Pennsylvania

 Honors in Basic Sciences with a dean's citation

**POST GRADUATE EDUCATION AND TRAINING**

1986-1989 Internal Medicine Resident University of Pittsburgh Presbyterian University Hospital

1989-1993 Cardiology Fellow Medical Center Hospital and University of Vermont

1990-1992 Research Postdoctoral Fellow University of Vermont

**BOARD CERTIFICATION**

Internal Medicine 1991

Cardiovascular Medicine 1993; re-certified 2004,2014

**MEDICAL LICENSURE**

Medical Board of Pennsylvania Inactive 1988

Medical Board of Vermont Inactive 1989

Medical Board of Ohio Inactive 1993

Maryland Board of Physicians Active 2011

**EMPLOYMENT HISTORY**

1993 - 1995 Research Associate, Case Western Reserve University

1995 - 1996 Instructor, Case Western Reserve University, Dept. of Medicine

1996 - 2002 Assistant Professor of Medicine and Physiology and Biophysics, Case Western Reserve University School of Medicine

2002 - 2011 Associate Professor of Medicine and Physiology and Biophysics, Case Western Reserve University School of Medicine

2005 Award of tenure, Case Western Reserve University

2011- Professor, Departments of Medicine and Physiology, University of Maryland School of Medicine

2016- Veterans Administration attending physician, 2/8th effort

**PROFESSIONAL SOCIETY MEMBERSHIPS**

1996 - Present American Heart Association-Basic Research Council

1996 - Present American Physiological Society

1998 - 1999 International Society for Heart Research

2001 - 2004 American Society of Biochemistry and Molecular Biology

2005 - Present American Society of Clinical Investigation

**HONORS AND AWARDS**

Graduated cum laude, University of Pennsylvania

Dean’s citation for honors in the Basic Sciences, University of Pennsylvania School of Medicine

1990-1992 NIH Training grant

1994 NIH Training Grant

1998 Astra-Merck Cardiovascular Young Investigator Award finalist

2000 Weinstein Heart Development meeting- Best abstract

2003 Porter FASEB Minority travel award (to Michael Payne)

2005 American Society of Clinical Investigation

2010 Best Doctors in Cleveland

2010 Markwald award, Weinstein Heart Development Meeting

2012 Weinstein meeting, Travel award for best poster (K. Doreswamy)

2013 Best Doctors

2013 Best basic science paper, Dept of Medicine, Univ of Maryland-Baltimore

2014 Distinguished Service Award, Physiological Genomics Group of APS

**ADMINISTRATIVE SERVICE**

**INSTITUTIONAL SERVICE**

Case Western Reserve University

1994-2011 Interviewer for Division of Cardiology fellowship applicants, Interviewer for Division of Pediatric Cardiology fellowship applicants

1994-2001 Attending cardiologist at University Hospitals; Wade Park VA Hospital

1997-2005 Institutional Biosafety Committee

1995-2005 Thesis committees: Albert Rhee, Ossama Lashin, Devi Pedmandban, Eric Wright, Eric Morgan, Kristen King, Julie Rennison, Tony Prodoscimo, Obinna Ndubuizu (MD/PHD) -Dept of Physiology

1995-2005 Mentor for Dept. of Physiology Summer Undergraduate Research Program (SURP)

2001-2011 Member of Dept. of Medicine Ad Hoc Committee on Basic Cardiovascular Science

2002-2004 Grant reviewer for the Presidential Research Initiative

2001-2006 Director of Cardiology fellows’ seminar series,

2003-2008 Mentor for CWRU Health Careers Enhancement Program for Minority Students

2003-2011 Dept. of Medicine intern recruitment committee

2003 Participant in Dept. of Physiology scientific retreat

2004-2009 Mentor for Cleveland High School Student Scientific Enrichment and Opportunity Program

2005 Participant in Dept. of Physiology scientific retreat

2005-2006 Chief of Cardiology search committee

2005-2008 Committee on Appointments, Promotion and Tenure, Dept. of Medicine

2005-2009 Lepow Day medical student research committee

Steering Committee for the NHLBI T35 “Research Training in Heart, Lung and Blood Disorders”

2006 Co-organizer for the Cleveland Cardiovascular research retreat

2008 Participant in Dept. of Physiology scientific retreat

University of Maryland School of Medicine

2012- Attending Physician, Progressive Cardiac Care and Consult services, 4-8 weeks/yr

2012- Attending Physician, Baltimore VA Hospital Cardiology service, 2-6 weeks/yr

2012-13 Dept of Physiology faculty search committee

2012,2013 Cardiovascular (and Muscle Biology) Retreat, Organizer

2013-15 MSTP Advisory Committee

2013-15 Medical school interviewing committee

2013- Dept of Medicine, Publications review Committee

2013-16 Thesis committees: Haouyue Zhang (UMD), Kelly O’Connell, Peter Hecker

 2014-16 Division of Cardiovascular Medicine, Research Executive Committee

2016- Institute for Global Health, Univ of Maryland SOM, Affiliate Member

**LOCAL AND NATIONAL SERVICE**

1997 “What’s New in Cardiovascular Research” to Cleveland Regional Association of Biology Teachers. Sponsored by the Northeast Ohio AHA

1997 A Gem of an Evening: Northeast Ohio AHA Fundraiser: research poster presentation

1999 Reviewer for the South Carolina Commission on Higher Education Research Initiative

1998-2001 Ohio Valley American Heart Association study section

2002 Invited expert for workshop on “The role of environmental agents in cardiovascular disease,” subgroup #6: Environmental toxicity and cardiovascular development. Sponsored by the NIEHS, US EPA, NHLBI, AHA and St. Jude Medical Foundation

2002 SPEP: US EPA STAR program: Airborne Particulate Health Effects: Cardiovascular mechanisms

2002-2004 National American Heart Association, Cell and Molecular Biology 2 study section

2003 NIH Cardiovascular-A study section, ad hoc

2004-2008 NIH Cardiovascular development and differentiation (CDD) study section, charter member

2004 SPEP, NIEHS/EPA RFA Airborne pollutants and cardiovascular disease

2005 NIH/NHLBI SPEP R01 grant reviewer (2)

2006 NIH NCRR COBRE review SPEP, ZRR1-R1-8

2006 NIH NHLBI SPEP Biologic Regeneration Partnership ZRG-1 CVS- P50

2006 American Diabetes Assn., ad hoc grant reviewer

2006-2007 Ohio Valley American Heart Association Research Committee

2006-2008 Agence Nationale de Recherche, France- ad hoc grant reviewer

2006-2009 Johns Hopkins Particulate Matter Research Center, Scientific Advisory Committee (SAC)

2008 Chairman, Integrated Responses to Tissue Hypoxia study section, Dept of Defense

2009 NIH SPEP ZRG1 CVRS-F, Cardiac Hypertrophy

2009 NIH/NHLBI HL-09-002 NHLBI Cardiac Development Consortium,U01, study section member

2009 NIH American Reinvestment and Recovery Act, grant reviewer

2009 NIH ARRA AREA grants Panel 10 (ZRG1 CVRS-F 52R), reviewer

2009 2010 South Carolina EPSCoR/IDeA grants (GEAR), reviewer

2010,11 Agence Nationale de Recherche, France- ad hoc grant reviewer

2011 NIH SPEP, ZRG1 CVRS-L (02) M, CDD Members panel review

2011 NIH ZRG1 CVRS-B Member Conflict CV Sciences study section

2011 Chair, AHA National meeting: Vascular Development, Differentiation and Regeneration

2011 US-Israel Binational Science Foundation, grant reviewer

2012 NIH Cardiovascular development and differentiation (CDD) study section, ad hoc reviewer

2012-4 APS Physiological Genomics Steering Committee Member, Newsletter Editor

2013 NIH/NHLBI SPEP 2013 NITM (OA) 1, T-32 training grants, ad hoc reviewer

2014 Co-organizer, 1st Physiological Genomics Group Conference, EB mtg

2014-16 NIH SPEP ZHL-1 CSR-F (O2), Mentoring programs to promote diversity in health research

2015 NIH SPEP ZRG1 CVRS-C-02, Member Conflicts Special emphasis panel

2015,16 American Heart Association, Cardiac Bio Reg - BSci 7 study section

2017 Co-chair, American Heart Association, Cardiac Bio Reg - BSci 5 study section

 2016-7 NHLBI Programs to increase Diversity in Health Related Research (PRIDE), mentor

 2017 NIH Molecular and Integrative signal transduction (MIST) study section

Editorial board member:

*Journal of Molecular and Cellular Cardiology*

*Developmental Dynamics*

*Translational Medicine*

*American Journal of Physiology-Heart*

Ad hoc reviewer for: *Acta Physiologica*  *American Journal of Physiology-Cell*

*Birth Defects Research Assn Biophysical Journal*

*BBRC J Neurochemistry*

*Circ British Journal of Pharmacology*

*Circ Res Cell and Tissue Research*

*Development PLos Genetics*

*Developmental Biology Poultry Science*

*Anatomical Record Journal of Cell Physiology*

*Antioxidants and Redox Signaling J Clinical Invest*

*Microvascular Research J Vasc Research*

*Mechanisms of Ageing and Development Physiol Genomics*

*Histol and Histopathol African Journal of Biotechnology*

**Teaching Activities – Case Western Reserve University/University Hospital**

1994-present PHOL 514/518 Cardiovascular Physiology, 5-10 Graduate Students, 6-10 hrs/yr

1995-2006 Homeostasis I, Medical Students Year 1, Cardiovascular committee, 150 Year 1 Medical Students,

 6-10 hrs/yr

1998-2000 PHOL 532 Molecular organization of cells, 5-10 Graduate Students, 6 hrs/yr

2000-2008 Cardiology fellow school: Molecular mechanisms of cardiovascular disease, Cardiology Fellows, 1-2 hr lecture

2003-2007 Medical residents lecture: Molecular mechanisms of cardiovascular disease, Internal Medicine Residents, 1-2 hr lecture

2003-2007 Ambulatory medicine clerkships: third year

2005-2007 School of Medicine Curriculum reform committee, Block 4

2006-2009 School of Medicine WR2 curriculum, Block 4 Cardiovascular section, Co-director

2006-2009 Block 4 Lectures on Heart and Vascular Function and Review Sessions, 150 Year 1 Students, 10 hrs/yr

2006-2007 Case SOM Scholars Collaboration in Teaching and Learning

2006 Back to basics- cardiovascular- 3rd year medical school 2 hour interactive session, 150 -3rd Year Medical Students

2007 Block 4, Medical student IQ small group leader, 10 – 15 Year 1 Medical Students, 50 hrs

2007-2008 Case SOM, third year case studies, Aortic valve disease, medium groups, 3 hrs per quarter

Hospital Inpatient Cardiology Service Internal Medicine Residents and Cardiology fellows, 40 3rd Year Med Students, 250 hrs/year

2008 Back to basics- cardiovascular- 3rd year medical school 2 hour interactive session, 150- 3rd Year Medical Students

2009 Valvular heart disease lecture, Dept. of Family Medicine residents, 5-10 Family Medicine Residents, 2 hrs

**Teaching Activities – University of Maryland school of medicine**

2011 EKG small groups

2012 Hemodynamics- small groups

2012 Medical School Yr 2, Cardiac pathophysiology and therapeutics, Small Groups, 8 hrs

2013 Medical School Yr 1, Heart failure, 2 lectures

2013- GPLS 715 Muscle Cell Biology and Development, Heart Failure, 3 hrs (2 sessions)

2013- GPLS 750 Topics in Molecular Medicine, Heart Failure, 3 hrs (2 sessions)

2017 GPLS 645 Cell +Systems Physiology, CV System Overview + Cardiac Cycle 3 hrs (2 sessions)

**FELLOWS and STUDENTS DATES CURRENT ACTIVITY**

Ernest Siwik MD Ped Card Fellow 95-96 Assoc Professor, LSU + staff CCF

Denver Sallee MD Ped Card Fellow 98-99 Asst Professor, Emory University

Wessel Dirksen PhD Post-doctoral fellow 97-02 Senior Research Assoc, OSU-DVM

Kathy Schaeffer PhD Post-doctoral fellow 00-02 Assoc Prof w tenure, Randolph College

Jai Khatri MD Med resident/post-doc 99, 00-01 Private practice cardiologist

Y Sugishita MD PhD Adult Cardiology fellow 01-04 Dept of Cardiology, Kanto Central Hosp,

Supriya Shukla PhD Post-doctoral fellow 02- 09 Senior Research Associate, CWRU

Hai-ying Zhang MD Post-doctoral fellow 05-08 Pathology Resident, U Arizona

Lu Yuan MD Post-doctoral fellow 04-06 Instructor, CWRU

Hongbin Liu PhD Post-doctoral fellow 06-10 Masters Genetic Counseling, Arcadia College

Praveen Pakeerappa MD Research Associate 2008-2010

Liping Luo, PhD Research Associate 2010-11 Senior Res Assoc CWRU

Fukang Fu, MDPhD Research Associate 2010-11 Biotech company, China

Congli Cai, PhD Research Associate 2010-2011

Hema Raina, PhD Research Associate 2011-2012 Health Care Admin

K Doreswamy,PhD Research Associate 2011-

Xiaoxu Zheng, PhD Research Associate 2011-4 Research Associate, UMB

Uday Maachani, PhD Research Associate 2012 NIH post-doctoral fellow

John Reho, PhD Research Associate 2012-15 University of Iowa

Rachael Dippold, PhD Research Associate 2012-4 Law school-patent law

Irina Kolosova, PhD Research Associate 2012-3

Mariam Meddeb, MD Volunteer 2016-7 Medical resident

Kenneth Gresham Graduate student 2009

Andrew Rassi Pre-med student- indep study 2002 Cardiology fellow, Cleveland Clinic

Karen Knopp Pre-med student 6/97-9/97 Medical student, U Pittsburgh

Kate Joyce Pre-med student (Villanova) Summer 1999-2000; 2002-3 Ped resident, RB&C

Ekaterina Katsmann Pre-med student Summer2002 Case student

Kate Bundy Pre-med student Summer 2003 John Carroll Undergraduate

Jon Rassi Pre-med student Summer 2005 Case medical student

Arene Butto Pre-med AHA fellow Summer 2006 Case medical student

Rachel Whitsel CWRU undergrad Summer 2001

N. D. Dharmadhikari CWRU undergrad Summer 2010

Lediani Goduni CWRU undergrad 2010-2011

Olu Sengabore CWRU Medical student Summer 2004 Case student

Hjon Jae Lee Medical student Crile Fellowship 2006 Internal Medicine Resident, BI

Greg Lessans UMB medical student Summer 2012

Andrew Wescott UMB MD/PhD student Summer 2012, rotation

James Benjamin UMB medical student, HP STAR program Summer 2013

Kim Oslin Univ of Maryland student, Summer 2016 UM Scholars research program

**GRANT SUPPORT**

**Current:**

9/2015-8/2019 Co-PIs: Steven A. Fisher and Christopher Plowe

 Variant surface antigens in cerebral malaria pathogenesis

 NIH/NHLBI R01 130750

 Annual direct costs: $311,738

9/2015-3/2017

PI: Steven A. Fisher

Novel models to study effect of high altitude hypoxic exposure and placental insufficiency on fetal oxygen metabolism and congenital heart defects

 Dept of Defense Discovery Award W81XWH-14-PRMRP-DA

 Total direct costs: $307,000

4/2017-3/2021 Co-PIs: Gil Wier and Mark Rizzo

 Co-Investigator: Steven A. Fisher

 Creation of optical biosensor mice for longitudinal studies of vascular function

NIH/NHLBI R01 122827

Annual Direct costs: $250,000

**Past:**

2/10-4/16 Steven A Fisher (PI, 35%) (NCE)

 Smooth muscle myosin phosphatase subunit isoforms

 NIH/NHLBI R01 HL66171-14

 Annual Direct Costs: $250,000/yr

 Total Direct Costs: 1 million dollars

7/10-6/14 P.I. Steven A Fisher (PI, 35%) (NCE)

 Tissue hypoxia in cardiac morphogenesis

 NIH/NHLBI R01 HL65314-14

 Annual Direct Costs: $250,000/yr

 Total Direct Costs: 1 million dollars

2012- Training Grant in Cardiovascular Cell Biology (PI) (NCE

T32 HL-072751

4/1/03-7/31/14

7/1/95-6/30/00 Steven A Fisher (PI, 80%)

 Regulation of Smooth Muscle Myosin Light Chain Kinase Expression

 NIH NHLBI K08

 Annual Direct Costs: $84,000

 Total Direct Costs: $418,230

7/96-6/98 Steven A Fisher (P.I., )

 Transcriptional Controls in the Developing Embryonic Chick Heart Northeast Ohio AHA Grant-in-Aid

 Total Direct Costs: $60,000

1/98-1/01 Steven A. Fisher (P.I.)., )

 Cell and Molecular Mechanisms of Outflow Tract Morphogenesis

 National AHA Grant-in-Aid

 Total Direct Costs: $195,000

7/00-6/05 Frank Brozovich (P.I.) Steven A Fisher (Co-I. 15%)

 Regulation of smooth muscle contractile properties

 NIH/NHLBI R01

 Annual Direct Costs $250,000

 Total Direct Costs $1,000,000

2/01-2/05 Steven A Fisher (P.I., 35%)

 Smooth muscle myosin phosphatase subunit isoforms

 NIH/NHLBI R01 HL66171

 Annual Direct Costs: $175,000/yr

 Total Direct Costs: $700,000

2/05-2/10 Steven A Fisher (P.I., 35%)

 Smooth muscle myosin phosphatase subunit isoforms

 NIH/NHLBI R01 HL66171

 Annual Direct Costs: $200,000/yr

 Total Direct Costs: $800,000 dollars

7/00-7/05 Steven A Fisher (P.I., 35%)

 Tissue hypoxia in cardiac morphogenesis

 NIH/NHLBI R01 HL65314

 Annual Direct Costs: $200,000/yr

 Total Direct Costs: 1 million dollars

7/05-6/10 Steven A Fisher (P.I., 35%)

 Tissue hypoxia in cardiac morphogenesis

 NIH/NHLBI R01 HL65314

 Annual Direct Costs: $225,000/yr

 Total Direct Costs: $900,000

**Provisional Patent# 62312196:2016:** A genome editing system and methods to lower blood pressure. Issued to Steven A Fisher and the University of Maryland-Baltimore

**PUBLICATIONS**

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1ZoH7WqyInQ5/bibliography/41169007/public/>

1. **Fisher S**, Buttrick P, Sukovich D, Periasamy M. Characterization of Promoter Elements of the Rabbit Cardiac Sarcoplasmic Reticulum Ca2+ATPase Gene Required for Expression in Cardiac Muscle Cells. Circ Res 1993;73:622-628. PMID: 8370120.
2. **Fisher S** and Periasamy M. Collagen Synthesis Inhibitors Disrupt Embryonic Cardiocyte Myofibrillogenesis and Alter the Expression of Cardiac Specific Genes in vitro. J Mol Cell Cardiol 1994;26:721-731. PMID: 7522275.
3. **Fisher S** and Absher M. Norepinephrine and AngII stimulate secretion of TGF- by neonatal rat cardiac fibroblasts in vitro. Am J Physiol 1995; 268:C910-917. PMID: 7733239.
4. Andres V, **Fisher S**, Wearsch P and Walsh K. Regulation of Gax Homeobox Gene Transcription by a Combination of Positive Factors Including MEF-2. Mol Cell Biol 1995; 15:4272-4281. PMID: 7623821. PMCID – PMC230666
5. **Fisher S** and Ikebe M. Developmental and Tissue Distribution of Expression of Non-Muscle and Smooth Muscle Isoforms of Myosin Light Chain Kinase. Bioch Biophy Res Comm 1995, 217: 696-703. PMID: 7503753.
6. **Fisher S**, Walsh K and Forehand C. Characterization of Cardiac Gene cis-Regulatory Elements in the Early Stages of Chick Heart Morphogenesis. J Mol Cell Cardiol 1996; 28:113-122 PMID: 8745219.
7. **Fisher S** and Watanabe M. Expression of exogenous protein and analysis of morphogenesis in the developing chicken heart using an adenoviral vector. Cardiovascular Research 1996, 31: 86-95 PMID: 8681350.
8. Slinker B, Stephens R, **Fisher S** and Yang Q. Immediate Early Gene Responses to Different Cardiac Loads in the Ejecting Rabbit Left Ventricle. J Mol Cell Cardiol, 1996, 28:1565-1574 PMID: 8841944.
9. **Fisher S**, Ikebe M and Brozovich F. Endothelin-1 Alters the Contractile Phenotype of Cultured Embryonic Smooth Muscle Cells. Circ Res, 1997, 80: 885-893. PMID: 9168792.
10. **Fisher S**, Siwik E, Scopicki H, Branellec D, Walsh K and Watanabe M. Forced Expression of the Homeodomain Protein Gax inhibits Cardiomyocye Proliferation and Perturbs Heart Morphogenesis. Development, 1997, 124:4405-4413. PMID: 8334288.
11. Watanabe M, Choudhry A, Berlan M, Singal A, Siwik E, Mohr S and **Fisher S** Developmental Re-modeling and Shortening of the Cardiac Outflow Tract Involves Myocyte Programmed Cell Death. Development, 1998, 125: 3809-3820. PMID: 9729489.
12. Huang Q, **Fisher S** and Brozovich F Forced expression of essential myosin light chain isoforms demonstrates their role in smooth muscle force production. J Biol Chem, 1999, 274:35095-35098. PMID: 10574990.
13. Dirksen W, Vladic F and **Fisher S.** A myosin phosphatase targeting subunit isoform transition identifies a smooth muscle developmental phenotypic switch. Am J Physiol Cell Physiol, 2000,278:C589-600. PMID: 10712248.
14. Smith PG, Roy C, **Fisher S**, Huang QQ, and Brozovich F Cellular Responses to Mechanical Stress: Mechanical strain increases force production and calcium sensitivity in cultured airway smooth muscle cells. J Appl. Physiol. 2000 89: 2092-2098. PMID: 11053368
15. **Fisher S**, Langille L, Srivastava D Apoptosis during cardiovascular development. Circ Res, 2000,87:856-864. PMID: 11073880.
16. Khatri JK, Joyce KM, Brozovich FV and **Fisher S** Role of myosin phosphatase isoforms in cGMP-mediated smooth muscle relaxation. J of Biol Chem 276, 37250-37257, 2001. PMID: 11486008.
17. Watanabe M, Jafri A, and **Fisher S** Apoptosis is required for the proper formation of the ventriculo-arterial connections. Dev Biol, 2001, 240: 274-288. PMID: 11784063.
18. Watanabe M, Hitomi M, van der Wee K, Rothenberg F, **Fisher S**, Zucker H, Svoboda K, Goldsmith E, Heiskanen K, A Nieminen The pros and cons of apoptosis assays for use in the study of cells, tissues and organs Microscopy and Microanalysis, 2002, 8, 375-391. PMID: 12533214.
19. Rothenburg F, Hitomi M, **Fisher S**, Watanabe M Initiation of apoptosis in the developing avian outflow tract myocardium. Dev Dyn, 2002,223,469-482. 11921336.
20. Dirksen W, Mohamed S and **Fisher S** Regulated splicing of MYPT1 involves intronic cis-elements and a novel exonic splicing enhancer, J Biol Chem, 2003, 278, 9722-9732. PMID: 12509424.
21. Ferrari V and **Fisher S** Imaging the embryonic heart: How low can we go? How fast can we get? J Mol Cell Cardiol, 2003, 35, 141-143. PMID: 12606254.
22. Rothenberg F, **Fisher S** and Watanabe M Sculpting the cardiac outflow tract Birth Defects Research, 2003 (Part C) 69:38-45. PMID: 12768656.
23. Payne MC, Hai-Ying Zhang, Joseph Benoit and **S Fisher** Dynamic changes in myosin phosphatase expression in a model of portal hypertension Am J Physiol Heart 2004, 286, H1801-1810. PMID: 14704233.
24. Huang QQ, **Fisher S**, Brozovich F Unzipping the role of myosin light chain phosphatase in smooth muscle cell relaxation J Biol Chem,2004, 279:597-602 PMID: 14530290.
25. Shukla S, Dirksen W, LeGuinier, C Breathnach R and **Fisher S** TIA-1 is a necessary but not sufficient for tissue-specific splicing myosin phosphatase targeting subunit 1, J Biol Chem, 2004, 279, 13668-13676. PMID: 14736875.
26. Schaeffer K, Doughman YQ, **Fisher S**, Watanabe M Dynamic Patterns of Apoptosis in the Developing Heart, Dev Dyn, 2004, 229:489-499. PMID: 14991705.
27. Sugishita Y, Watanabe M, **Fisher S** Role of myocardial hypoxia in the remodeling of the embryonic avian cardiac outflow tract, Dev Biol, 2004, 267, 294-308. PMID: 15013795.
28. Sallee D, Watanabe M and **Fisher S** Fas ligand gene transfer to the embryonic heart induces the program of cell death and outflow tract defects, Dev Biol, 2004, 267, 309-319. PMID: 15013796.
29. Sugishita Y, Leifer D, Agani F, Watanabe M, **Fisher S** Hypoxia-responsive signaling regulates the apoptosis-dependent remodeling of the embryonic avian cardiac outflow tract, Dev Biol, 2004, 273:285-296. PMID: 15328013.
30. Sugishita Y, Watanabe M, Fisher S The development of the myocardial portion of the embryonic outflow tract provides novel insights into cardiac differentiation and remodeling, Trends in Cardiovascular Medicine, 2004, 14:235-241. PMID: 15451515
31. Shukla S, Dirksen W, LeGuinier, C Breathnach R and **Fisher S** Competition between TIA-1 and PTB for binding to a U-rich cis-element determine the tissue-specific splicing of myosin phosphatase targeting subunit 1, RNA, 2005, 11:1725-36. PMID: 16177139 PMCID – PMC1370859
32. Payne MC, Hai-Ying Zhang, Dominic Prodoscimo and **Fisher S** Myosin phosphatase isoform switching in vascular smooth muscle development, J Mol Cell Cardiol, 2006,40:274-282. PMID: 16356512.
33. Wikenhiser J, Doughman Q, **Fisher SA** and Watanabe M Differential levels of tissue hypoxia in the developing chick heart, Dev Dyn, 2006, 235:115-123. PMID: 16028272.
34. Egelhoff,TT and **Fisher SA** Cardiac myocyte cytokinesis: The contractile ring is the thing, J Mol and Cell Cardiol, 2006,41:592-594. PMID: 16934289.
35. Zhang HY and **Fisher SA** Conditioning effect of blood flow on resistance artery smooth muscle myosin phosphatase, Circ Res, 2007,100:730-737. PMID: 17293476.
36. **Fisher S** and Burggren W Role of hypoxia in the development and evolution of the cardiovascular system, Anti-oxidants and Redox Signaling, 2007,9:152-159. PMID: 17627471
37. **Fisher SA** The developing embryonic cardiac outflow tract is highly sensitive to oxidant stress. Dev Dyn. 2007 Dec;236(12):3496-502. PMID: 17994543. PMCID – PMC2694184
38. Lu Y, Zhang H, Gokina N, Mandala M, Sato O, Ikebe M, Osol G, **Fisher SA**. Uterine artery myosin phosphatase isoform switching and increased sensitivity to SNP in a rat L-NAME model of hypertension of pregnancy. Am J Physiol Cell Physiol. 2008 Feb;294(2):C564-71. PMID: 18094148.
39. Liu HL and **Fisher SA** Hypoxia-inducible transcription factor-1 triggers an autocrine survival pathway during embryonic cardiac outflow tract remodeling, Circ Res, 2008;102(11):1331-9. PMID: 18467628. PMCID – PMC2737447
40. Shukla S and **Fisher SA** Tra2 as a novel mediator of vascular smooth muscle diversification, Circ Res, 2008, 103:485-492. PMID: 18669920.
41. Zhang HY, Pakeerappa P,Lee HJ and **Fisher SA** Induction of PDE5 and de-sensitization to endogenous NO signaling in a systemic resistance artery under altered flow, J Mol Cell Cardiol, 2009;47:57-65 PMID: 19374906. PMCID – PMC2798812
42. Liu H, Yang Q, Radhakrishnan K, Whitfield DE, Everhart CLM, Parsons-Wingerter P, **Fisher SA** Role of VEGF and tissue hypoxia in patterning of neural and vascular cells recruited to the embryonic heart, DevDyn,2009, 238:2760-2769 PMID: 19842184. PMCID – PMC2825682
43. Wikenheiser J, Wolfram J, Gargesha G, Yang K, Karunamuni G, Wilson DL, Semenza GL, Agani F, **Fisher SA**, Ward N, Watanabe, M Altered Hypoxia-inducible factor-1 alpha expression levels correlate with coronary vessel anomalies, Dev Dyn, 2009;238: 2688-2700 PMID: 19777592. PMCID – PMC3724469
44. **Fisher SA**, Vascular smooth muscle phenotypic diversity and function, Physiol Genomics, 2010:42A: 169-187 PMID: 20736412. PMCID – PMC3008361
45. Bhetwal BP, An CL, **Fisher SA**, Perrino BA [Regulation of basal LC20 phosphorylation by MYPT1 and CPI-17 in murine gastric antrum, gastric fundus, and proximal colon smooth muscles.](http://www.ncbi.nlm.nih.gov/pubmed/21883701) Neurogastroenterol Motil, 2011 23:e425-436 PMID 21883701. PMCID – PMC3173524
46. Fu F, Mende Y, Bhetwal BP, Baker S, Perrino BA, Wirth Band **Fisher SA** Tra2b is required for tissue-specific splicing of myosin phosphatase targeting subunit alternative exon, *J Biol Chem,* 2012,287:16575-16585, PMID22437831. PMCID – PMC3351297
47. Basu S,Srinivasan DK,Yang K, Raina H,Banerjee S, Zhang R, **Fisher SA** and A Proweller Notch Transcriptional Control of Vascular Smooth Muscle Regulatory Gene Expression and Function, J Biol Chem 2013 288:11191-202 PMID 23482558. PMCID – PMC3630855
48. Zacharia J, Mauban JR, Raina H, **Fisher SA** and Wier WG High vascular tone of mouse femoral arteries is determined by sympathetic nerve activity via a1A- and a1D-adrenoceptor subtypes, PLoS One 2013, 8: e65969 PMID 23776582. PMCID – PMC3680395
49. Zheng X, Heaps CL, **Fisher SA** Myosin phosphatase isoforms and related transcripts in the pig coronary circulation and effects of exercise and chronic occlusion *Microvascular Research,* 2014 PMID 24534069
50. Reho J, Zheng X and **Fisher SA** Smooth muscle contractile diversity in the control of regional circulations, *AJP-Heart* ,2014, 306: H163-72 PMID 24186099;PMCID PMC3920130
51. Dippold R and Fisher **SA** Myosin Phosphatase isoforms as determinants of smooth muscle contractile function and calcium sensitivity of force production, *Microcirculation*, 2013 PMID 24112301
52. D Kenchegowda, H Liu, K Thompson, L Luo, SS Martinand **SA. Fisher** Vulnerability of the developing heart to oxygen deprivation as a cause of congenital heart defects, J Am Heart Assoc. 2014 May 22;3(3):e000841. doi: PubMed PMID: 24855117.
53. Reho JJ, Zheng X, Benjamin JE, **Fisher SA** Neural Programming of Mesenteric and Renal Arteries, Am J Physiol Heart Circ Physiol. 2014, 307: H563-73 PubMed PMID: 24929853.
54. Dippold R and **Fisher SA** Computational and Bioinformatic Analysis of Myosin phosphatase subunit diversity, Am J Physiol Regul Integr Comp Physiol. 2014: 307: R256-70 PMC4121627
55. Outeda, P, Huso,DL,**Fisher SA,**Halushka MK, Kim H, Qian F, Germino GG and Watnick T Polycystin signaling is required for directed endothelial cell migration and lymphatic development *Cell Reports,* 2014 May 8;7(3):634-44 PMID: 24767998; PMC4040350.
56. Yang P, Kenchegowda D and **Fisher SA** Cardiac myocyte proliferation: not as simple as counting sheep, *J Mol Cell Cardiol,* J Mol Cell Cardiol. 2014 May 17;74C:125-126. PMID: 24839912.
57. Zheng X, Reho JJ, Wirth B, **Fisher SA** Tra2b controls Mypt1 exon 24 splicing in the developmental maturation of mouse mesenteric artery smooth muscle, *Am J Physiol-Cell,*2015, 308: C289-96
58. Reho JJ, Zheng X, Asico LD and **Fisher SA** Redox signaling and splicing dependent change in myosin phosphatase underlie early versus late changes in NO vasodilator reserve in a mouse LPS model of sepsis, *AJP-Heart,* 2015, 308: H1039-50
59. Wang F, **Fisher SA,** Wu Y, Yang P Superoxide dismutase 1 in vivo ameliorates maternal diabetes-induced apoptosis and heart defects through restoration of impaired Wnt signaling, *Circulation Cardiovasc Genetics,* 2015, 8: 665-76
60. Reho JJ,Shetty A, Dippold R, Mahurkar A and **Fisher SA** Unique gene program of rat small mesenteric resistance arteries as revealed by Deep RNA Sequencing, *Physiol Reports*,2015: 3 (7)
61. Reho JJ and Fisher SA The stress of maternal separation causes mis-programming in the post-natal maturation of rat resistance arteries, *Am J Physiol-Heart,* 2015 , 309: H1468-78
62. Reho JJ, Kenchegowda D, Asico LD and **Fisher SA** A splice variant of the myosin phosphatase regulatory subunit tunes arterial reactivity and suppresses response to salt loading *Am J Physiol-Heart, 2016* PMID 27084390
63. **Fisher SA** Smooth muscle phenotypic diversity: Effect on vascular function and drug responses, *Advances in Pharmacology,* 2017, 78, 384-407

**Book Chapters**

1. Fisher S and Watanabe M An Adenoviral gene Delivery System to Study Myocyte Proliferation and Death During Cardiac Morphogenesis. In Developmental Mechanisms of Heart Disease, Eds. Clark EB, Markwald RR and Takao A, 2000:211-215
2. Fisher S Murine Cardiovascular Development, Ch 5 in Cardiovascular Physiology in the Genetically Engineered Mouse" Second Edition. Edited by Hoit BD and Walsh RA. Kluwer Academic Publishers. Norwell, MA. 2002

**Online Report**

1. S Fisher and other invited participants The role of environmental agents in cardiovascular disease. Summary of a workshop sponsored by NIEHS, US EPA, NHLBI, St Judes Medical Center. The report was published at [www.niehs.gov](http://www.niehs.gov)

**MAJOR INVITED LECTURES**

1. Medical University of South Carolina, Cardiology section “Transcriptional Regulation of the SR CaATPase Gene” April, 1993

2. UCSF, VAH, Cardiology section “Transcriptional Regulation of the SR CaATPase Gene”, May, 1993

3. St. Elizabeth’s Medical Center, Division of Cardiology, Boston, MA “Transciptional Controls in the Developing Embryonic Chick Heart”, May, 1994

4. University of Massachusetts Medical Center, Dept. of Physiology , Worcester, MA “Determinants of Smooth Muscle Contractile Properties”, September 1994

5. Weinstein Cardiovascular Development Conference “Overexpression of the Growth Arrest Homeobox (Gax) Protein with an Adenoviral Alters Early Heart Development” Children’s Hospital of Philadelphia, June 1996

6. Rammelkamp Research Center, Cleveland Metro Hospital “Molecular Determinants of Smooth Muscle Contractility”, June 1996

7. “What’s New in Cardiovascular Research” to Cleveland Regional Association of Biology Teachers. Sponsored by the Northeast Ohio AHA, March 1997

8. “Genetic Mechanisms of Cardiovascular Disease” to the Summer undergraduate Research Program for minorities (SURP), August 1997

9. Splice variants of the myosin binding subunit of myosin phosphatase and smooth muscle phenotypic heterogeneity Univ of Massachussetts, Dept of Physiology, March 1998

10. Death and differentiation in the cardiovascular system: a chick(en) story. Washington University Cardiology Research Seminar, September 2000

11. Splice variants of the myosin phosphatase and tissue-specific responses to cGMP signaling. University of Alabama-Birmingham, Department of Pathology, 2000

12. Splice variants of the myosin phosphatase and tissue-specific responses to cGMP signaling. Division of Pulmonary Medicine, Johns Hopkins University, October 2001

13. Splice variants of the myosin phosphatase and tissue-specific responses to cGMP signaling. University of Alabama-Birmingham, Division of Cardiology Grand Rounds, October 2001

14. Splice variants of the myosin phosphatase and tissue-specific responses to cGMP signaling. Cleveland Clinic Cardiology seminar series, March 2002

15. Role of apoptosis in the developmental remodeling of the cardiac outflow tract, Weill-Cornell Medical Center, Division of Cardiology Grand Rounds, March 2002

16. Role of tissue hypoxia and cardiomyocyte apoptosis in the remodeling of the embryonic cardiac outflow tract, Division of Cardiology seminar series, Stanford University, May 2002

17. Regional myocardial hypoxia triggers cardiomyocyte apoptosis and remodeling of the embryonic outflow tract Cardiology Grand Rounds, University Hospitals of Cleveland, March 2003

18. Regional myocardial hypoxia triggers cardiomyocyte apoptosis and remodeling of the embryonic outflow tract Cardiology Grand Rounds, University Calif San Diego, April 2003

19. Role of myocardial hypoxia in cardiac outflow tract remodeling, Univ of Miami, Dept of Pharmacology, May 2005

20. Blood flow conditions resistance artery smooth muscle, Ohio State Heart and Lung Institute, May 2006

21. Blood flow conditions resistance artery smooth muscle, Metro Hospital Rammelkamp Research, May 2006

22. FASEB Summer Conference, Smooth Muscle, Selected oral presentation (Yuan Lu), Hypertension of pregnancy, cGMP signaling and MYPT1 isoforms, July 2006

23. Blood flow conditions resistance artery smooth muscle, Univ of Illinois-Chicago, Department of Medicine Grand Rounds, November 2006

24. Blood flow conditions resistance artery smooth muscle, University of Chicago, Division of Cardiology Grand Rounds, May 2007

25. National AHA meeting. Mini-symposium: Micro-circulation in Health and Disease, November 2007

26. Medical University South Carolina Cardiovascular Development Retreat, March 2008

27. Univ Illinois-Chicago, Dept of Pediatrics, Role of hypoxia in heart development, May 2008

28. Case Western Reserve University, Department of Physiology and Biophysics Retreat, October 2008

29. University of Cologne, Germany Institute of Human Genetics Vascular smooth muscle diversification, February 2008

30. Case Cardiovascular V retreat, Vascular smooth muscle phenotypic diversity and function, September 2009

31. CWRU RNA Center, Regulated splicing of myosin phosphatase, December 2009

32. Medical College of Georgia Cardiology Grand Rounds, Vascular smooth muscle phenotypic diversity and function, December 2009

33. University of Pittsburgh, Division of Pulmonary Medicine, Cardiovascular coupling: smooth muscle phenotype, function and drug responses, June 2010

34. University of Pittsburgh, Division of Cardiology, Vascular diversity, function and drug responses, October 2010

35. NEOUCOM, Department of Physiology, Pharmacology and Biochemistry, Regulated expression of myosin phosphatase and vascular function, October 2010

36. University of Maryland, Division of Cardiology, Smooth Muscle Contractile Apparatus: Commonly Targeted, Poorly Understood, October 2010

37. University of Maryland, Center for Vascular Inflammation and Disease, Pulsatile blood flow conditions resistance artery smooth muscle, Oct 2011

38. University of Maryland, Dept of Physiology, Pulsatile blood flow conditions resistance artery smooth muscle, Nov 2011

39. University of Maryland, Renal Grand Rounds, Pulsatile blood flow conditions resistance artery smooth muscle, Nov 2011

40. University of Maryland Dept of Medicine Grand Rounds, Targeting vascular smooth muscle contraction: a look across the centuries, March 2012

41. University of Nevada-Reno, Dept of Physiology, Vascular smooth muscle phenotypic diversity and function, April 2012

42. Mayo Clinic, Dept of Biochemistry, Vascular smooth muscle phenotypic diversity and function, December 2012

43. Smooth Muscle Underground Satellite symposium to EB, Myosin Phosphatase, 2013

43. Symposium: “Regulatory circuits in cell motility: A celebration of Dave Hartshorne’s career”, sponsored by The Physiological Society of Philadelphia, Invited speaker “Regulation and function of myosin light chain phosphatase”, Oct 2013

44. University of Maryland Baltimore County Myerhoff Scholars Program, “CV Research Opportunities at University of Maryland School of Medicine”, November 2013

44. International Society for Applied Cardiovascular Biology, “Smooth muscle cell biology and mechanobiology, April 2014

45. National Institute of Aging, Vascular function and aging: Role of developmental programming, Jan 2015

46. Wiggers Symposium at the Experimental Biology meeting, April 2016: A splice variant of the myosin phosphatase regulatory subunit tunes arterial reactivity and suppresses response to salt loading,